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NFCC National Fire Chiefs Council

National Operational Guidance

National Operational Guidance topic	
National Operational Guidance: Water rescue (First edition, volume one)	
Change originator	
NFCC Fire Central Programme Office – National Operational Guidance content team	
Change requested	
Pre review consultation: • 17 responses for Water rescue and flooding • 14 responders graded the content as positive and high quality • Various points from the survey have been addressed by this review Each piece of National Operational Guidance should be reviewed on a three-year cycle; this review is part of that agreed process, in conjunction with a separate review of flooding, which is being amalgamated into a new piece of context guidance for Geophysical hazards. It was initially proposed that Water rescue would be combined with Search, rescue and casualty care, after the separation from flooding. However, it became apparent through feedback from stakeholders that it may lose some impact though being combined. The proposal was updated, with Water rescue becoming a standalone piece of guidance, with references to the more generic content in Search, rescue and casualty care where appropriate Trends identified through National Operational Learning have indicated an increase in the number of water rescues, and particularly rescues of submerged casualties. There has also been an increase in incidents involving emerging technologies, such as electric and hybrid road vehicles interacting with water.	
Consultation process	
The draft guidance will undergo a six-week open consultation.	
Changes proposed	**Rationale for change**
Content added to the introduction to cover the risk management planning considerations for submerged casualties, covering competence, training and risk information	To address the National Operational Learning User Group (NOLUG) recommendations on the fire and rescue approach to submerged casualty rescue
Inserted text in risk management planning for water rescue to consider the impact of climate change	To provide the ongoing consideration of a tangible, global issue that directly affects this subject area

Combined three control measures (*Appropriate techniques: Water management systems*, *Isolate water movement and holding systems*, and *Specialist advice: Water movement and holding systems*) into one control measure, *Safe system of work: Water management systems*	A more comprehensive way of presenting the content
Removed strategic actions that referred to training of personnel	Covered by training specification
Provided the expectation of JESIP to be applied at all multi-agency incidents in the introduction and removed tactical actions associated with JESIP	JESIP regarded as business as usual for all users of National Operational Guidance
New strategic action: *Identify appropriate sources of information and resources to define a water search plan and area*	To assist responding personnel access the required information when searching water
Added in further content to assist in identifying a search area	Information is a useful addition to aid search area identification
Added a dedicated hazard of *Submerged casualty*	To address the issues raised in the National Operational Learning User Group (NOLUG) case
Removal of the generic control measure *Arrangements to deal with firefighter emergencies*, as contained in the Incident command guidance. Replaced with tailored control measure *Initiate firefighter emergency: Water rescue*.	To reduce duplication of all-incident content and provide tailored guidance
Added information about the requirement for fire and rescue services to identify the limitations of their training to their personnel, clearly identifying what actions are outside of the expectations of their training. This includes a strategic action.	To support the tactical decisions made by an incident commander and to help in providing clarity at incidents involving a submerged casualty
New strategic action: *Establish memoranda of understanding with agencies that may request assistance with body recovery*	To help develop procedures and awareness on the responsibilities of body recovery
Change in when the clock can be started in the survivability model, to include when control rooms gain accurate situational awareness	To assist in reducing uncontrolled and unwanted risks being performed at incidents involving water

Added strategic action: *Consider providing appropriate equipment to facilitate safe entry and egress into water*	Added to facilitate the control measure
Archived strategic action: *Ensure staff are aware of the effects of cold water shock*	Removed as will be covered in training specifications
Linked vehicle in water hazards to transport	To maintain and improve clarity in guidance to the context where necessary
Revised strategic action and used against two control measures: *Provide appropriate communication equipment for water rescue incidents*	To assist with rescue from water
New strategic action: *Provide appropriate equipment to safely rescue casualties from a road vehicle in water*	To assist with rescue from road vehicles in water
Changed the hazard title from *Vehicle in water* to *Casualty in a vehicle in water: Rescue*	A vehicle in water is not a hazard as such within this guidance
Changed control measure title from *Evacuating road vehicles in water* to *Rescue from road vehicles in water*	This control measure was centred around stranded road vehicles in floodwater. This will be covered in Geophysical hazards. This control measure now covers elements of a rescue of people from a vehicle in water.
Added strategic action: *Consider providing the necessary equipment for a suitable assessment and treatment of a casualty in water*	Expanded control measure knowledge and a lack of an appropriate strategic action
Added into control measure knowledge, a consideration for emergency water rescue teams when other teams are deployed in a risk area	This was at the request of the Fire Brigades Union and as an acceptable request when dealing with rescues in the water environment
Moved National Resilience Flood Rescue control measures under the hazard *Insufficient resources: Water rescue*	To highlight the National Resilience control measures against the correct hazard.
Amended content around search levels	Refers to the content in the Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) and improves alignment with the police
Added strategic action: *Provide personnel with access to up-to-date information regarding*	Include one of the Transport guidance strategic actions for fire and rescue services to provide

vehicle design, including vehicle safety systems	personnel with access to data on electric road vehicles and safety systems for road vehicles in water
Control measure title change from *Communication strategy* to *Effective communications: Water rescue*	Tailored guidance for communications at a water rescue incident
Added in content regarding electric road vehicles and how to deal with them when submerged	To improve firefighter safety when dealing with submerged electric road vehicles
Reinstatement of the casualty care hazards and control measures relating to water rescue	When carrying out the review, it was discovered that the generic hazards and control measures for casualty care had been published in this section of guidance in error
Removal of hazards and control measures that are published in other sections of guidance	Removal of duplicated content – the affected elements have been moved to the end of the draft document

Impacts on other guidance and NOG products

Some minor impacts to other pieces of guidance have been identified:

- Flooding, including evacuation due to flooding, relocated to the new Geophysical hazards guidance
- Amend all hyperlinks in the guidance where they currently point to the *Water rescue and flooding guidance*
- Additional detail to be added to the *Corporate guidance for operational activity: Site specific risk information control measure:*
    - Sites where people are likely to require being rescued from water
    - Control mechanisms that may be able to assist in reducing the flow and volume of water in waterways
- Relocate the hazard *Biosecurity* and the control measures *Clean equipment, vehicles and personal protective equipment* and *Specialist advice: Biosecurity* to the *Environmental protection guidance*; these topics already exist in the *Environmental protection handbook* and should be pointed to from this hazard and control measure

Relevant training specifications and scenarios will be redrafted to reflect approved changes.

National Operational Guidance

Water rescue

Water rescue review for consultation

March 2021

Contents

Introduction

This section of National Operational Guidance sets out the hazard knowledge and control measures that should be considered for the rescue and care of casualties in water. The aim is to integrate the knowledge, understanding and actions required to support the appropriate, safe and efficient resolution of any incident involving rescues from water. Personnel should be made aware of the hazards that exist when responding to a rescue from water. They should also understand how their actions may impact on the environment and other emergency responders. This guidance should be read in conjunction with:

- Search, rescue and casualty care
- Geophysical hazards
- Operations – Infectious diseases
- Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO)

Terminology

To clarify the position of a casualty or object in relation to the water, the following terminology is used:

- **Underwater or submerged** (also referred to as subsurface by other agencies)

  A state where a person's airway is compromised due to their physical position in the water, usually due to their head being under the surface of the water

- **In the water**

  A situation where a person is partially submerged, with their head above the surface of the water

- **On the water**

  Where the person is in or on a vessel, such as a kayak or inflatable dinghy

Risk management plan

Each fire and rescue authority must develop their strategic direction through their risk management plan. To determine the extent of their services, strategic managers will consider their statutory duties and the foreseeable risk within their area.

Work to identify risk and prepare operational plans should consider all stakeholders, including local emergency planning groups and the fire and rescue service risk management plan.

Risk management planning for water rescue

Risk management plans should consider the foreseeable water-related hazards and events that may

result in the need for a water rescue. The community risk profile, along with knowledge of local infrastructure that includes bodies of water should inform risk management planning for water rescue. This should include the identification of sites where people are likely to require being rescued from water.

Water risks should be considered as part of overall risk management planning and consider the foreseeable hazards associated with water rescue. The community risk profile, along with knowledge of local infrastructure that includes bodies of water, should inform risk management planning for water rescue.ly to negatively interact with each other. Community risk profiles provided by responsible bodies will further help to develop risk management plans.

Climate change is having profound effects on the environment, including an increase in rainfall. This may result in unexpected or unpredictable bodies of water that present hazards to people. The impacts of climate change should be considered in risk management planning for water rescue.

Water may present a hazard to people through them:

- Using bodies of water for recreation or transport, such as:
    - Lakes
    - Rivers and streams
    - Reservoirs
    - Canals
    - Ponds
    - Swimming pools
    - Tidal pools
    - Those created by heavy rainfall, for example, water in disused quarries
- Accidentally entering a body of water, such as those:
    - In unlit areas
    - Near to uneven ground, footpaths or cycle paths
    - In parks or playgrounds
    - Near to public houses or nightclubs
- Accidentally entering a body of water while in a road vehicle

~~Assessments of water hazards should include the identification of existing bodies of water, particularly those used by the public for recreation and those that are likely to negatively interact with the public, such as disused quarries, tidal pools and canal systems or areas that may be affected in times of heavy rainfall or tidal surges.~~

~~It may be necessary to identify areas where bodies of water are of increased risk due to their proximity to areas where environmental and human factors may exist, such as darkness, uneven ground, cycle paths, playgrounds, pubs and nightclubs.~~

For more information about flood planning refer to Geophysical hazards – Flooding.

Submerged casualties

Fire and rescue services need to consider their approach to attending incidents where casualties have been identified as being submerged for a prolonged period, in situations that are not conducive to support life.

Personnel must not be deployed to perform a rescue at an incident where a casualty is submerged that knowingly requires personnel to remove personal protective equipment (PPE). Personnel must not attempt a rescue that is not performed from the surface of the water, in the water, from land, or within agreed protocols and parameters.

If a rescue is deemed outside of the parameters identified in service policies, procedures or tailored guidance, it is still appropriate for personnel to be mobilised to perform functions such as:

- Implementing cordon controls
- Establishing the necessary safety measures
- Gathering risk and resource information and requirements

Pre-planning can reduce the likelihood of personnel being exposed to perform an unnecessary underwater rescue. It should be used to ensure the mobilisation of the most effective resource, to allow rescues to be performed that are within the firefighter's identified capabilities, and the expectations of the role they are undertaking.

Water awareness

All personnel who are likely to be exposed to bodies of water, regardless of their level of competence, need to be aware of the hazards and risks that may be present. They also need to be aware of the hazards and risks associated with a water rescue.

Fire control room role

To ensure that water rescue incidents are dealt with safely, effectively and efficiently, fire and rescue services should train fire control personnel so that they can appropriately screen calls. Fire control personnel should understand how to interrogate callers to gather situational awareness, which would include:

- Information about the risks and hazards
- Access to the incident
- If anyone is currently attempting to rescue the casualty
- If any other emergency responders are in attendance or en route to the incident
- Whether the casualty is on, in or under the water
- If the casualty is submerged, how long ago were they last seen

Responsibility of fire and rescue services

Fire and rescue services are responsible, under legislation and regulations, for developing policies and procedures and to provide information, instruction, training and supervision to their personnel about foreseeable hazards and the control measures used to reduce the risks arising from those hazards.

This guidance sets out to provide fire and rescue services with sufficient knowledge about the potential hazards their personnel could encounter when attending incidents. Fire and rescue services should ensure their policies, procedures and training cover all of the hazards and control measures contained within this guidance.

Roles and responsibilities

Although there is no specific legislative duty for fire and rescue services in England to respond to flooding or water rescues, the Fire and Rescue Services Act does make provision for rescuing and protecting people in the event of emergencies, other than fires and road traffic accidents.

The Fire and Rescue Services (Emergencies) (Wales) (Amendment) Order contains an amendment to include a duty to prepare for and respond to flooding and rescues from inland waters.

The Fire (Additional Function) (Scotland) Order and The Fire and Rescue Services (Emergencies) Order (Northern Ireland), sets out a duty for the Scottish Fire and Rescue Service and the Northern Ireland Fire and Rescue Service to prepare for and respond to serious flooding. This includes any flooding that causes or is likely to cause a person to die, be seriously injured or become seriously ill.

Hazard – Hydrological hazards

HAZARD KNOWLEDGE

Hydrology is the science concerned with the properties of water, and especially its movement in relation to land. The study of water movement and its behaviour relating to the topography, allows personnel to assess the hydrological hazards that can exist in moving or static water. This website provides some descriptions and diagrams of hydrological hazards.

The hazards of water will vary greatly, depending on whether the water is static or flowing, rising or receding, its temperature, speed and depth. To properly assess an appropriate course of action, personnel should understand water hazards and hydrology.

The force of water is directly related to the speed and volume of the flow; doubling the water speed will quadruple the force. Small volumes of water at sufficient velocity may be enough to cause personnel to lose their footing. Standing water will exert an upward pressure against an object, which may cause it to lift, and a lateral pressure that can cause movement of structures, vehicles and people. For more information relating to vehicles in water refer to Casualties in a road vehicle in water.

Micro geography in a water environment can create radically different water movement and hydrological features over very short distances, even less than 1m. The risks to personnel will need to continuously reviewed by the teams, with team leaders being responsible for decision-making, based on their level of competence.

Moving water in a channel

It can be useful to consider a moving body of water as a series of connected layers rather than a single body. In flowing water, the layer in the middle of the channel generally moves fastest, with the speed decreasing closer to the edge or bottom of the channel.

Casualties or personnel caught in the flow may be subject to impact, as the water collides with structures or objects in its path. The noise of moving water can affect communication between people, whether in the water or on land.

Recirculations

When water passes over a vertical drop it accelerates and then recirculates downstream of the drop. This can cause a casualty or object to be held by the recirculating water. The strength of the recirculation will vary depending on water levels, angle of descent and speed of flow.

Recirculations may create ‘tow back’, an area of water that moves back against the direction of the flow, pulling an object or casualty back towards the hazard. They can aerate the water, which may affect the buoyancy provided by personal protective equipment (PPE) and buoyancy aids. Because the aeration of water reduces the density and makes swimming less effective, coupled with the strength of the water, it may not be possible to swim out of a recirculation hydrological feature .

Undercut riverbanks

Moving water will erode underwater materials such as mud and stone. This erosion can be unseen, particularly where the substrate beneath the surface is softer than that above it. Areas that are subjected to continuously greater forces generated from the flow, such as a waterfall or bend in a river, are also more prone to erosion.

Erosion or undercutting can make riverbanks unstable, collapsing when a load is applied. Underwater areas that have been subject to undercutting can also generate eddies that pull objects, casualties and personnel into holes and gaps beneath the surface.

Eddies

Where flowing water passes static or slower moving water, it causes the area of static water to rotate in the opposite direction to the main flow. This recirculated water, or eddy, is slower than the main flow. The reduction in speed causes debris to be deposited, reducing water depth around eddies. Areas of slower flow and shallower water, such as those around eddies, can be an area of relative safety in the water.

Eddies form more frequently as water speed increases and may form behind obstacles in flowing water, where channels increase in width suddenly and where a narrow channel of flowing water enters a wider, static body of water.

Inland waterways

A casualty who has fallen into an inland waterway may become involved with the features present, such as sluice gates, locks, and debris strainers. These features can produce the same hydrological hazards experienced in a natural river environment and the operation of such mechanisms may result in injury or death. For more information refer to On-site machinery: Water management systems.

Flood water

Flood water should be considered in a similar way to moving water when considering a water rescue. The principles of operating in moving water apply, even when the conditions appear to be still. As with tidal conditions, water levels can rise rapidly. For more information refer to Geophysical hazards - Flood.

Flooded built environments will create entrapment hazards that may not be expected, such as displaced drain covers or submerged street furniture. These items can create hydrological hazards, like those found in the natural environment.

Tidal water

Tidal conditions are usually predictable, which can be anticipated and prepared for. However, tidal water can rise quickly, isolating people and resources, and the depth of water can change rapidly as the tide turns. This represents a significant hazard to those who are unprepared for tidal changes.

Incidents involving tidal water have additional hazards from currents and waves. Some rivers, inlets and estuaries are influenced by tides.

Care should be taken to avoid being cut off or isolated from egress routes. This may occur over a very short space of time, at least twice a day. Where ingress and egress of tidal water is restricted, for example around a tunnel, water levels can change dramatically and unexpected hazards may form quickly, including recirculations. If teams may be made available for mutual aid deployments out of their area, they should be trained and equipped to operate in all foreseeable water environments, including tidal waters.

Sea foam

Sea foam is a common natural occurrence, along the coastline in small quantities, which may result in a fire and rescue service responding to a coastal rescue.

On rare occasions it can accumulate in very large quantities, often due to wind, water currents and waves pushing the foam towards land features that trap it, for example, coves, gullies, and harbour walls. It has been recorded that foam can reach up to 3m in depth.

There are specific circumstances where it can present significant risks. It is often difficult to assess the level of risk, as the composition of the foam is unknown in the early stages of the incident. This could include health hazards, such as infectious diseases. For more information refer to Operations – Infectious diseases.

The foam may present risks including:

- Low buoyancy compared to water
- Casualties and rescuers will sink through it
- Powered rescue craft will have issues with buoyancy and oxygen starvation to engines
- Restricted visibility in the foam, making it difficult to estimate its depth or see submerged obstacles or hazards
- A lack of visual reference, which increases the risk of slips, trips and falls

Any dynamic wave action or currents below the surface of the foam will be ‘dampened’; the surface of the foam may be static while there is water movement below it.

Obstructions in the water

In a moving body of water, hazardous debris and materials including large objects can affect personnel or compromise safe systems of work. Debris may be on the surface, suspended in the water or rolling along the bottom.

Rocks or other debris, such as branches or rubbish, underwater or partially submerged, may present entrapment or entanglement hazards. This is particularly hazardous in flowing water, where the force of water may also cause a loss of balance. Poor water clarity will make it difficult to identify obstructions in the water.

Biosecurity

Fire and rescue services can affect biosecurity if facilitating the transfer of material from one open water source to another. This could be as a result of equipment, vehicles or PPE being contaminated

while carrying out a water rescue.

Unless otherwise confirmed by a responsible person, bodies of water should be treated as if they are contaminated, as they may contain biological hazards. This could include harmful substances, such as sewage or industrial chemicals. Bodies of water may also contain invasive species.

For more information refer to Environmental protection – Biodiversity.

Control measure – Check water and tidal conditions

CONTROL MEASURE KNOWLEDGE

Where available, fire and rescue services should receive notification of strong stream advice, tide predictions and river level warnings. This information can be used to predict likely changes in river levels that may affect tactical plans.

Information regarding river conditions in a fire and rescue service's area may be provided by environmental agencies, the Met Office, the Rivers Agency or local water management groups, such as the Canal Trust or local drainage boards.

Physical observations on the state of the water may provide an accurate assessment of the hazards present and the hydrology of the river, and where best to operate in the water. It may be appropriate for a safety officer to be appointed to carry out this assessment. For more information refer to Safety officers: Water rescue.

Tidal changes occur predictably in coastal waters and rivers, but the timings of high and low tides fluctuate throughout the year. Planning for water rescue incidents should take into account tidal conditions if relevant, by using tide charts or timetables.

Beach tide times are available from the Met Office and tide tables are available from the BBC. Other sources of information may be required for specific locations.

Local authorities, water management bodies, environmental agencies and the Met Office may be available to provide water temperature charts. Available charts will provide either average, expected or current water temperature information for seas, rivers and other bodies of water. If available, temperature data should be considered when planning for or carrying out a water rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21361	• Establish mechanisms to receive and share notifications of changes in river conditions	No change

21370	• Provide relevant personnel with access to information on tide patterns if appropriate	Revised

TACTICAL ACTIONS

Incident commanders should:

- Access all available information sources on river levels and conditions
- Consider contacting environmental agencies or other responsible bodies for information on changes in river conditions and levels
- Use visual assessment of the water to identify hazards and hydrological features
- Consider appointing safety officers to assess river conditions
- Consider using tide times and temperature charts when planning for or carrying out a water rescue

Control measure – Cordon controls: Water rescue

This control measure should be read in conjunction with Incident command – Cordon controls

CONTROL MEASURE KNOWLEDGE

When working near, on or in water, it may be appropriate to establish hazard areas to restrict the movement of personnel, depending on levels of training and available equipment. Where possible, areas should be indicated using physical barriers and access should be controlled. However, if a large geographical area is involved, this may not be feasible.

If cordons for hazard areas are required, access should be controlled by using comprehensive briefings and physical barriers. Personnel should be directed to operate in safe areas, such as guarded edges where possible.

Cordons may also be required to prevent members of the public from entering the hazard area.

Hazard areas can be separated into hot, warm and cold zones. It may not always be appropriate to establish zones, or access to the hot zone may be prevented depending on the risk assessment. Known bodies of water, with limited risk, may not require any hazard zones to be established.

The hot zone is usually defined as the area of water or unstable surface. This area may be expanded based on risk assessments. The hot zone is the area of greatest risk, where rescues will be carried out; it should only be entered by personnel with the appropriate training and personal protective equipment (PPE).

The warm zone is the working area adjacent to the hazard, usually within 3m; this distance may be extended or reduced following a risk assessment. There may be a significant risk of uncontrolled entry into the water in this area. A warm zone may not be required when accidental entry into water can be prevented, or if the hazard from entry is minimal, such as still bodies of water with known depths. Personnel working in the warm zone should be suitably trained, equipped and briefed to

carry out specific tasks.

The cold zone is a safe area located outside the hot and warm zones. Equipment dumps, holding areas, casualty reception centres and marshalling areas can be located in this zone.

The cold zone is usually established beyond 3m from the water's edge. However, this distance will depend on the ground conditions, slope and presence of barriers around the edge of the water. It may be extended or reduced following a risk assessment.

It is important that these zones are established, effectively implemented and communicated to all emergency responders as early as possible, to maintain safe working areas and to assist in defining roles, responsibilities and objectives.

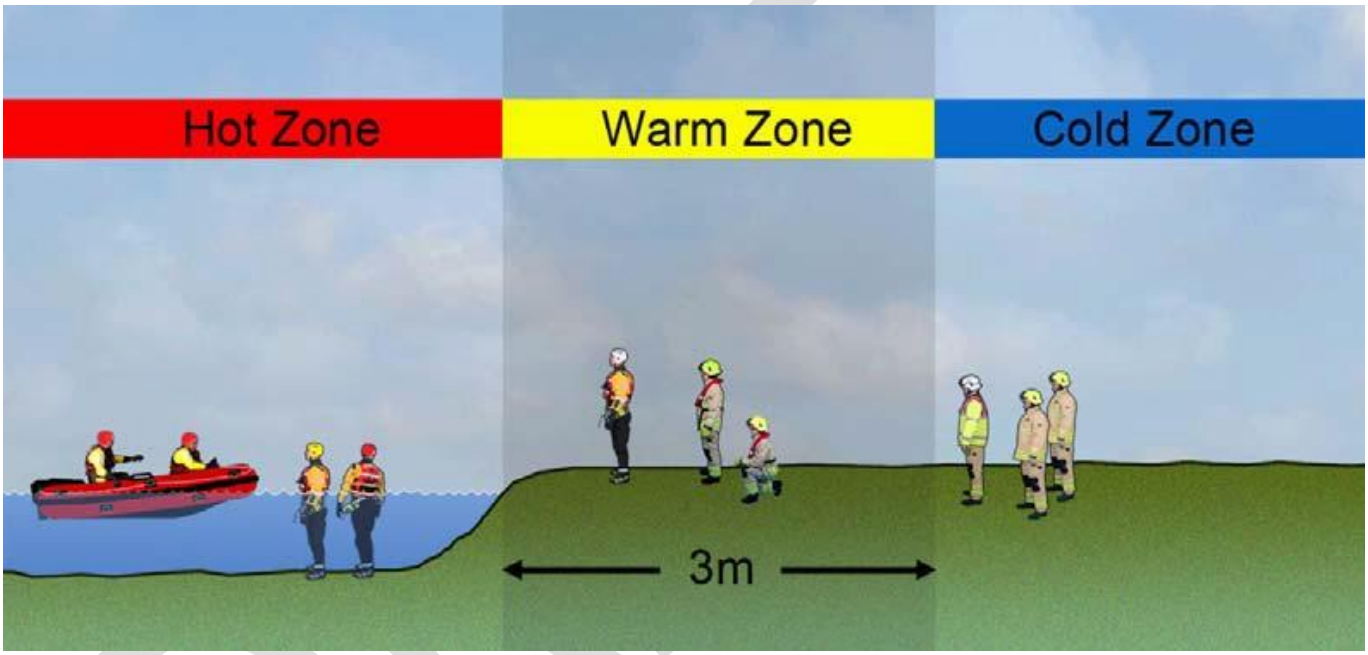


Figure: Diagram showing an example of hot, warm and cold zones for a water-related incident

The geographic scale of a water rescue incident can make the management of personnel difficult. To establish greater levels of command and control, incident commanders should consider cordon control gateways that perform the activity of logging and permitting the number of personnel committed to the hazard area. This should include the times of entry of personnel, assigned tasks and equipment.

It may be necessary to place appropriate limits on durations committed to the hazard area. The duration of commitment will depend on the required tasks and environmental conditions. Regular radio contact with personnel in the hazard area should be maintained.

Appointing a safety officer can assist in controlling a cordon and the zones within it. For more information refer to Safety officers: Water rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21663	• Provide appropriate means of implementing and controlling cordons at incidents involving water	No change

TACTICAL ACTIONS

Incident commanders should:

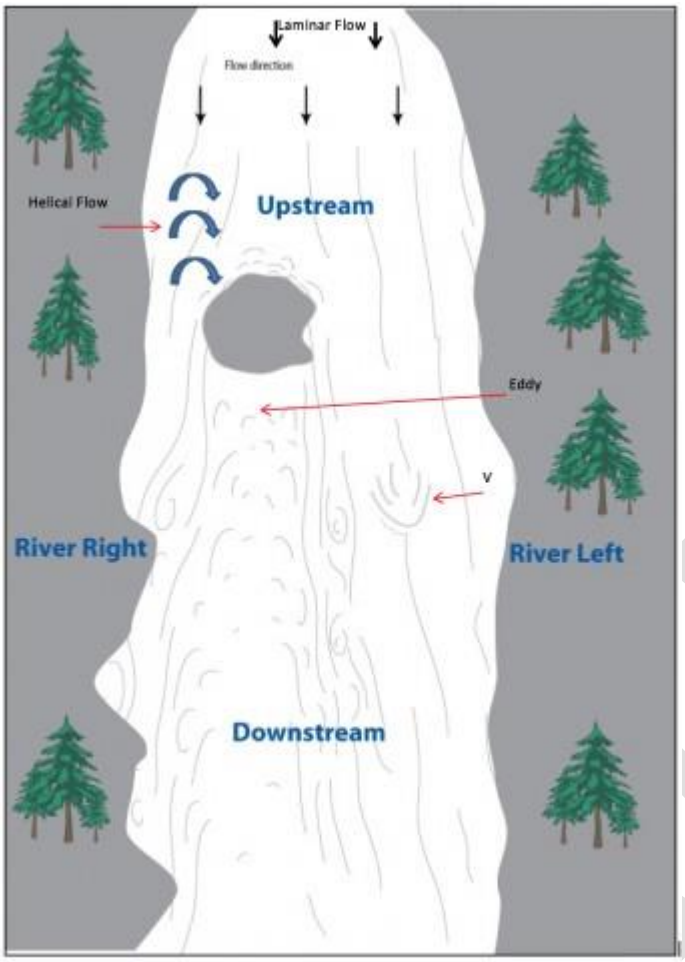
- Ensure that personnel operate on the safe side of existing guarding near water or unstable surfaces
- Establish and maintain the hazard area and hot, warm and cold zones and communicate to all emergency responders, including any changes
- Ensure that entry to the hazard area is controlled, including the need for appropriate PPE
- Consider using cordon control gateways for water rescue incidents
- Consider appointing a safety officer to control cordons and the zones within it for water rescue incidents

Control measure – Effective communications: Water rescue

CONTROL MEASURE KNOWLEDGE

Using common terminology when conducting briefings, debriefings and operating near water is vital, to ensure messages are understood.

When working near, on or in flowing water, personnel are often facing the opposite direction to spotters and may be working on different riverbanks. Upstream is the area closer to the source of the flow and downstream is the direction of flow of the water. To avoid confusion, downstream is always considered to be forward, river right is the right-hand side when facing downstream and river left the left-hand side.



Communication with personnel committed to the water can be difficult. The noise of moving water and the distance between personnel may make verbal communication between personnel difficult. Although waterproof communication equipment is available, it is often not appropriate for swimmers, due to the effects of the water, personal protective equipment (PPE) and levels of exertion.

Hand and whistle signals

To ensure interoperability and joint understanding between teams regardless of their agency, it is essential that all teams use a standard set of signals for communication. The Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) (page 39) provides a list of standard hand signals and whistle blasts that will assist with communication for emergency responders when working near, on or in water.

If the standard hand or whistle signals are inappropriate for a specific tasks or incident, variations should be established and confirmed with all emergency responders.

Radios

A consideration for communicating with other agencies that may be involved in water rescue may assist in improved interoperability. For example, Her Majesty's Coastguard (HMCG) uses very high frequency (VHF) radios.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21381	• Provide appropriate communication equipment for water rescue incidents	Revised

TACTICAL ACTIONS

Incident commanders should:

- Consider using appropriate equipment or other methods of communication for water rescues
- Ensure all emergency responders involved in the water rescue have a joint understanding of the communication signals being used

Control measure – Safety officers: Water rescue

CONTROL MEASURE KNOWLEDGE

Safety officers should be appointed, briefed and positioned as soon as practicable. They should have an understanding of the nature of the incident and the environment that personnel are working in. The hazard area and activities being carried out should influence the number and location of safety officers required at water incidents.

The effective use of personnel and equipment, particularly when waiting for additional resources to arrive, will need to be prioritised. It may be necessary to implement either downstream safety teams or upstream spotters according to a risk assessment.

The following safety officer roles are suitable for water incidents:

Upstream spotters

Upstream spotters should be appointed to identify hazards, such as debris that may present a risk to personnel and the casualty in the water. This information should be communicated to personnel, including the incident commander, at the earliest opportunity. Upstream spotters should also communicate any changes in conditions, or sudden releases of water.

Downstream safety officers

Downstream safety officers are positioned to retrieve personnel and provide assistance to casualties.

Situational awareness and a risk assessment should be promptly used to determine if downstream

safety teams will be required. This should take into account the urgency of the rescue and the available resources.

Personnel should be positioned at a suitable point downstream to perform rescues. When using safety systems, such as downstream safety lines, the time required to establish and deploy them is a factor to be considered. It may be necessary to adopt alternative downstream safety until systems have been established.

Safety systems should be appropriate for the environment; for example, when working near large static bodies of water, watercraft may be used to recover personnel who accidentally enter the water. A fixed downstream safety line, or teams positioned on the bankside, may be appropriate to perform in water or bank-based rescues.

Downstream safety officers should be positioned with safe entry and egress points in mind. Entry and egress may not necessarily be the same point; water and bank conditions may make a point further downstream more suitable for egress.

Downstream safety teams should be comprised of a suitable number of personnel and appropriate equipment, with the ability to rescue all people committed to the water, including personnel in watercraft and casualties.

If downstream safety officers are not deployed, another means of recovering casualties or personnel should be considered.

Safety officers for the management of tethers or lines

If watercraft or personnel are tethered, trained personnel should manage any lines or tethers in use. They should be positioned at a point of relative safety, considering the requirements of the rescue.

Appointed safety officers should perform checks of equipment and personal protective equipment (PPE), confirm communication signals, hazards, control measures and any expected tasks. Safety officers should ensure that the clean line principle is maintained throughout the rescue. For more information refer to Clean line principle.

Any member of personnel managing a line should always have a clear line of sight to the tethered member of personnel or personnel in the watercraft and maintain verbal or visual communication with them.

Controlling hazards entering the area of operations

Members of the public, including swimmers, divers and those using vessels, may be unaware of operational activity. They may affect search and rescue activities or endanger personnel, casualties and themselves. Moving vessels can also cause water movement, making searching and rescues more difficult.

To provide a safe working environment, spotters should be positioned a suitable distance from the area of operations so that they can inform personnel of potential hazards entering the area. They may also need to stop members of the public from entering the area while a water search or rescue is in progress. When positioning spotters, consider the speed of flow and physical restrictions of the

location, to allow the best opportunity for early identification and communication of hazards.

Control of cordons

It may be necessary to appoint a safety officer to ensure that the cordons are maintained and that the personnel operating within the cordons are wearing the necessary PPE in line with the identified risks, such as unstable riverbanks and unguarded hazards.

The cordons may need to be extended or reduced, following a risk assessment. The safety officer should monitor the situation and make recommendations for changes to the incident commander. The safety office should also ensure personnel are kept advised about any changes to the cordons. For more information refer to Cordon controls: Water rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21376	• Provide equipment suitable for establishing safety systems at water incidents	No change

TACTICAL ACTIONS

Incident commanders should:

- Consider appropriately deploying safety officers at water rescue incidents
- Consider using safety systems when carrying out water rescues
- Appropriately restrict members of the public from entering the area of operations while a water search or rescue is in progress
-

Hazard – On-site machinery: Water management systems

HAZARD KNOWLEDGE

Water management systems are the various types of on-site machinery used to stabilise channels and manage water levels. The systems are used to:

- Manage flooding
- Maintain water supplies for irrigation
- Impound water for navigation
- Control levels up or downstream of the system for ecological or other purposes

Water management systems include:

- Sluices
- Weirs
- Pumping stations
- Locks

Individual features may appear in isolation, especially static weirs, but usually form part of a system of water management features. Where structures prevent navigation of the channel, locks or man-made channels that bypass the system are usually present.

When these systems are activated or in use, they may create movement of water that can produce a range of hydrological hazards. For more information refer to Hydrological hazards.

Locks are structures that allow vessels to navigate a channel. Although lock gates are operated either manually or automatically by someone on site, it is possible for them to move as water pressure changes. This occurs if the gates have not been secured properly, have been poorly maintained or due to a failure in the system. Guillotine gates are used to reduce pressure to allow lock gates to open; these can release water, which can form strong currents.

The Canal & River Trust website provides more information about lock gates and canals.

Pumping stations manage water levels between two separated bodies of water, for example a drain or dyke and a river. The size and design of pumping stations vary greatly, but most operate using an impeller system protected by a weed screen, with secure hatches to prevent entry. Impellers may operate with little or no warning and will almost immediately achieve a hazardous velocity. The volume of water moved can be substantial, creating hazards upstream and downstream of the system. An upstream pull towards a filter designed to safeguard operating equipment can generate enough pressure to pin or trap a casualty or rescuer, similar to a strainer in fast flowing water.

Sluices and weirs may be fixed in position but can often be lowered or raised, changing level depending on local requirements or weather conditions. Weirs are man-made features designed to regulate the flow of water downstream. The regulation of water can create increases in speed and dangerous currents. Changing levels can cause the formation of undertows, hydraulics or

recirculations downstream of a weir.

A person or object in the water may be drawn towards the face of the weir and forced under the surface. Depending on the design and the presence of undercutting, a person caught in a recirculation may be flushed out further downstream or held below the surface. The recirculating water may also hold a person within it.

Sluices operate in a similar manner to weirs but allow water to run underneath rather than over the top of the gate. Changes in position and conditions created are harder to identify and are likely to be submerged. Sluice gates restrict flow by allowing the release of water below the surface, which can create dangerous eddies, unseen recirculation, siphons and undertows.

Activation of water management systems

Water management systems may be fixed, or operated manually, automatically or remotely. Activation of automated systems can be based on water level triggers, timed or seasonal programmes. Any decrease or increase in water levels will affect the flow and hydrology of a body of water. Decreasing or increasing flow rates can be hazardous, as unexpected hydrological features may form. When water levels decrease, submerged objects may come closer to the surface and the risk of entrapment may increase. Any risk assessment of a water management system is time-limited. Changes in water levels and operation of the system will change the hazards associated with the system.

Although systems may have visual or audible warnings when activated, it is common for no activation warning to be given. Changes in conditions may not be evident, for example a sluice gate raised incrementally may not be obvious, but conditions may change significantly enough to prohibit entry into an area that was previously assessed to be safe.

Control measure – Safe system of work: Water management systems

CONTROL MEASURE KNOWLEDGE

When attending incidents on canals, all lock gates and paddles should be completely closed before any rescue attempt. Personnel should not attempt to open the lock gates or paddles to empty the lock as releasing the water can result in strong currents and turbulence downstream.

Personnel should not work in the water near a lock gate without first taking control of the gates. Where possible, an exclusion zone should be established on the high-pressure side of the lock gates and paddles. Access to the lock should be via the fixed raking ladder. Mud and silt will be present on the canal bottom and lock walls.

Any attempt to drain the lock should consider the potential of trapping the casualty. A 50mm gap will create sufficient pressure to pin a person. If the incident involves a casualty below the surface of the water and it is not possible to assist without underwater equipment, a specialist underwater rescue and recovery team should be requested.

Personnel should not enter the operating areas of the pumping station unless confirmation that isolation has been achieved is received from a responsible person. Any related machinery including

weed screen cleaners should be isolated prior to a rescue attempt.

Weirs and sluice gates vary greatly in their potential for harm. Personnel should avoid entering these features unless a well-informed risk assessment identifies that it is safe to do so.

Fire and rescue services should identify appropriate means of rescue, control measures and exclusion zones for water management systems in their area. It may be beneficial to participate in joint on-site training and exercises to provide personnel with a better understanding of water management systems.

Isolate water movement and holding systems

Automated water management systems may have on-site isolation switches or control panels. To prevent public access, they are usually in a secure location. Activating these systems may affect hydrology in unexpected ways and the effects will vary with levels and speed of flow. Activation will also affect areas remote from the system, including the potential to cause flooding or damage to vessels located up or downstream. Activation should only ever be considered with the permission and advice of the managing agency.

Personnel should not enter an area where there is a water management system until confirmation has been received of its isolation.

For more information refer to Utilities and fuel: Lock out power supplies to on-site machinery.

Specialist advice

Water management systems are usually operated by either an environmental agency, canal trust or an internal drainage board. Contact details for engineers and responsible persons for water management systems should be displayed nearby. Fire and rescue services should maintain a record of managers of known water management risks and their contact details as appropriate.

GOV.UK provide information about river level and strong stream warnings for certain areas and rivers. This includes warnings of increased activation of water management systems.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21420	• Identify high-risk water management and holding facilities and systems and put in place arrangements and safe systems of work where appropriate	Revised

21413	• Establish methods of identifying and sharing information on water management systems	No change
21417	• Establish protocols with responsible bodies for the isolation and control of water management systems	Revised
	• Consider participating in joint on-site training and exercises to provide personnel with an understanding of water management systems	New

TACTICAL ACTIONS

Incident commanders should:

- Consider taking control of lock systems when working near or rescuing casualties from water management systems
- Liaise with the responsible person to isolate or control the water management system
- Establish an exclusion zone to restrict access on the high-pressure side of lock gates until control of the gates is confirmed
- Establish an exclusion zone to restrict access to an area with a water management system until isolation has been confirmed
- Consider obtaining strong stream warnings to identify the likelihood of system activation

Hazard – Entering the water

HAZARD KNOWLEDGE

This hazard should be read in conjunction with Hydrological hazards

Water environments can have appreciable variations over short distances and can change rapidly as weather conditions and conditions upstream alter. This presents significant challenges when gathering information to establish accurate situational awareness when considering entry into the water. It may not be possible to identify underwater hazards or variations in depth before committing personnel to the water, but every effort should be made to identify the relevant information.

Entering moving water to perform a rescue is a high-risk activity and should only be carried out by trained and equipped personnel.

The first attendance may not be equipped with specialist water personal protective equipment (PPE). Attempting to rescue someone in dangerous circumstances can place the rescuer, the casualty and others in further danger. The first attending incident commander should decide if it is safer to act or to contain the incident and wait for support.

Personnel are not prohibited from taking reasonable action to save life before specialist resources arrive for example, where the casualty is in shallow, still water in a known location and entry into the water may present minimal hazards.

A considered approach needs to be adopted on the immediate need for rescue, the potential for securing casualties and to provide time to implement appropriate control measures.

A water search and rescue environment can be a dynamic and high-risk situation, often led by the willingness to act along with the pressures from the public. These factors may contribute towards the events that could lead to an event where personnel may be uncontrollably exposed to the risks leading to an emergency. However, unlike other incidents; controlling the public may be made more difficult due to the public being spread out over a wider area and not being able to be controlled by cordons or personnel. For more information refer to Operations: Seek assistance for dealing with people.

Sudden immersion in water may result in cold water shock, which causes the drawing in of a deep breath that can result in water being inhaled or swallowed and the pooling of blood in the torso and brain; this may cause even strong swimmers to lose motor function and strength.

Casualties who require rescue from water may panic, increasing the risk to rescuers. Casualties may pull rescuers under the water as they try to maintain their own airway, pull rescuers into the water as they attempt to pull themselves out, or act aggressively towards rescuers. This should be considered when selecting rescue techniques and control measures.

Control measure – Hierarchy of risk (Rescue formula)

CONTROL MEASURE KNOWLEDGE

Rescues from water are often high-risk activities and where possible entering the water should be avoided. Incident commanders should consider the hierarchy of rescue options available to them and select the most appropriate tactic for any rescue attempt, the options available throughout the hierarchy of risk (Rescue formula) should be supplemented by the most appropriate resource. For more information refer to Deploy adequate resources: Water rescue.

- **Talk/Shout:** Casualties are sometimes able to self-extricate or reach a position of relative safety to allow the rescue to be completed. Early contact should always be made with any casualty this may calm the casualty and allow incident commanders to gather information including whether the casualty is trapped, conscious or able to self-extricate.
- **Reach:** Using an object to make physical contact with the casualty. This may be a tool designed specifically for the purpose or a found object. When selecting a reach tool, personnel should consider that a casualty's motor skills and grip strength may be affected by their immersion in water. Where possible buoyant objects should be used; this will aid a casualty if they cannot be recovered immediately. Personnel should avoid making direct physical contact with a casualty where possible, to prevent their own safety being compromised.
- **Throw:** Using specially designed rescue tools or buoyant objects to help retrieve or stabilise a casualty.
- **Row:** Committing trained personnel on to the water in rescue boats, sleds or similar craft.
- **Go:** Committing trained personnel into the water to perform a rescue by wading, swimming or other techniques. The need to retrieve committed personnel should be considered and appropriate safety systems implemented.
- **Don't go:** A dynamic risk assessment may identify that it is not possible to perform a rescue until additional control measures are identified.
- **Helicopter:** Use air support to assist search and rescue activities Refer to Search, rescue and casualty care – Aerial resources: Helicopters for search and rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21727	Identify an appropriate response to incidents involving people in the water	Revised

TACTICAL ACTIONS

Incident commanders should:

- Adopt a Talk – Reach – Throw – Row – Go – Don't go – Helicopter hierarchy approach in the rescue plan
- Safely approach the casualty and maintain a safe environment for casualties, personnel and the public
- Establish and maintain contact with the casualty
- Consider the need for immediate rescue or a means of securing the casualty

Control measure – Personal protective equipment: Water rescue

This control measure should be read in conjunction with Operations – Personal protective equipment

CONTROL MEASURE KNOWLEDGE

Protecting rescuers when dealing with flooding and water rescue requires different clothing and accessories than protecting them during land-based rescues. When working near, on or in water personal protective equipment (PPE) suitable for the task and environment should be used.

Personnel committing to water must have PPE specifically designed for expected activities. For example, immersion in offshore waters may require greater thermal protection and the effects of saltwater on equipment seals may need to be considered.

Any personal flotation device (PFD) should be appropriate to the personnel's height, weight and size to ensure the appropriate level of buoyancy. It should also be suitable for the activities expected to be performed and provide a releasable tether where required.

Personal flotation devices (PFD)

A personal flotation device (PFD) must be compatible with any other PPE in use. There are two main categories of PFD; buoyancy aids and life jackets.

Buoyancy aids

Buoyancy aids are designed to allow wearers to swim and make other movements; they are suitable for use by trained responders during rescue but are not compatible for use with fire kit.

They should include a quick release securing system, designed for personnel to release themselves from a system if they experience difficulty while deployed in the water. A buoyancy aid should assist with retrieval and provide suitable buoyancy for the conditions it will be used in. Information on buoyancy aid requirements are provided in the Health and Safety Executive (HSE) publication, Personal buoyancy equipment on inland and inshore waters.

Once saturated, the additional weight of fire kit will negate any buoyancy offered by buoyancy aids; they will also not assist in maintaining a clear airway. Life jackets, which offer a greater level of

buoyancy and hold the wearer face up when immersed, regardless of levels of consciousness, are more appropriate for working near water. Any life jackets used should provide enough buoyancy to keep an adult wearing structural fire kit afloat, considering the weight when saturated.

Thermal injury

The risk of thermal injury during a water rescue, including heat illness and hypothermia, should be considered when selecting appropriate PPE for personnel. The choice of PPE and thermal layer should reflect the expected activities and environmental conditions. For more information refer to:

- Operations – Physiological stress
- Operations – Heat illness in personnel
- Operations – Hypothermia in personnel

Helmets

Firefighting helmets are not designed for submersion and may pose a risk of neck injury if accidental entry into water occurs. When working near water responders should consider the need to wear a helmet that is suitable for use near water, consider relaxing helmets or wearing them without fastening the chin strap. Any decision to change the standards of PPE in use should reflect the levels of risk presented by other hazards personnel may be exposed to.

Footwear

PPE selection for use in water should include footwear suitable for use on slippery surfaces.

Drysuits

Drysuits should provide the necessary protection from water temperature and ingress into the suit. This is achieved by ensuring that the suit fits the user, and all orifice seals provide an adequate seal against the skin. The size of the suit is very important as some neck seals can be very tight and could restrict blood flow.

Snag hazards

Snag hazards should be removed from all PPE used in moving water. It is necessary to provide equipment to personnel to be able to release themselves if they become snagged or tangled in the water.

Working at night or with poor visibility

If accidental entry into water occurs, it may be difficult to see or track personnel that are partially submerged. Fire and rescue services should consider some means of illuminating individuals who are working near, on or in water.

Waterproof beacons, lights or other personal illumination devices should be attached to personnel so that they can be identified if accidental entry into water occurs. Lights attached to PFDs should be activated. The Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) (page 38) provides more information, including the accepted form for colour-

coded lighting.

Decontamination

Equipment, vehicles and PPE used during a water rescue should be thoroughly decontaminated, with any debris such as mud, plant or animal matter removed and left at the site. Attention should be paid to the seams and seals of boots and waders, with any pockets of pooled water emptied.

Dry suit neck seals should be constructed of a latex type material, to allow appropriate decontamination before the suit is removed. Neck seals made from neoprene or other absorbent materials can hold and absorb contaminants even after wiping. A suitable decontamination procedure may be necessary to prevent contaminating the wearer when the dry suit is removed.

For more information refer to Environmental protection – Clean equipment, vehicles and personal protective equipment.

STRATEGIC ACTIONS

Fire and rescue services must:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21670	• Ensure PPE provided is fit for purpose and complies with current legislation	No change
21671	• Provide appropriate maintenance and care of water PPE	No change

Fire and rescue services should:

		Archived
	Ensure that water rescue PPE does not physically impact users and can be adequately decontaminated	New
	Consider providing illumination devices for use in water	New

TACTICAL ACTIONS

Incident commanders should:

- Ensure all personnel wear appropriate PPE according to service risk assessment and procedures for water rescues
- Monitor personnel for heat illness or hypothermia when performing water rescues
- Ensure that adequate decontamination of equipment, vehicles and PPE is carried out if used

for a water rescue

- Consider the use of illumination devices, including coloured lights, to identify personnel and equipment in water

Control measure – Safe entry into the water

CONTROL MEASURE KNOWLEDGE

When following the hierarchy of risk (Rescue formula) there may be a requirement for operational personnel to enter the water and subsequently exit with a casualty.

An entry site that allows rescuers to walk into or lower themselves into the water should be used where possible. To reduce the risk of cold-water shock or physical injury, personnel should attempt to identify a safe access point and where possible, walk into or lowering themselves into the water and if possible using hydrological features that aid safe entry.

This may require the use of inflatable platforms to assist entry or require additional control measures to be implemented to gain access to a bankside. Diving or jumping into the water should be avoided and only trained personnel should consider this option following an appropriate risk assessment.

A safe point of egress should also be identified; this will not necessarily be the same point as the entry point. Any egress point should consider the effect of hydrology and the condition of the casualty.

Accurately identifying hazards, water conditions and weather conditions are important factors when planning to enter the water. The information that should be considered includes:

- Water:
  - Speed of flow
  - Depth
  - Temperature
  - Tidal patterns
- Hydrological hazards, including debris
- Upstream conditions
- Unstable or unsafe structures
- Current and forecast weather conditions

Any assessment of conditions can vary significantly over short distances or time periods and should be updated regularly.

Sea foam

Committing personnel into sea foam of unknown depths and without an appreciation of the location of the water may present risks that far outweigh the benefits. Before committing personnel, it may

be necessary to request the attendance of a helicopter to disperse foam that is above waist height. For more information refer to Search, rescue and casualty care – Aerial resources: Helicopters for search and rescue.

Personnel should not attempt a swim rescue and wade only at a maximum of waist depth to protect their airway and cater for depth change due to water action.

It may be necessary to shuffle to check for trip hazards or depth changes. If operating in the water, it may be appropriate to use equipment or other personnel to provide mutual support and stability against wave action, or to protect a casualty.

When working in sea foam, the use of tethers should be considered to allow personnel to track back to a safe point.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
		Archive
	Consider providing equipment to facilitate safe entry to and egress from water	New
	Have arrangements in place for requesting air support assistance to disperse sea foam during a water rescue	New

TACTICAL ACTIONS

Incident commanders should:

- Ensure personnel enter the water slowly to minimise the effects of cold-water shock
- Consider the use of inflatable platforms to assist entry
- Identify an appropriate and safe point to enter the water
- Consider the most appropriate egress point for the casualty
- Identify hazards, water conditions and weather conditions when planning to enter the water and monitor for changes
- Consider the need for tethers when operating in sea foam
- Consider requesting the attendance of a helicopter to disperse foam that is above waist height

Control measure – Initiate firefighter emergency: Water rescue

This control measure should be read in conjunction with Incident command – Arrangements to deal with firefighter emergencies

CONTROL MEASURE KNOWLEDGE

A water rescue environment can be a dynamic and high-risk situation, often led by the willingness to act along with the pressures from the public. These factors may contribute towards personnel becoming uncontrollably exposed to hazards, resulting in an emergency. If a member of personnel is in distress in a water environment, a firefighter emergency should be promptly initiated.

In the event of a firefighter emergency in a water environment developing, a prompt reaction to initiate a suitable response should be undertaken. Action may be required to prevent an untethered rescuer from breaching any downstream safety mechanisms, as this could result in a rescuer not being contained.

If a fire and rescue service provides a water rescue response, it will be necessary to provide information on the actions to take in the event of a firefighter emergency in water. This may require support from other agencies. For more information refer to Specialist resources – Water search and rescue.

An assessment of the firefighter emergency may determine that using existing control measures, such as downstream safety officers or emergency water rescue teams, is the most appropriate action to take. For more information refer to: Safety officers: Water rescue

A firefighter emergency may require the attendance of a search and rescue helicopter. For more information refer to Search, rescue and casualty care – Aerial resources: Helicopters for search and rescue.

Emergency teams

When operating in environments involving water, it may be necessary to provide emergency teams that are equipped with the ability to provide an effective and prompt rescue resource dedicated to personnel committed to the water.

The likelihood of a firefighter requiring medical assistance while in the water environment should be considered. For more information refer to:

- Specialist resources: Medical resources for water rescue
- Carry out a structured assessment and treatment: Water rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
	Determine the actions necessary for dealing with a firefighter emergency if they occur when responding to a water rescue	New
	~~Consider developing procedures for critical incident welfare of affected personnel~~	Archive
	~~Have policies for firefighter emergencies which incorporate communications, investigation and welfare~~	Archive

TACTICAL ACTIONS

Incident commanders should:

- Establish emergency arrangements appropriate to the size and complexity of the water rescue incident
- Request additional emergency team equipment and resources in-line with any rescue plan for water rescues
- Promptly commence firefighter emergency procedures if a member of personnel is in distress during a water rescue incident

Hazard - Lack of co-ordinated search and rescue plan: Water rescue

This hazard should be read in conjunction with Search, rescue and casualty care – Lack of co-ordinated search plan: All searches

HAZARD KNOWLEDGE

A lack of or inaccurate information may result in a delay in effective searching for a missing casualty. Any delays in locating the casualty can impact on the outcome of a water rescue.

Personnel may attend incidents where people are missing and known to, or may have, entered a body of water. Whether a person is believed missing or lost will also influence the response.

The Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) (page 26) provides more information, including the definition of a missing person and the categories of a missing person.

Different control measures apply for a search where a casualty is known to or believed to be submerged. For more information refer to Submerged casualty.

Control measure – Situational awareness: Water rescue

This control measure should be read in conjunction with Incident command – Situational awareness

CONTROL MEASURE KNOWLEDGE

Personnel will need to gather information from credible sources to ensure that the correct resources are requested at the earliest opportunity. This information should also be used to identify the potential for the casualty's survivability, by taking into account the impact of environmental factors. En route to or on arrival at an incident, it may be appropriate to gather information such as:

- Which agencies are already in attendance
- An early brief from the police search adviser (PolSA)
- Incident history and any background information; this could be from:
    - Witnesses
    - The initial caller
    - CCTV footage
- Whether there are any unstable or unsafe structures involved
- Presence of physical evidence, such as clothing or possessions at the potential water entry point (WEP)
- Whether a vehicle is involved
- Whether the casualty can be accessed from the surface of the water or land using equipment

Information about the casualty or casualties that will inform an effective search includes:

- Number of casualties
- Last known position (LKP) of the casualty
- Whether the casualty is in sight or submerged
- How long since the casualty was last seen
- Whether they can swim
- Details of any injuries to the casualty
- Whether the casualty has a flotation aid, such as:
    - A life jacket
    - A lifebelt
    - A piece of water sports equipment
- Age of casualty

Information about the environment that will inform an effective search includes:

- Water temperature and depth
- Speed of water if relevant
- Status of tide if relevant
- Time of day and visibility
- Weather conditions

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
New	Provide incident commanders with the means to access relevant information at water rescue incidents	Revised
		Moved

TACTICAL ACTIONS

Incident commanders should:

- Question first responders and witnesses to gain situational awareness, incident history and background information

- Establish casualty details, including name, age, gender, size, state of mind, can they swim
- Establish the last known position (LKP), or water entry point (WEP) of casualties, including times
- Establish where the casualty was in the water, for example swimming, floating or submerged
- Establish what the casualty was wearing and whether they had a flotation aid
- Collate relevant information that will support and inform a water rescue
- Establish communications with police search advisors (PolSA) and other responder agencies when carrying out a water rescue
- Anticipate casualty condition and potential survivability given the environmental situation

Control measure – Apply the survivability model: Water rescue

CONTROL MEASURE KNOWLEDGE

One of the most important decisions to be taken at water incidents is whether actions are being taken to rescue or recover casualties. A rescue is for when people display signs of life or are considered able to survive. Recovery is made when people are known to be deceased.

The distinction between rescue and recovery is important because it is a strong factor for decision-making. The level of acceptable risk for a rescue is considerably higher than that for body recovery in almost all circumstances.

Survivability model

A model has been developed to help incident commanders decide if a casualty is survivable. Joint decision-making may be required, with other emergency services or rescue organisations that are in attendance.

The model is designed to give casualties every reasonable chance of rescue and resuscitation and is balanced against the risk of harm to personnel when carrying out rescues.

The main factors to be considered are the length of time the casualty has been submerged and the water temperature. Water temperature in the UK averages about 10°C but can range from 0°C to 25°C, depending on the location and type of water. Available medical evidence suggests that water temperatures in the region of 6°C to 7°C or less are required for prolonged survival times in submerged casualties, sometimes described as ‘icy cold’.

It is not possible to know for certain when a casualty became submerged, so the clock should start when the first emergency responder arrives on-scene. It should not be assumed that the casualty has been submerged for longer than this. However, if control room operators can gather the appropriate information to identify an accurate time for when the casualty became submerged, the clock may be started at this point. Credible information sources that may be able to confirm this can be:

- Situational awareness systems, such as 999eye

- CCTV
- Credible witnesses, such as other emergency service responders

This can provide the incident commander and other decision-makers with improved information and reduce the level of exposure to risk in response to the level of activity required.

It may be beneficial to align local control rooms in the use of information gathering and call scripting to improve the accuracy of information gathered. Joint decision-making will be supported if there is credibility in the information about the time the casualty became submerged.

The incident commander should carry out an appropriate risk assessment, balancing the likelihood of casualty survival against the likelihood and severity of harm to personnel.

It is anticipated that after 30 minutes all three emergency services will probably be on-scene. This may include specialist teams from the ambulance service and other rescue organisations. The incident commander should liaise with officers from the other services to decide how to proceed.

The first element to consider is the likelihood of survival. This clinical decision will be taken by the ambulance service based on the criteria above, or in their absence, by the incident commander. If the water is icy cold the casualty should be considered survivable, although the likelihood of survival reduces as time passes. The risk assessment should be revisited to decide if a rescue should continue or if the incident should switch to body recovery.

If a decision is taken to continue the rescue then, at 60 minutes, the incident commander should liaise again with the senior officers from the other services. If the water is cold and the casualty is known to be young or small they should be considered survivable, although again their chances further reduce as time passes. The risk assessment should be revisited to decide if a rescue should continue or if the incident should switch to body recovery.

After 90 minutes, the incident commander should liaise again with the senior representatives from the other services. A joint decision should be made to switch to body recovery, as the circumstances are regarded as no longer survivable.

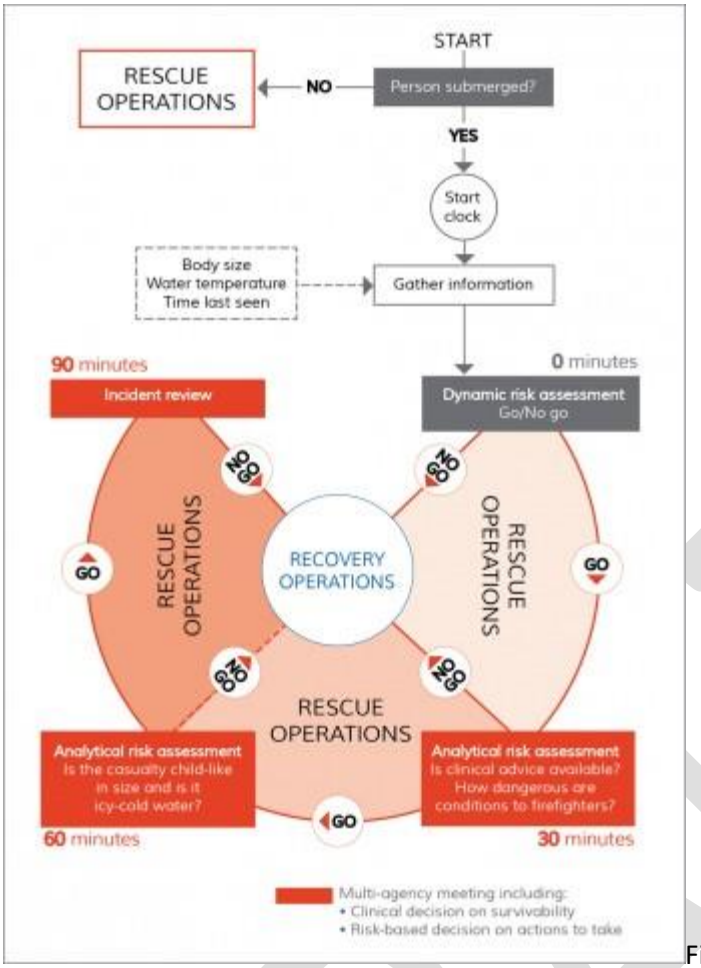
Body recovery

Once the joint decision is made to commence body recovery, the police become responsible and should be requested, if not already in attendance., Fire and rescue services may become involved, depending on local arrangements, but personnel should not be put at undue risk to perform a body recovery.

Any incident where a body is discovered should be treated as a potential crime scene, and disturbance kept to a minimum. However, it may be necessary for personnel to secure the body to prevent it from being swept away.

For more information refer to:

- Search, rescue and casualty care – Deploy adequate personnel and resources: Rescues
- Operations – Preserve evidence for investigation



920 Figure: Survivability in water model

921 *STRATEGIC ACTIONS*

922 Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21424	Ensure that operational and fire control personnel are aware of the guidance for the rescue or recovery of a casualty from water and the survivability model	Revised
	Establish memoranda of understanding with agencies that may request assistance with body recovery	New
	Work with other agencies to align the information obtained through call handling for water rescues	New
	~~Have a body recovery policy~~	Archive

TACTICAL ACTIONS

Incident commanders should:

- Use the survivability model to determine actions at incidents involving submerged casualties
- Use credible information to determine and apply the remainder of the survivability model
- Triage casualties and prioritise rescue activities
- Jointly agree a search and rescue or recovery response with other agencies, based on survivability model
- Consult with other agencies to agree on a stage to defer to body recovery
- Request the attendance of police when body recovery is required
- Consider the possibility that evidence may be present at incidents requiring body recovery

Control measure – Clearly defined area of operations: Water rescue

This control measure should be read in conjunction with Search, rescue and casualty care – Effective search management

CONTROL MEASURE KNOWLEDGE

Personnel should be aware that casualties in a water environment may not remain static. It is important to quickly limit the scope of the search by identifying and placing controls around the places where a casualty may be identified. The water entry point (WEP) and point last seen (PLS), can be used as the initial planning point (IPP), if they are the same. However, more recent sightings will update the PLS and can be used to update a tactical plan. The time of these sightings will help to establish the starting point of a search; this information should be established and recorded.

Once the WEP or the PLS and time are known, a judgement should be made on the movement of water and the time between PLS and the start of the search to ascertain where a casualty may have travelled to.

Improved situational awareness will help to clearly define the operating area. This can include:

- Information on the physical environment, such as:
  - Water flow
  - Tide times
- Visual information, such as footage from drones (classified as a type of unmanned vehicle by the CAA)

Requesting resources that may assist in defining the area of search should be considered at the initial stages. For more information refer to Specialist resources: Water search and rescue.

In channels with a directional flow, resources should be sent to a point beyond this to secure a downstream containment. To establish the area to be searched and prevent any casualties from

travelling beyond this point, the speed of flow should be estimated.

When calculating the size of the search, it should be assumed that the casualty is travelling where the water is at its fastest, usually the centre of the channel. It is then possible to calculate the possible distance travelled, by multiplying this estimate by the time that has passed since entry.

This calculation should include any time required to reach the point downstream in order to close off the search box.

Example

- A river that is flowing at 1m per second will potentially move the casualty in 30 minutes - 1800m from the water entry point (WEP)
- If the travel time for personnel to the WEP is 10 minutes, the casualty will have travelled a further 600m
- Therefore, the total distance to close off the search box is 2400m

Physical barriers should be considered as a useful tool in identifying a search box; in the water environment, these may be features such as:

- A strainer feature that will not let a person pass through it
- Water process features, such as pumping stations
- Shallow areas of flow that would not support the movement of a person

These features should be considered on a case-by-case basis and with the potential for a person in the water to bypass them assessed.

STRATEGIC ACTIONS

Reference No. if applicable	Strategic action	Revised, new, archive or no change
	Identify appropriate sources of information and resources to define a water search plan and area	New

TACTICAL ACTIONS

Incident commanders should:

- Establish a water rescue area of operations with attending agencies, based on the information available
- Request and deploy resources to assist in defining the search area for a water rescue
- Identify features that can assist in identifying and determining the water rescue search area

- Determine the distance a casualty may have travelled in moving water
- Consider mobilising appropriate resources to close off the water rescue search area

Control measure – Co-ordinated search plan: Water rescue

CONTROL MEASURE KNOWLEDGE

Police search advisers (PolSA) hold a Home Office licence and have a responsibility to plan, organise, and manage a missing person search. While the PolSA will co-ordinate the overall search operations, it is recognised that some functions will be supported by partner agencies with specific water rescue expertise. This includes flood rescue tactical advisers and water and flood incident managers.

It may be beneficial for fire and rescue services to arrange joint training and exercises with responders who may be involved in a water rescue to improve interoperability.

A missing person search aims to locate a person who is missing or otherwise establish and confirm the person's whereabouts and identity. An assessment should be completed to improve intelligence and inform search planning and management. Joint decision-making should determine the search plan, including the type, area, and resources to be deployed. Once determined, the search plan should be communicated and co-ordinated using the JESIP principles.

The Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) (page 28) provides details about the types of search in a flood environment which may be applied to a water rescue.

To facilitate the selected type of search, the most appropriate resource should be tasked. For more information refer to Specialist resources: Water search and rescue.

Search exit strategy

As a general principle, search activity should continue until the casualty is located. Sometimes the casualty will not be found before the search needs to be called off. Search and rescue teams may be required to stop searching for several reasons, including the safety of personnel. The police have the responsibility to call off a search. **Submerged casualties**

Information gathered during the initial response to an incident should be shared with oncoming resources to help limit the search area.

If services have procedures and equipment to perform underwater searches, they should consider water flow and conditions as well as the point and means of entry. Most casualties who are submerged remain within a short distance of the point of entry; if underwater searching is required, this area should be the focus in the early stages of the search.

For more information refer to Rescue: Submerged casualties.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21711	Liaise with local authorities or emergency planning groups to develop multi-agency arrangements for search procedures	No change
	Develop a memorandum of understanding with agencies that can assist with underwater searches	New
	Participate in joint training and exercises with other agencies to improve interoperability at water rescue incidents	New

TACTICAL ACTIONS

Incident commanders should:

- Use situational awareness to determine the type of water rescue search activity required
- Apply joint decision-making to develop a co-ordinated water rescue search plan
- Develop and communicate a co-ordinated search plan following JESIP principles
- Continue with the search until the casualty is found or the search is called off
-

Hazard – Insufficient resources: Water search and rescue

HAZARD KNOWLEDGE

Insufficient resources can impact on the successful outcome of an incident. If relevant information that informs the necessary resources are not determined at an early stage, opportunities may be missed resulting in the deterioration or death of a casualty. When requesting resources, consideration should be given to aspects of an incident that may impact on the outcome, such as:

- Flow and volume of water
- Water temperature
- Access to the hazard and casualty
- Visibility
- Number of casualties
- Size of casualties

If a casualty has been injured in a water environment, refer to Failure to assess, identify and treat life-threatening injuries to a casualty: Water rescue.

In spate conditions or if many people need rescuing, a fire and rescue service may require additional resources to assist. Early identification of the potential for diminished resources should be prioritised, to prevent a delay in the rescue of casualties.

Personnel without the required specialist skills have limited equipment and training to perform water search and rescues. Attempting rescue may be hazardous without the right level of expertise and specialist equipment.

Personnel may face difficult, morally challenging situations and may have to make decisions in extremely hazardous, emotionally charged and fast-moving situations. They may face an uncontrolled situation where hazards are not yet identified, and information is incomplete.

What is reasonably practicable to achieve will depend on the circumstances and demands of the incident and the available resources balanced against the identified hazards and evaluated risks.

For incidents involving a submerged casualty refer to Actions associated with rescuing a submerged casualty.

Control measure – Deploy adequate personnel and resources: Water search and rescue

This control measure should be read in conjunction with Search, rescue and casualty care – Deploy adequate personnel and resources: Rescues

CONTROL MEASURE KNOWLEDGE

To reduce the likelihood of personnel being exposed to incidents where they are unable to act, fire and rescue services should gather information and deploy adequately trained personnel to

appropriately screened calls, which result in the most appropriate resources being mobilised.

Personnel should be sufficiently informed on the hazards that may exist, as well as the length of time a casualty has been submerged. Additionally, personnel should be aware of the limitations of their competence and equipment in the environment they are operating in.

The capabilities and the expected agreed extent of the interventions of personnel should be understood in the context of the approved rescue techniques trained for and adopted by the fire and rescue service. Teams should not operate in a way that they are not equipped or trained for.

Establishing a predetermined attendance for water rescues may be necessary, to ensure a swift and appropriate response to these incidents.

If personnel identify the need for an advanced resource to perform a water rescue, they should request more appropriate assets and resources. This may be due to limitations in their own training, skills, equipment or knowledge.

Individual identification

The use of standard and agreed methods of individual identification during a water rescue will support:

- Determining the capability of emergency responders
- Distinguishing roles and responsibilities on the incident ground
- More effective and efficient incident ground management
- Appropriate deployment of personnel.

The Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) provides:

- The accepted form of Individual identification through the use of colour-coded helmets and lighting (page 38)
- The equipment applicable to each level of water rescue response (Annex E)

Emergency teams

In addition to appropriate downstream protection, consideration should be given to deploying emergency teams to carry out the rescue of personnel who are committed into a hazard area. Competent personnel should be equipped for immediate deployment with adequate equipment to perform a rescue. For more information refer to Initiate firefighter emergency: Water rescue.

Water awareness

All personnel who are likely to be exposed to bodies of water, regardless of their level of competence, need to be aware of the hazards and risks that may be present. They also need to be aware of the hazards and risks associated with a water rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21685	• Consider determining the acceptable actions and limitations during water rescue incidents	Revised
	• Inform fire control room personnel of the most appropriate information to gather to mobilise the most appropriate resource to an incident involving a submerged casualty	New
21686	• Make arrangements for specialist and emergency water rescue resources in line with their risk management plan	Revised
	• Consider providing the necessary resources and equipment to facilitate water search and rescue	New
	• Consider adopting the Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) for application to water rescue activities	New
	• Predetermine which personnel are competent to attend water search and rescue incidents	New

TACTICAL ACTIONS

Incident commanders should:

- Deploy appropriately trained personnel at incidents involving water
- Recognise the limitations of personnel capabilities with recognition to their level of training and competence
- Use an appropriate system of identification for water safety, search and rescue teams
- Request the attendance of personnel with the required skill levels
- Request adequate emergency rescue teams to stand-by

Control measure – Specialist resources: Water search and rescue

This control measure should be read in conjunction with Search, rescue and casualty care – Specialist resources: Search

CONTROL MEASURE KNOWLEDGE

The police are responsible for co-ordinating search and rescue on land and inland waters. The Maritime and Coastguard Agency (MCA), through HM Coastguard (HMCG), will respond to rescues at sea, on the coastline, within tidal waters and in certain delegated inland waters. HMCG are responsible for co-ordinating search and rescue at sea. Local arrangements may exist for governing responsibility between HMCG and the police in certain areas.

HMCG Search and Rescue have capabilities including:

- Search
- Water rescue
- Mud rescue
- Rope rescue

HMCG and the police can call on various search and rescue assets, for example, fire and rescue services, lifeboats, helicopters, ambulance, cave rescue, mountain rescue and lowland search and rescue. Fire and rescue services will often provide an initial response or offer support in HMCG's statutory area of responsibility.

The ambulance service is responsible for the clinical care of casualties in the pre-hospital environment. It has a legal duty of care for casualties that is not shared by other responding agencies.

Hazardous Area Response Teams (HART) and Special Operations Rescue Teams (SORT) have skills and equipment that enable them to work with rescue agencies and gain access to casualties in the hazard area. However, there may be incidents where it would be unsafe for medical responders to go to the casualty. If personnel need to rescue the casualty, they should maintain communication with the medical responders.

It is vital for the successful rescue of a person from water that agencies adopt a co-ordinated approach to work together, share situational awareness, and jointly agree on a plan. This should be done at the earliest opportunity, to prevent any delay in commencing the search. Joint training and exercises may help fire and rescue service personnel to understand the priorities and capabilities of other responding agencies and specialist resources.

Attendance of the police should be requested to manage the co-ordination of search operations by police search advisors (PolSA).

The Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) (page 29) provides details about the type of search resources that may be available.

Specialist resources for water search and rescue include:

- Water rescue teams from other agencies
- Voluntary search teams and community assets, such as mountain or lowland rescue teams
- Maritime and Coastguard Agency (MCA)

- HM Coastguard (HMCG) Search and Rescue Royal National Lifeboat Institution (RNLI)
- Public technicians and specialists
- Inland Waterways Rescue Association members
- Technical rope over water rescue teams
- Drones (classified as a type of unmanned aircraft by the Civil Aviation Authority) – for more information refer to Search, rescue and casualty care – Aerial resources: Drones for search
- Helicopters – for more information refer to Search, rescue and casualty care – Aerial resources: Helicopters for search and rescue

The Hazardous Area Response Team (HART) or Specialist Operations Response Team (SORT) may be able to provide an on or in water response to assist personnel when stabilising casualties before extrication and can provide tactical medical advice.

For more information refer to:

- Search, rescue and casualty care – Specialist resources: Search
- Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO)

Body search and recovery

For information refer to Apply the survivability model: Water rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
	• Maintain contact information regarding applicable water rescue responders	New
	• Make arrangements for the request of specialist water rescue resources	New
New SA (Previously 15036)	• Consider carrying out joint training and exercises with specialist resources for water rescues	Revised

TACTICAL ACTIONS

Incident commanders should:

- Establish communications with police search advisors (PolSA) and other agencies

- Jointly agreed on incident priorities with other responding agencies and specialist resources
- Request and deploy adequate resources to complete or contribute to the level of water search required

Control measure – Request National Resilience resources for flood rescue

CONTROL MEASURE KNOWLEDGE

If a fire and rescue service requires National Resilience (NR) resources to assist with a water rescue, the terminology used by NR will be 'flood rescue'.

Much of the information regarding flood rescue can be found in the Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO). The information provided in this section of National Operational Guidance seeks to provide high-level detail that specifically involves the fire and rescue service.

Interoperability is critical for routine cross border mutual aid operations and larger-scale incidents involving the deployment of national assets. The duty to co-ordinate inland flood rescue lies with the police; they will have primacy during major flood events. During a major flood event, flood rescue assets will be deployed from a wide range of organisations, including emergency services and volunteers.

The common objectives for a flood rescue response are:

- Saving and protecting human life
- Relieving suffering
- Protecting property
- Providing the public with information
- Containing the emergency – limiting its escalation or spread
- Maintaining critical services
- Maintaining normal services at an appropriate level
- Protecting the health and safety of personnel
- Safeguarding the environment
- Facilitating investigations and inquiries
- Promoting self-help and recovery
- Restoring normality as soon as possible
- Evaluating the response and identifying lessons to be learned

Therefore, the response of the fire and rescue service may include the provision of additional assets, for example, high volume pumps (HVPs), water rescue and other related activities. For more information refer to Geophysical hazards - Flooding.

Once a full picture of the potential flood or water rescue is established, a strategy for dealing with the incident must be developed. This should set the priorities for the management of the event and allow an accurate assessment of operational requirements. To provide a safe and efficient response, it is essential that these resources are capable of operating at an incident and do so under a single unified command system and supported with necessary functions, such as decontamination and welfare facilities.

Requesting a national response

Assets and skills hosted by individual fire and rescue services, and other agencies, can respond if specifically requested to do so as a national capability and where incident timescales allow. If the fire and rescue service incident commander believes that national flood rescue resources are required, they should provide the following information to the National Resilience Fire Control (NRFC):

- Location of the incident or the expected time and location of impact
- Nature of the incident and any specific hazards
- Prevailing weather and, if known, water conditions
- Estimated number of persons requiring rescue
- Local resources already in attendance and/or available
- The requirement for urban search and rescue (USAR) teams; they may be able to construct landing platforms
- An estimate of mutual aid resources required (as detailed in the Flood Rescue of Concept of Operations) – this may be flood rescue teams and flood rescue tactical advisers
- Host fire and rescue service point of contact name and contact details
- The initial location for a rendezvous point (RVP), strategic holding area (SHA) or multi-agency strategic holding area (MASHA)
- Safe approach route to the incident, including any access issues caused by the flooding

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
22756	• Have systems in place to request national flood rescue resources	No change
22757	• Consider predetermining locations for the rendezvous point, strategic holding area or multi-agency strategic holding area	No change

TACTICAL ACTIONS

Incident commanders should:

- Request flood rescue resources using agreed NCAF protocols
- Establish the number of resources being provided and identify suitable locations for them such as a rendezvous point, strategic holding area or multi-agency strategic holding areas
- Collate team data sheets on the arrival of flood rescue resources
- Record all flood rescue assets being deployed
- Establish communications protocols with flood rescue resources, including the issue of radios if not already held
- Establish and record agreed call signs for all flood rescue resources
- Nominate a site for each team at the rendezvous point, strategic holding area or multi-agency strategic holding areas
- Request welfare facilities for flood rescue teams
- Request decontamination facilities for flood rescue teams

Control measure – National Resilience: Mobilise appropriate assets for flooding

CONTROL MEASURE KNOWLEDGE

When assessing mutual aid requirements, consideration must be given to the time of day, distance to be travelled and logistical arrangements, including rest and accommodation centres. The National Resilience Fire Control (NRFC), usually assisted by a National Resilience Officer or a flood rescue tactical adviser (TacAd), will co-ordinate the mobilisation of mutual aid for flood rescue, in partnership with the receiving authority.

A system of team typing has been developed for flood rescue teams. This system assures the capabilities of each element deployed and that each operates to a common standard and specification irrespective of the organisation to which it belongs.

The Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) provides further details on the specification for each team type.

If assets that are on the national asset register are deployed through local mutual aid agreements, the NRFC must be informed so that these assets are flagged as unavailable for deployment elsewhere. If the assets being requested are not part of the fire and rescue service, the appropriate contact or control room should be contacted.

STRATEGIC ACTIONS

National Resilience should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
22770	• Maintain a register of qualified flood rescue tactical advisers, including their current availability	No change
22768	• Request flood rescue assets by contacting responder organisations using agreed and necessary protocols for mobilisation	Revised
22767	• Maintain a register of flood rescue assets by gathering updates from the holders of those registered assets, including their current availability	No change
22771	• Mobilise flood rescue tactical advisers as required	No change

TACTICAL ACTIONS

Specialist responders should:

- Assist the NRFC with the mobilisation of declared flood rescue assets

Control measure – National Resilience: Accepting flood rescue assets

CONTROL MEASURE KNOWLEDGE

All Flood rescue assets, irrespective of their organisation, will be required to comply with the incident command structure. Upon arrival, all flood rescue assets should produce a pre-prepared team datasheet following the concept of operations. This should be presented at the rendezvous point (RVP), strategic holding areas (SHA) or multi-agency strategic holding areas (MASHA), so that each asset can be checked in and directed as appropriate to the incident. Usually, a flood rescue tactical adviser (TacAd) performs a 'credentialing' process to assess the capability of responding assets.

Details of incident arrangements, as detailed in the Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) should be provided to the team leaders of the flood rescue assets on arrival at the RVP, SHA or MASHA, including:

- Communications detail
- Logistics, using enhanced logistics support (ELS) protocols
- Mapping or on-scene detail
- Location of casualty landing sites and/or reception centres
- Location of fuel provision for vehicles and powered craft

STRATEGIC ACTIONS

National Resilience should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
22773	• Provide flood rescue supporting documentation for completion by specialist responders	No change

TACTICAL ACTIONS

Specialist responders should:

- Ensure that all flood rescue assets are checked in and provided with incident arrangements on arrival, before tasking

Control measure –National Resilience: Tasking flood rescue resources

CONTROL MEASURE KNOWLEDGE

The resources to deal with the incident should be matched effectively against the incident need. The flood rescue tactical advisers (TacAds) will provide detailed tactical capability-relevant advice to the incident commander. This will inform the allocation of a specific site for each team within the holding area, with an established means of communication before tasking. Different team types should be identified and located accordingly for immediate deployment.

The incident requirements should be recorded and communicated to the flood rescue response that will carry out the tasks required. Teams should be given a comprehensive operational and task-specific brief. To ensure flood rescue activity is effectively managed, briefings and records should include elements such as:

- A record of the task to be carried out
- Which flood asset the task has been assigned to
- Start and finish times
- How progress will be monitored
- Search audit
- Decision logs, narratives and action logs
- Handover briefings

A full debrief should be undertaken to capture lessons learned; this should assist with planning for the future.

1298 *STRATEGIC ACTIONS*

1299 National Resilience should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
22776	• Gather and assess information from debriefs, including any lessons learned that are relevant for specialist responders	No change

1300 *TACTICAL ACTIONS*

1301 Specialist responders should:

1302 • Provide briefings to flood rescue teams

1303 • Keep records and logs of flood rescue teams briefs and debriefs

1304 • Provide regular updates to the NRFC via the enhanced logistical support (ELS)

Hazard –Submerged casualty

HAZARD KNOWLEDGE

Fire and rescue services may be mobilised to an incident involving a submerged casualty, putting personnel in a situation where their timely and effective action is expected.

If intervention by personnel is not seen by the public, this could result in unwanted behaviour or actions, such as self-deploying into a hazard area which may lead to multiple casualties needing to be rescued. For more information refer to Operations - People.

Such pressure may lead to personnel feeling the need to deploy into a hazard area to save life where a diminished risk-benefit exists. Examples such as removing personal protective equipment (PPE), duck-diving or trying to enter a submerged vehicle are unacceptable levels of intervention and are high-risk activities.

Fire and rescue services should not deploy resources to incidents that involve submerged casualties, which result in action being taken that is not supported by legislation, policy, procedure, equipment and training.

Conversely, there may be incidents where an appropriate rescue of a submerged casualty can be achieved, if they are visible, within reach and not in a confined space or trapped.

The time taken to rescue a submerged casualty can impact on whether their condition deteriorates, resulting in death or severe injury.

This hazard also applies if a casualty is in a submerged road vehicle, as this will impact on their survivability. It may be possible to access a submerged road vehicle if the appropriate equipment is available. Alternatively, the road vehicle should be relocated to a position where it is no longer submerged, before a rescue can proceed. For more information refer to Casualties in a vehicle in water: Rescue.

Operational discretion

The use of operational discretion should not be applied to search for or rescue a submerged casualty if the activity contradicts service policy or procedures on actions such as removing PPE, entering underwater confined spaces or physically going underwater. The NFCC Position Statement illustrates the reasons for this decision and it is strongly advised that it is complied with when producing service policy, procedures and training.

Additionally, the use of operational discretion to resolve such incidents may result in investigation and litigation from the Health and Safety Executive (HSE) if it is used to address foreseeable risks. For more information refer to Incident command – Decision-making.

Due to the nature of water incidents, in particular incidents involving a submerged casualty, the likelihood of exposing personnel to situations where they cannot act, due to the limitations of their competence, legislation, policy or procedure, are high and should be minimised where possible. For more information refer to Operations - Failing to manage health, safety and welfare.

Control measure – Appropriately informed actions - Search and rescue of a submerged casualty

CONTROL MEASURE KNOWLEDGE

NFCC Position statement – Submerged casualties

Unless services are able to address the identified gap in the required resources, equipment, training, and the actions that are required to remain compliant with legislation, when attending an incident involving a casualty that is submerged, all rescues of a submerged casualty should be taken from the land, the surface of the water or by personnel in the water.

Personnel should be competent to risk assess and carry out rescues and should maintain the correct levels of personal protective equipment (PPE). Operational discretion should not be used as justification to remove PPE, enter confined spaces underwater or act outside of service policy to go underwater.

There may be specific underwater situations that can be controlled to allow a rescue attempt. These situations will usually be when the casualty is visible and submerged in shallow water.

The NFCC will consider future National Operational Learning cases but are unlikely to re-evaluate existing guidance unless they include new evidence, alternative safe systems of work or equipment, or other technical solutions that are deemed as a potential improvement in this matter.

To assist with upholding the NFCC Position Statement on submerged casualties, it is important that the most appropriately equipped and competent resources are mobilised to a casualty who is submerged below the surface of the water. The position statement will assist fire and rescue services in identifying their own position against their identified risks in respects to undertaking rescues of submerged casualties.

Personnel must not be deployed to perform a rescue at an incident where a casualty is submerged that knowingly requires personnel to remove PPE. Personnel must not attempt a rescue that is not performed from the surface of the water, in the water, from land, or within agreed protocols and parameters.

Information gathered from the initial call and first attending responders should assist fire control rooms to mobilise the most appropriate and informed resources to the incident.

Dive teams

Fire and rescue services should try to identify dive teams that can provide an underwater search and rescue capability for incidents involving submerged casualties. If available, they should be mobilised to incidents where a fire and rescue service intervention is not possible. This may be due to the depth or position of a casualty, or a situation that may result in personnel being exposed to an underwater rescue situation.

Restrictions that prohibit dive teams from providing assistance, such as volunteer staffing levels, weather or reduced visibility, should be considered when mobilising or requesting resources.

Information gathering

Fire control rooms and initial responding personnel should contribute to effective information gathering regarding the rescue of a submerged casualty. This can improve on the actions taken in respect to the appropriate weight and effective intervention, by ensuring that the necessary resources are mobilised. For more information refer to Gather information to inform and support an effective water rescue response.

The information collated should be used in collaboration with the survivability model to determine the actions and resources required. For more information refer to Apply the survivability model: Water rescue.

Depending on the information received, fire and rescue services may deem it necessary to minimise the risk of exposure by mobilising a member of personnel to survey the scene. This may be appropriate if a casualty has been submerged for longer than 90 minutes and the likelihood of them surviving due to the presence of an air pocket is minimal. Conversely, if the information received cannot be verified or the casualty is within the survivability model for rescue operations, mobilising an appropriate water rescue response should be considered.

The information gathered from the initial call handling will assist the incident commander in determining the level of equipment, resources and competence that is required to undertake rescue. It will also help establish whether the rescue will be made from the surface of the water or using land access, such as the bankside or bridges. This information will also help to develop a tactical plan and establish whether a viable rescue attempt can be made. A rescue attempt of a submerged casualty should be within service policy and procedure.

Once initial information has been established, if a rescue cannot be achieved; incident commanders may need to promptly consider alternative options, such as:

- Request attendance of police dive teams
- Mobilise enhanced rescue teams with capabilities to operate on the surface of the water
- Attendance of resources with stand-off search and rescue capabilities, such as cameras and reach poles

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
	• Ensure that operational discretion is not used as a pre-planning measure for submerged casualty rescues	New
	• Ensure that personnel understand and operate within	New

	their level of competence	
	• Consider complying with the NFCC Position Statement on submerged casualties	New
	• Consider establishing memoranda of understanding with search and rescue dive teams	New

TACTICAL ACTIONS

Incident commanders should:

- Gather the necessary information to inform a safe and effective submerged casualty search and rescue
- Ensure that personnel do not act outside of the limitations of their competency when searching for or rescuing a submerged casualty
- Consider requesting specialist resources for submerged casualty search and rescue

Control measure – Search and rescue: Submerged casualty

CONTROL MEASURE KNOWLEDGE

A search and rescue of a submerged casualty may be possible by using the equipment available while operating within the parameters of personnel competence and capabilities, either on the water, in the water or from the land. An assessment of the incident should determine what level of intervention is required and a request for the most appropriate resource should be made at the earliest opportunity.

Examples of equipment that can be utilised at water search and rescue:

- Reach poles and attachments
- Bathyscope
- Sonar equipment
- Cameras
- Underwater drones

Deploying personnel under the hierarchy of risk (rescue formula) may adequately provide the options appropriate for providing a rescue capability within the parameters of legislation, training, and competence.

If a rescue cannot be achieved, it may be necessary to apply the survivability model to inform the decision to cease rescue operations and help inform the actions of oncoming responders. For more information refer to Apply the survivability model: Water rescue.

At the point that a rescue cannot be achieved, the incident commander should request the attendance of the police, if they are not already at the incident, and establish functional cordons. For

more information refer to Cordon controls: Water rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
	• Ensure all relevant personnel understand the acceptable methods and limitations for rescuing a submerged casualty	New
	• Consider providing appropriate equipment to facilitate a surface or land-based search and rescue of a submerged casualty	New

TACTICAL ACTIONS

Incident commanders should:

- Consider the use of specialist equipment to help locate and rescue submerged casualties
- Record when a casualty became submerged

Hazard – Entrapment or entanglement in water

This hazard should be read in conjunction with Hydrological hazards

HAZARD KNOWLEDGE

Entrapment and entanglement are hazards that may affect members of the public and personnel. Entrapment or entanglement in static or moving water is hazardous as it may be difficult to escape without assistance. If somebody is trapped in water, they may be at risk of hypothermia.

Entrapment or entanglement in water may cause personnel or casualties to lose their footing or be pulled under the water. Once submerged, the force of water and the environment may make it difficult to keep their head above water, increasing the risk of drowning unless released.

Entrapment or entanglement may be caused by:

- Strainers
- Submerged street furniture and displaced drainage covers during flooding
- Debris
- Loose rocks and unstable ground conditions
- Fire and rescue service lines, including incorrect or non-floating lines

Control measure – Clean line principle: Working near, on or in water

CONTROL MEASURE KNOWLEDGE

Fixed lines can pull responders underneath the water and untreated lines may sink and snag on submerged objects when saturated. Any fixed line may hold a responder or casualty in a hazardous position.

All lines used in the water environment should be designed and treated for use in water. All lines must always be easily releasable. Personnel should have other means of releasing lines if they present a hazard to casualties or emergency responders such as the ability to cut a line if necessary.

The use of collective or personal work restraint systems that completely remove the risk of accidental entry when working near water may be considered where appropriate. The use of work restraint systems should be risk-assessed considering any reasonably foreseeable actions that may be required. If the risk of entry cannot be entirely removed, the clean line principle should be followed.

The consideration for appropriate personal protective equipment (PPE) should always be considered. Releasable flotation devices for deployed personnel in a water environment and necessary lighting can contribute towards ensuring the safe use of lines within a water environment. For more information refer to Personal protective equipment: Water rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21373	• Provide lines and equipment suitable for use at water rescues	Revised

TACTICAL ACTIONS

Incident commanders should:

- Use the clean line principle at water rescue incidents
- Deploy appropriate work restraint systems at water rescue incidents
- Use lines suitable for water rescue incidents

Control measure – Remove entrapment or entanglement hazards in water

CONTROL MEASURE KNOWLEDGE

Potential entrapment or entanglement hazards should be removed from the water where possible.

This may involve cutting lines, removing debris or otherwise changing the environment to eliminate the risk.

If personnel that are operating in the water and encounter entrapment or entanglement that cannot be released, a firefighter emergency may need to be declared. For more information refer to Initiate firefighter emergency: Water rescue.

STRATEGIC ACTIONS

Reference No. if applicable	Strategic action	Revised, new, archive or no change
	• Consider providing equipment suitable for dealing with entrapment or entanglement in water	New

TACTICAL ACTIONS

Incident commanders should:

- Consider removing entrapment or entanglement hazards from the water when attending a water rescue incident
- Consider cutting rescue lines during a water rescue incident if necessary

Hazard – Casualty in a road vehicle in water

This hazard should be read in conjunction with Height, structures and confined spaces – Confined space environment

HAZARD KNOWLEDGE

Road vehicles containing passengers may accidentally enter a body of water or become partially submerged in rising floodwater or tides. Road vehicles may be stable in low levels of water but become buoyant if water levels rise. A submerged road vehicle can be considered as a confined space.

A road vehicle entering a body of water may quickly float away from the point of entry. The electrical systems and powered windows may work for a time, even if it is full of water.

Electric road vehicles

Electric and hybrid road vehicles are designed to be safe in water, even if fully submerged. The high-voltage system is isolated from the chassis and is designed to not pose a risk of shock or energize the surrounding water. However, attempting to isolate or disconnect the high-voltage circuitry while a vehicle is in water may result in electric shock as well as wider transmission of electricity through a body of water.

When submerged, bubbles may be visible from the battery arrays, this is referred to as micro-bubbling and does not indicate a shock hazard nor energise the surrounding water.

Submersion in water, especially salt water may damage high and low voltage components. Although not a common occurrence, this could result in an electrical short and potential fire when the vehicle is no longer submerged.

If there is evidence or reason to believe that the high-voltage systems have been damaged, extreme caution should be exercised when entering the water or approaching the vehicle due to the risk of electric shock.

For more information refer to– Transport – Electrical systems in modes of transport.

Road vehicle safety systems

When submerged, vehicle electronics may activate without warning and for no apparent reason because water is affecting the vehicle's circuitry.

Supplementary restraint systems (SRS) may activate and act as a hazard to the casualties and personnel as well as restrict the ability to exit the vehicle.

For more information regarding the systems that may be affected by water. For more information refer to Transport - Road vehicle safety systems.

Road vehicle position and stability

Once a vehicle is full of water, other factors will influence how it behaves, including the underlying

surface, water current and the weight and distribution of passengers or load. During floods, uncontrolled flows of water can pick up road vehicles and propel them at speed to hazardous areas, including electrical installations, deeper water, areas where members of the public are trapped or where emergency responders are working.

Depending on ground conditions, a partially buoyant vehicle may pivot around its heaviest point. Eventually, road vehicles are likely to move to a position where its heaviest part is pointed into the flow.

Although a vehicle may appear stable in this position, no vehicle in water should be considered safe until secured as changes in flow, ground conditions, changes in load position in a car or release by an object such as a branch or rock holding a vehicle in position may cause sudden movement.

A vehicle's orientation to the flow will affect its movement. If the vehicle is side-on to the current on a solid riverbed in flowing water, a vehicle roll is almost inevitable. Even in slow currents, a vehicle may be rolled a considerable distance. If a vehicle lands on its wheels on a soft river bottom each tyre will create an eddy. This may scoop out mud and sand causing the vehicle to settle onto its chassis.

If a vehicle comes to rest or becomes wedged against an obstacle, an eddy may present a seemingly safe area to work from. However, the obstacle or object may suddenly move due to its compromised stability causing the vehicle to rotate, roll or move while rescue operations are being attempted. Even seemingly stable road vehicles may need to be secured.

Redistribution or removal of the load from a vehicle may cause it to flip or move suddenly. Responders should be aware of this risk and should avoid removing weight from a vehicle before stabilising and securing it. Movement of casualties inside a buoyant vehicle may cause unexpected vehicle movements.

Any attempt to gain access to a vehicle or any sudden movement of the vehicle may trigger a vehicle's supplementary restraint systems (SRS). These systems may present a direct hazard to personnel and any movement of the vehicle created by the activation of the device may affect the vehicle's stability. For more information refer to Transport - Road vehicle safety systems.

Water conditions will dictate the best direction to approach an unsecured vehicle in water. Depending on the hydrology, flow of water around a vehicle, ground conditions and depth, a car may move or roll which will endanger personnel approaching from downstream. In flowing water, currents will pass under and around the vehicle creating a strainer or siphon-like effect. Creating openings on the upstream side may be difficult and affect the stability of the vehicle.

Evacuation from a road vehicle

When evacuating or rescuing people, consider the effect of pets and other animals. Controlling the movement and behaviour of animals during rescue attempts may not be possible and their movement may affect the stability of the vehicle. Animals may be distressed by the incident and require additional restraint to prevent them posing a hazard to rescuers.

For more information on rescuing animals from road vehicles, refer to Incidents involving animals –

Animal in transit.

Road vehicle underwater

If a vehicle is underwater and cannot be relocated, the vehicle and its occupants should be treated the same as a submerged casualty. For more information refer to Appropriately informed actions - Search and rescue: Submerged casualty

Control measure – Stabilise and anchor a road vehicle in water

CONTROL MEASURE KNOWLEDGE

The risk of a vehicle moving or flipping due to the impacts of hydrology, should be considered as part of the rescue plan and appropriate control measures used to secure the vehicle before the start of casualty removal. Personnel should avoid working directly in the downstream path of unsecured road vehicles that are or may become buoyant.

Direction may need to be given to people inside or on top of a vehicle to remain in place, to ensure that the vehicle remains stable. This will allow personnel to initiate appropriate stabilisation and anchoring before the occupants of the vehicle are requested to move. Anchoring a vehicle will reduce the likelihood of it moving and reduce the risk of harm to emergency service personnel, members of the public and persons trapped inside the vehicle. When anchoring a vehicle, consider the affects any method of securing the vehicle will have on the rescue of casualties, for example, securing and anchoring around the door pillars may restrict the doors when they are required to be opened as part of any rescue plan.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21731	• Provide appropriate equipment to stabilise or anchor road vehicles in water	Revised

TACTICAL ACTIONS

Incident commanders should:

- Consider the stability of unsecured road vehicles
- Consider hydrology and vehicle stability when approaching a vehicle in the water
- Consider securing or anchoring road vehicles in water
- Regularly assess and review the effectiveness of the stabilisation techniques employed

- Consider how the stabilisation methods may interfere with the rescue plan
- Direct the occupants of a vehicle to remain in place until adequately anchored and stabilised

Control measure – Avoid entering a road vehicle in water

CONTROL MEASURE KNOWLEDGE

Entering an immersed, partially submerged or completely submerged vehicle can be extremely hazardous. Road vehicles can suddenly shift with movement or an increase in depth of the surrounding water, ultimately trapping rescuers inside and causing physical injury.

Initial call interrogation can help to prevent unnecessary or inappropriate deployment of resources. An example of this would be to challenge an emergency call regarding an unoccupied vehicle in floodwater. The line of questioning to determine appropriate mobilisation includes:

- The length of time the vehicle has been in the water
- The depth and speed of flow of the water
- If the vehicle is occupied or unoccupied

A dynamic risk assessment should consider the window of opportunity for performing a life-saving rescue, using safe working practices and competent personnel to carry out tasks. This may mean considering the speed of water flow and how quickly an area is becoming inundated, the depth of the water and the likely path of travel the vehicle may take if it were to move.

Personnel should avoid entering a submerged or partially submerged vehicle as this may affect its stability, potentially resulting in entrapment. The surface of a road vehicle is likely to be extremely slippery and standing on top of it is not recommended.

Leaning into a vehicle to assist a casualty while wearing automatically inflating life jackets should be avoided. If the device is activated while fully or partially in a vehicle, either by accidentally triggering the device or if sensors become submerged, the inflated life jacket may cause the responder to become trapped.

Casualties can be encouraged to self-extricate once appropriate control measures are established. For more information refer to Rescue from road vehicles in water.

Electric road vehicles

Hybrid and electric road vehicles should be isolated in the same way as conventional road vehicles, using the vehicle ignition. This will assist in preventing the unwanted movement of the vehicle. High-voltage circuitry should not be disconnected or touched if a vehicle is submerged, to prevent the risk of electrocution and the transmission of electricity through the water.

An appropriate scene survey may be necessary to determine if the high-voltage system has been compromised through damage as a result of an accident. If a high-voltage battery has been damaged, there may be a risk of electric shock and transmission through the body of water.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21731	• Provide appropriate means for assessing road vehicles in water	Revised
	• Provide appropriate equipment to safely rescue casualties from a road vehicle in water	New

TACTICAL ACTIONS

Incident commanders should:

- Avoid entering submerged or partially submerged road vehicles
- Survey the vehicle for positive identification of occupancy
- Identify the likelihood of damage to an electric vehicle's high-voltage system
- Appropriately isolate the road vehicle
- Prevent any interaction with the high-voltage system on an electric or hybrid road vehicle

Control measure – Gaining access to a road vehicle in water

CONTROL MEASURE KNOWLEDGE

Opening windows, doors or taking any action that alters the weight of a vehicle in water will affect its stability and buoyancy. The removal and safety of casualties should be the primary concern during a rescue from a vehicle in water but altering the stability or buoyancy of a submerged or partially submerged vehicle that has not been suitably anchored should be avoided where possible.

Stabilisation should be prioritised in flowing water. Hydrology can impact on the stability of a vehicle through actions such as the removal of weight from a vehicle, for example by removing a casualty, or by opening a door. The resultant outcome may cause sudden uncontrolled vehicle movements and present a hazard to both casualties and personnel. Working near an unsecured vehicle should be avoided.

Each situation will need to be carefully assessed to identify the appropriate method and angle of approach to the road vehicle.

If an opening needs to be made, personnel should consider how this will affect the vehicle's stability and do so from a position of safety. The use of hydraulic rescue equipment may be necessary but the effect of the application of force, safety restraint systems and sudden movements of the vehicle or parts of the vehicle should be considered.

When removing structural elements of a vehicle in flowing water, large or heavy objects should be secured, or the hazard to downstream responders considered.

It may be necessary to brief and appoint a safety officer to monitor the stability and safety of the vehicle if access to it is required to rescue a casualty. For more information refer to Safety officers: Water rescue.

STRATEGIC ACTIONS

Reference No. if applicable	Strategic action	Revised, new, archive or no change
	• Consider providing appropriate equipment to gain access to a vehicle in the water	New

TACTICAL ACTIONS

Incident commanders should:

- Consider the possibility of air pockets maintaining the buoyancy of a vehicle in deep water
- Consider hydrology and vehicle stability while gaining access to road vehicles in water
- Consider nominating a briefed safety officer to monitor vehicle stability

Control measure – Rescue from a road vehicle in water

CONTROL MEASURE KNOWLEDGE

If there are occupants in a road vehicle in water, before encouraging them to self-evacuate or performing a rescue, protective safety measures should be deployed if necessary to protect them once they enter the water. Protective safety measures can include:

- Personal flotation devices (PFDs), such as:
  - Life jackets
  - Lifebelts or floats
- Throwlines
- Downstream protection, such as:
  - Safety teams
  - Rescue teams

In the first instance, the occupants of a vehicle should be encouraged to self-extricate, but if they cannot get out of the vehicle, personnel will need to perform a rescue.

There should be early and clear communication with the occupants of the vehicle to ensure they are

aware of the rescue plan. They should be provided with clear instructions if personnel need them to comply with any of the activities. This should reduce the likelihood of vehicle occupants or other members of the public taking unwanted or unplanned risks.

Once a rescue has been completed, it may be necessary to hand over responsibility for the security of a road vehicle, establish a means of protecting it or moving it when safe to do so. The last of these options may be required to provide a clear route for emergency vehicles.

Relocation

Following a suitable risk assessment, the relocation of a road vehicle may be a viable option to save the lives of any occupants trapped within a vehicle. This may also be a suitable option if a road vehicle containing occupants becomes submerged.

Road vehicle safety systems

If personnel need to enter a road vehicle, steps should be taken to mitigate the risks from vehicle safety systems activating. Water may trigger the actuation of systems, such as airbags, which could result in injuries to the casualty or personnel and impact on the stability of the vehicle.

The presence and location of road vehicle safety systems, such as supplementary restraint systems (SRS), should be identified. Personnel should be briefed on the location and type of systems that may need to be avoided or controlled, by using equipment such as airbag protectors.

For more information refer to Transport – Road vehicle safety systems.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
	• Provide appropriate communication equipment for water rescue incidents	New
	• Consider providing appropriate equipment to safely rescue casualties from a vehicle in water	New
Transport	• Provide personnel with access to up-to-date information regarding vehicle design, including vehicle safety systems	No change

TACTICAL ACTIONS

Incident commanders should:

- Make early, clear communication with the occupants of a road vehicle in water
- Use available equipment to support self-extrication from a road vehicle in water, if

appropriate

- Consider the presence of vehicle safety systems in a road vehicle in water
- Provide appropriate protective safety equipment to occupants of a vehicle in water
- Consider relocating a vehicle in water

Hazard – Deterioration in the condition of a casualty: Water rescue

This hazard should be read in conjunction with Search, rescue and casualty care – Deterioration in the condition of a casualty

HAZARD KNOWLEDGE

A compromised airway in a water environment is likely to be the main cause of death. This may be caused by several factors, including:

- Loss of consciousness
- Shock leading to cardiac arrest
- Hydrology overcoming a casualty leading to drowning

When water is inhaled or swallowed it may prevent respiration or trigger a cardiac arrest, eventually causing drowning. Small quantities of water can cause drowning and other health implications. It is also possible for submerged casualties to drown without inhaling or swallowing any water, as survival mechanisms can cause an airway to close to prevent water from entering the lungs.

There remains a significant hazard to rescued people who may have inhaled or swallowed even a relatively small amount of water and even after breathing has resumed. Water can damage the inside surface of the lung, causing heart irregularities and reducing the ability to exchange air. It can lead to serious secondary complications after the event, including death. This delayed collapse is referred to as secondary drowning and can be a cause of death in casualties who have been successfully rescued.

Hypothermic casualties may be extremely vulnerable and should be handled with additional care. Although the priority will be to move a casualty to a position of safety, responders should be aware that rough handling of hypothermic casualties can result in cardiac arrest.

The blood pressure of casualties who have been in the water for some time, have become hypothermic or have lost significant volumes of fluid, maybe being maintained by the pressure of the water; this is referred to as hydrostatic squeeze. When removed there is a risk that blood pressure will drop, causing cardiovascular injury or hypovolemic shock.

Control measure – Specialist resources: Medical resources for water rescue

This control measure should be read in conjunction with Search, rescue and casualty care – Specialist resources: Medical resources

CONTROL MEASURE KNOWLEDGE

Due to entrapment, entanglement or the hazards related to moving a casualty, it may be necessary to treat a casualty in situ. Specialist teams are available that can access casualties in the water environment, stabilise and treat them.

Mobilising specialist medical teams should be considered during the initial assessment of resources, as medical advice may be required during the planning stage of a water rescue.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21717	• Hold contact details for specialist medical responders to enable a timely response to water incidents	No change
21718	• Consider requesting specialist medical teams to incidents involving water	No change

TACTICAL ACTIONS

Incident commanders should:

- Consider requesting specialist medical teams to incidents involving water
- Consider using medical advice when planning rescues from water

Control measure – Carry out structured assessment and treatment: Water rescue

This control measure should be read in conjunction with Search, rescue and casualty care – Carry out structured assessment and treatment

CONTROL MEASURE KNOWLEDGE

A casualty who is still in water may require immediate intervention to keep their airway clear. Personnel can carry out measures to achieve this, but only if it is safe for them to enter the water.

Alternative methods of maintaining a casualty's airway may need to be considered, such as using available equipment. For example, if the casualty cannot be removed from the water, equipment can be used to support their weight and maintain their airway until specialist resources can rescue them.

Structured assessment and treatment of the casualty should be carried out. This should include assessing the casualty to recognise potential signs and symptoms of drowning. Intervention may be required to prevent a casualty from vomiting, as this may block their airway or trigger a cardiac arrest.

Personnel should monitor the casualty after they have been rescued from the water, until they are handed over to a medical responder. It may not always be obvious that a casualty requires immediate hospitalisation. However, it is recommended that a casualty who may have inhaled or swallowed water is treated with oxygen and transferred to a hospital, unless a medical responder advises otherwise.

STRATEGIC ACTION

Reference No. if applicable	Strategic action	Revised, new, archive or no change
	• Consider providing the necessary equipment to suitably assess and treat a casualty in water	New

TACTICAL ACTIONS

Incident commanders should:

- Consider initial actions to provide and maintain an airway
- Provide appropriate first aid for casualties rescued from the water
- Monitor the casualty after their rescue from the water, until they are handed over to a medical responder

Control measure – Rescue of a hypothermic casualty from water

CONTROL MEASURE KNOWLEDGE

Due to the risks related to transporting hypothermic casualties, establishing a controlled method of rescue should be considered. Specialist medical advice may be required when establishing a method of removal. For more information refer to Specialist resources: Medical resources for water rescue.

Methods of removal may require stabilising casualties in situ and using on-water resources, rope rescue or technical rescue teams to allow the casualty to be removed horizontally.

Removing a casualty from the hazard area will remain the priority, but responders should consider the risk of removing casualties too quickly or vertically, and where possible rescue casualties in a horizontal position with legs elevated to reduce the risk of shock.

STRATEGIC ACTIONS

Fire and rescue services should:

Reference No. if applicable	Strategic action	Revised, new, archive or no change
21722	• Consider providing relevant personnel with appropriate means of rescuing hypothermic casualties from water	Revised

TACTICAL ACTIONS

Incident commanders should:

- Consider requesting specialist teams to assist with the rescue of a hypothermic casualty
- Consult with medical responders to help formulate a rescue plan and communicate to relevant responders
- Remove casualties from water in a horizontal position and elevate legs where possible

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Hazard – Working environment: Water rescue and flooding [DUPLICATED CONTENT]

Hazard – Water rescue and flooding [COMBINED]

Control measure – Establish appropriate cordon controls [DUPLICATED CONTENT]

Control measure – Site-Specific Risk Information: Water rescue and flooding [RELOCATED]

Control measure – Tide timetables and water temperature charts [COMBINED]

Control measure – Assess current and forecast weather conditions [DUPLICATED CONTENT]Control measure – Arrangements to deal with firefighter emergencies [DUPLICATED CONTENT]

Control measure – Specialist resource: Helicopter [DUPLICATED CONTENT]

Control measure - Specialist advice: Water Management systems [COMBINED]

Control measure - Isolate equipment: Water management systems [COMBINED]

Hazard – Biosecurity [DUPLICATED CONTENT]

Control measure – Clean equipment, vehicles and personal protective equipment [DUPLICATED CONTENT]

Control measure – Containment [DUPLICATED CONTENT]

Control measure – Specialist advice: Biosecurity [DUPLICATED CONTENT]

Hazard – Waterways incidents [RELOCATED]

Control measure – Responsible person: Waterways incidents [RELOCATED]

Control measure – Safe system of work: Waterway incidents [RELOCATED]

Hazard – Insufficient resources: Flooding [RELOCATED]

Control measure – Specialist resource: Flooding [RELOCATED]

Control measure – Request National Resilience resources for high volume pumps [RELOCATED]

Control measure – Deployment of high volume pumps resources [RELOCATED]

Control measure – High volume pump hose deployment [RELOCATED]

Control measure – Water extraction: Deploy high volume pump to remove flood water [RELOCATED]

Hazard – Insufficient preparation for flooding [RELOCATED]

Control measure – Prepare for flooding [RELOCATED]

Control measure – Liaise with local emergency planning groups [RELOCATED]

Control measure – Warn, inform and advise people: Flooding [RELOCATED]

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