



Public Access to Open Reservoirs



Water UK Occasional Guidance Notes

Public Access to Open Reservoirs

Foreword

This Occasional Guidance Note (OGN) is produced by Water UK. It has been updated and reviewed by representatives of both the Water Industry and the Health and Safety Executive.

This OGN is not intended to be a handbook for controlling risks associated with open reservoirs, but to outline a management approach that individual water companies should consider when assessing foreseeable risks to members of the public and other third parties who have access to open reservoirs.

Water UK members are not obliged to implement nor interpret legal requirements in the same way as recorded in this Occasional Guidance Note. However, the Health and Safety Executive expects similar priorities and equally effective preventative measures to be enacted within each member organisation.

The water industry is committed to the highest standards of public health and safety and continues to develop and publish industry guidance on specific health and safety topics.

I would like to thank John Needs (Chair) and Roger Thomas (Technical Secretary) from Dwr Cumru, John Corden from Southern Water, Mark Dawson from HSE, Paul Roche from United Utilities, and Michelle Gale and David Matthews from Anglian Water for preparing this document on behalf of Water UK's Occupational Health and Safety Group.

Signed

Water UK Council Member

Date.....

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Contents

Foreword	2
Introduction	4
Background	5
What the Law Requires	6
What is a Reservoir?.....	7
Assessment of Risk	8
Step 1 - Identification of Hazards	9
Step 2 - Decide who may be harmed and how	11
Who might be at risk?	11
How people at risk may be harmed?.....	11
Drowning	11
Hypothermia	12
Poisoning/irritation from blue green algae	12
Entanglement.....	12
Step 3 - Evaluating the Risk	13
Evaluating the risk from Public Access to Reservoirs	13
Hierarchy of Control Measures	16
Eliminate (e.g. avoidance)	16
Reduce (e.g. security)	16
Isolate (e.g. barriers, fences)	16
Control (e.g. signs and warning notices, access)	18
Protect (e.g. lifesaving appliances).....	19
Discipline (e.g. Bylaws, education, training, inspection, maintenance)	19
Step 4 - Record the significant Findings	21
Accountability and Records.....	21
Step 5 - Review assessment at appropriate intervals	22
Further Reading	23
Relevant Legislation	23
Useful Websites	23

Public Access to open Reservoirs Occasional Guidance Note

Introduction

Reservoirs can seem inviting places, during the warmth of summer or the freezing cold of winter. However these expanses of open water have led to tragedies when members of the public have ignored safety advice not to swim in these reservoirs or walk on these reservoirs when frozen.

Contained within reservoirs there are many hidden dangers including extremely deep and cold water (even in summer), strong undercurrents and numerous underwater hazards.

When people get into difficulties, the risk of harm is heightened as many reservoirs are in remote locations which can delay any assistance or emergency response.

This Water UK Occasional Guidance Note (OGN) has been produced in association with the Utilities Section of the Health and Safety Executive (HSE) to provide a framework for water companies who have responsibilities for these assets, to undertake an assessment of the risks they present to the public.

The occupational dangers faced by employees or contractors whilst at work are specifically excluded from the guidance. So too are water sport activities, for which relevant standards of protection have been developed by water sport lead bodies.

This publication is also intended to assist other owners of similar open water facilities to identify and review their health and safety risks.

Background

This Guidance Note considers the water related risks to public safety at open reservoirs, where access, authorised or otherwise, can be made from the water's edge.

Those with responsibility for open reservoirs need to take measures to control the water related risks that the public may face. That is not to say that all risks need to be eliminated; instead, the measures taken should be proportionate to the level of harm that could arise.

Reservoirs and their surroundings can provide a valuable public amenity, one that greatly benefits the local community. By sensibly managing the risks, reservoir owners can ensure that their full potential is realised without endangering public safety.

The assessment of risk is discussed on page 8. Further information can be found in the HSE leaflet INDG163 "[Five Steps to Risk Assessment](#)", and on the Risk Management pages of the Health and Safety Executive's website. Full commentary on the requirements of the Management of Health and Safety at Work Regulations (Management Regulations) can be found in "Managing Health and Safety" the Approved Code of Practice; reference L21, ISBN 0-7176-24899.

What the Law Requires

In addition to the common law duty of care, there are a number of relevant statutory requirements that may be applicable.

Section 3 of the Health and Safety at Work Act requires employers to conduct their undertaking without risk to the public, but this requirement is qualified by what is 'reasonably practicable'. This requires judgement about the extent of the risk and the cost of various options for removing or limiting the risk.

The Management of Health and Safety at Work Regulations require employers to make an assessment of the risk to the health and safety of those who may be affected by their work or business. This will include the general public. The assessment should identify what control measures are required, and there should be arrangements in place for the effective planning, organisation, control, monitoring and review of those control measures. This OGN will form a key part of the Water Industry's generic risk assessments.

Legal duties may also extend to those who have gained access unlawfully, i.e. those trespassing. The Occupiers Liability Act requires water suppliers to provide protection when it is reasonable to do so.



What is a Reservoir?

There are three main types of reservoir.

- a) Catchment reservoirs (sometimes called 'impounding reservoirs') have often been created by damming natural water courses and are used to store great quantities of water. They usually resemble natural lakes, being open to the elements, usually in quiet rural locations.
- b) Raw water reservoirs are often found at water treatment works. They receive water from catchment reservoirs, storing it prior to treatment, and are available as a precaution in case there is an unexpected interruption of supply.

Raw water reservoirs are also found nearer to centres of population, and will normally be open, with very steep or vertical concrete sides from which escape can be extremely difficult.

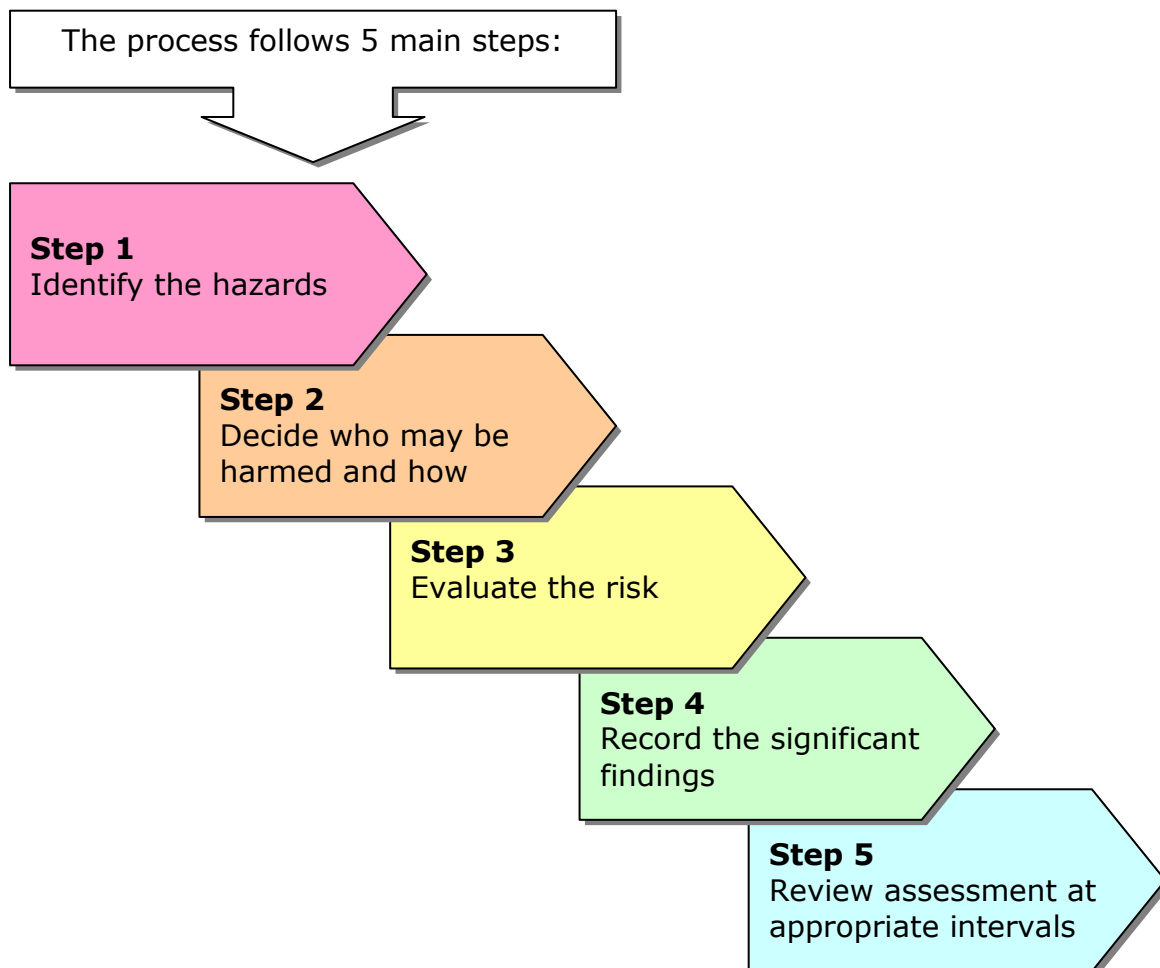
- c) Treated water reservoirs should be completely enclosed, and are therefore not referred to in this Guidance Note.



Assessment of Risk

The risks of injury or ill health that can be caused by the work undertaken by an organisation must be controlled, and to adequately control risk, the hazards, or causes of injury or ill health must be identified, evaluated and then put into context.

To assist organisations assess the health and safety risks associated with open reservoirs the following risk assessment protocol has been developed. It is based upon the well-established "5 Steps To Risk Assessment" document published by the Health and Safety Executive.



Step 1 - Identification of Hazards

There are a number of common hazards associated with open water reservoirs which should be considered as part of the risk assessment. Typical examples of these which are reasonably foreseeable include:

- **Ice** – persons accessing ice during winter months and falling through
- **Very cold water** - the temperature of the water can be very cold even in summer.
- **Blue-green algae** – a bacteria that can be present in or on the water and can cause illness to people and animals.
- **Mud / Silt** - due to low levels through drought or drawdown potential for persons to become stuck.
- **Underwater currents** – strong currents can be present in open water leading to greater risk of drowning.
- **Man made structures** – dams, walls, spillways, jetties and other areas where there is risk of persons falling in and not being able to get out
- **Bank erosion** – some parts of the reservoir are susceptible to bank erosion which increase the risk of falls into water.
- **Lack of appropriate signs or inadequate signs** – such as no swimming, bank erosion, and bylaws requirements.
- **Sub-surface machinery or aerators** – persons becoming entangled with them.
- **Drugs & Alcohol** – enforce message about dangers of drug use and alcohol consumption near open water.
- **Areas where there is evidence that a hazard has been regularly encountered** – unauthorised access to reservoir, trespassers.

Whilst not exhaustive this guide to common hazards found at open water reservoirs may be of assistance in formulating a risk assessment. The hazards identified will remain the same however the risk can increase at certain times such as school holidays, hot weather and freezing conditions which will also need to be included in the risk assessment.



Blue Green Algae

Step 2 - Decide who may be harmed and how

Who might be at risk?

- **Visitors** - can include authorised visitors, members of the public, children, and organised groups.
- **Trespassers** - risk assessments must take account of unauthorised visitors.
- **Young adults/teenagers** - evidence shows that this group represent a high proportion of fatalities at reservoirs. Sometimes teenager's sense of adventure can outweigh their appreciation of the risks.
- **Employees** - Water companies own employees, wardens, marshals etc. and those employed at reservoirs.
- **Vulnerable groups** - people visiting reservoirs can include disabled people, the elderly or very young, and foreign visitors who may not understand English.
- **Animals** - e.g. dogs being walked by their owners. Animal owners may put themselves at risk to rescue their pets if the pets got into difficulty.

How people at risk may be harmed?

Drowning

Drowning is an ever present risk to those who enter reservoir water either deliberately or accidentally. Even people who consider themselves to be good swimmers are potentially at serious risk especially if alcohol or drugs have recently been consumed. Sometimes, a person's perception of distance can be distorted by the scale of the surroundings and they rapidly become fatigued, increasing the risk of drowning.

Although there are relatively few drownings in lakes and reservoirs, local risk assessment and control is vital. Consideration to how easily accessible the water is for children must be considered. Children can be attracted to water and can be found playing near reservoirs without parental knowledge or supervision. Therefore the potential of a child drowning is significant.

Drowning occurs when a person cannot stay afloat and water enters the lungs through inhalation. Cold water temperature can trigger the 'gasp' reflex and therefore water is taken involuntarily into the lungs. Even if an individual is able to stay afloat, the rapid cooling of the body can lead to hypothermia, which may be fatal.

There is also a condition known as 'dry drowning', which is not fully understood, but which may be due to the effect of low temperature on the heart and breathing.

Hypothermia

People can be affected by hypothermia from swimming or falling into cold water, or stuck in mud/silt for a considerable amount of time

Poisoning/irritation from blue green algae

Minor contact and ingestion can cause abdominal pain, vomiting, diarrhoea, skin rashes, eye irritation and allergic reactions. Very severe contact and reactions can cause liver injury and death

Entanglement

Entanglement with vegetation, sub-surface machinery, aerators, or other underwater structures can cause serious injury or even death



Step 3 - Evaluating the Risk

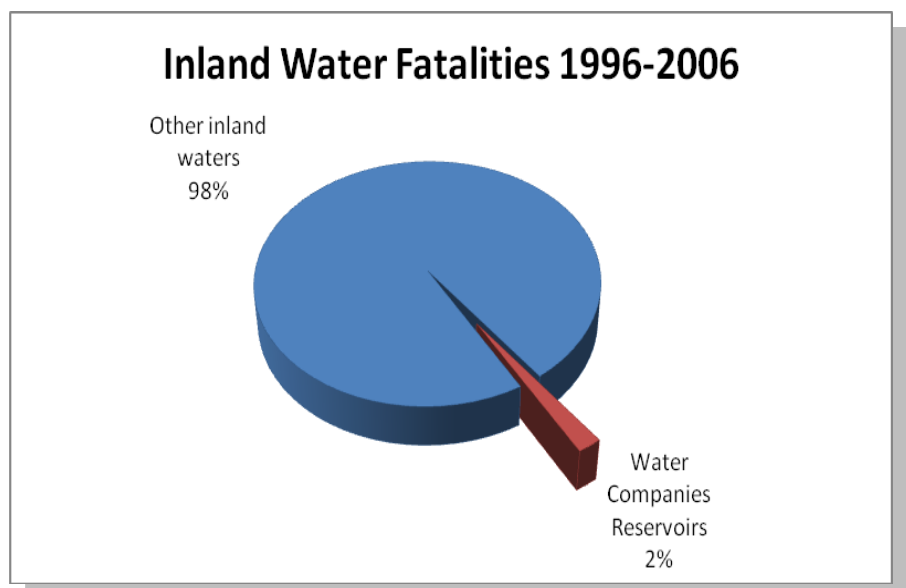
Evaluating the risk from Public Access to Reservoirs

While a range of hazards have been identified in the previous section, the risk of drowning is most often associated with the public accessing Water Company reservoirs.

The Royal Society for the Prevention of Accidents (RoSPA) state that the risk of drowning is small, with a death rate due to drowning of less than 0.8 per 100,000 in the UK each year. This compares to 5.6 per 100,000 for UK road deaths (source: National Statistics 2004).

To place this risk in context, statistics related to drowning are collated from a range of sources by the National Water Safety Forum Information Group (NWSF) (<http://www.nationalwatersafety.org.uk/information/index.htm>) and RoSPA show that in period 1996– 2006 a total of 2500 people drowned in all types of inland water location e.g. domestic baths, swimming pools, garden ponds, rivers, canals, lakes and reservoirs.

Of this total less than 2% (41) were in water Company reservoirs.



Data Source: RoSPA and NWSF

These statistics show that the risk of drowning in Water Company reservoirs is low, especially when it is noted that the data includes suicides.

Water Companies wish to encourage appropriate recreational access to reservoirs. While access may be restricted to some sites, most companies have developed access to particular reservoirs to further increase public amenity.

As a principle, Water Companies want to enable access, not unreasonably restrict or introduce widespread prohibitions on activities.

By undertaking a suitable local specific assessment of the hazards and resulting risks, effective control measures can be introduced which enable recreational public access. An example of this general principal is swimming. All Water Companies prohibit unauthorised swimming in their reservoirs. This decision is based on the incidence of drowning connected to uncontrolled swimming.

However, adopting the “enabling principle”, in recent years some companies at their discretion have approved professionally managed and organised events involving swimming to be run at their reservoirs (e.g. Triathlons and Aquathons). The companies approving this activity believe that organised swimming events that are properly managed with appropriate and visible safety arrangements, can have a positive influence on the wider issue of water safety.

Many water company reservoirs are set in wild and natural environments. The risk they present to visitors are mostly no different from a natural lake with gently sloping sides in a similar location. Natural lakes are not fenced and the water industry believes that fencing the water’s edge should not be the norm for reservoirs.

The Visitor Safety in the Countryside Group (VSCG) has produced guidance which provides far more detail on balancing the various areas of **“Visitor Awareness: Partnership: Responsibility: Risk Control”** when managing safety of visitors to the countryside.

Where a Water Company reservoir presents little or no extra risk to that encountered in the natural environment, there are few necessary additional control measures required.

While encouraging appropriate access, the water industry recognises that a key difference between a natural lake and a reservoir is that the latter may have steeply sloping manmade dams and spillways. These parts present a greater risk than the rest of the natural perimeter and require additional controls applicable to those defined areas.

As risks increase, for instance by proximity to denser populations, progressive control measures need to be considered. Therefore - whether for catchment or raw water storage reservoirs - a local judgement needs to be made in each instance about which control measures to apply. This judgement will rely on knowledge and experience local to the site and will include, for instance, any history of trespass or known short-cuts.

The water industry endorses the principles of sensible risk management stated by the HSE and developed by the VSCG (<http://www.vscg.co.uk/>).



Hierarchy of Control Measures

It is seldom possible or reasonably practicable to remove all risks. Therefore, water companies may need to select one or more control measures from the following list, depending on the outcome of the completed risk assessments.

Eliminate (e.g. avoidance)

At disused sites, it may be possible to remove all hazards, e.g. by removing water, infilling and landscaping the site permanently.

In other locations, for example at raw water reservoirs, the information in this guidance note may tip the balance toward permanent removal of the reservoir, if this is already under consideration for operational reasons.

Disused buildings which may attract trespassers can sometimes be removed.

Reduce (e.g. security)

There may be certain circumstances, for example where there is a persistent problem with trespass, some water companies have agreements with private security firms to help reduce unauthorised access and vandalism on their reservoirs. Security cameras may be used successfully in combination with other control measures.

All doors and access hatches should be securely locked.

Isolate (e.g. barriers, fences)

For a catchment reservoir in a rural location, with no watersports or other activity attracting the public to the water's edge, no particular control measures are required, except at vulnerable areas such as a weir or spillway. Here, edge protection may be required.

When designing new walls as part of a barrier, consideration should be given to avoid flat copings, which might encourage children to clamber onto them. Appropriate assessment and control measures should be applied for existing walls with flat copings.



Security fencing to a suitable height should be considered as a deterrent where local risk assessment highlights a particular need. This might be where:

- The reservoir is in or near an area of population.
- There is some other special local hazard warranting this extra precaution, e.g. where there is a known history of trespass or vandalism. Mesh infill is sometimes required to protect children.

Unauthorised vehicle access can be controlled by use of suitable barriers and bollards.

Natural barriers in the form of selective planting such as gorse, blackthorn or other thorny shrubs can be used to deter unauthorised access.

Rural catchment reservoir locations have no greater hazard than natural lakes with regard to the risk of falling in, except when there are dams or spillways. The water industry's view is that there is therefore no legal or societal expectation that perimeters should be fenced.

Control (e.g. signs and warning notices, access)

If there are water sports, special walkways, tea rooms, or any similar activities to invite public access, then reservoirs should be provided with warning notices at all main access points, e.g. vehicular access to sites, car parks, footpaths.

Notices should be posted so that they are visible from footpath level at the main access points. Water companies should consider whether it is reasonably practicable to have additional notices between footpaths and the water's edge to cater for draw-down situations.

Where applicable, notices should refer to:

- The dangers of deep water.
- A prohibition on swimming.
- The risk of bank erosion
- If appropriate, a simple description of blue-green algae, with a warning not to touch algae, and to keep animals out of the water.
- If appropriate in winter, a notice indicating the danger of thin ice should be displayed



Example of reservoir safety notice

In addition, if merited by the local risk assessment, notices should indicate how to contact the site owner/operator or keyholder of any buildings on the site.

The entrance to reservoirs with water sports or other activities should be clearly marked on local roads to assist speedy arrival of emergency services. Consideration should be given to providing double yellow lines on access roads to ensure clear routes for emergency vehicles.

In some cases, it will be appropriate for local emergency services to be advised about the contents of this guidance note, and be invited to inspect access, and perhaps practice rescue.

Notices and signs must comply with the Health and Safety (Safety Signs and Signals) Regulations.

*Some well known water safety signs and symbols have gone through the BSI standardisation process and have formed the basis of **BS 5499-11:2002 Part 11 Water Safety Signs**. Sign manufacturers should be aware of these standards and be able to supply signs that conform to them.*

Protect (e.g. lifesaving appliances)

Reservoirs which are open to the public and have very steep internal sides, where access to the water is not physically prevented, life saving appliances should be considered as part of the water company's risk assessment.

Employees who regularly visit open reservoirs may carry throw-lines in their vehicles, and should be trained to use them.

Discipline (e.g. Bylaws, education, training, inspection, maintenance)

Some water companies may choose to reinforce control measures with a reference to Byelaws for the prohibition of unauthorised swimming. Water companies may consider re-introduction of byelaws if they have lapsed or don't currently exist.

Water companies should endeavour to raise awareness about the risk of swimming in reservoirs. Any publications provided for visitors may carry warning information, and liaison with local communities should be seen as an opportunity to promote water safety.

In addition, employees whose work involves visiting open reservoirs should be made aware of:

- The standards given in this guidance note.
- Inspection and maintenance regimes.
- How to summon assistance.
- How to manage incidents.

Sites should be regularly inspected at a frequency determined by the risk assessment with remedial action taken as necessary. Warning signs should be designed to be robust and resistant to vandalism and be promptly repaired if damaged.

Records should be kept regarding the inspections and remedial action. Footpaths should be maintained in good repair to reduce the likelihood of falls into deep water.

All control measures are potentially defeatable, and education must be the key to long term success.



Step 4 - Record the significant Findings

Accountability and Records

Each water company should ensure that specific job-holders are accountable for the risk assessments described in this guidance note for:

- modifying the risk assessments
- Choosing, implementing and maintaining control measures.

Those with responsibility for open reservoirs should ensure they have access to competent in Health and Safety advice, as described in Management of Health and Safety at Work Regulations.

Records should be kept of the risk assessment for each location, and any modification of the assessment and control measures which may follow a change in circumstances. The record does not need to be kept at the reservoir itself, but should be readily available.



Step 5 - Review assessment at appropriate intervals

The accepted advice on reviewing risk assessments is to do so at regular intervals, when they are no longer valid or when there has been an accident or incident or a significant change.

Examples where a risk assessment should be reviewed include:

- Residential development close to a reservoir
- Maintenance or construction work
- Changes to the water company's operational regime
- Change of staff with different competence levels
- Legislative changes
- Shortcomings identified from inspections
- Threats of violence
- Unauthorised swimming

This list is non-exhaustive

If there are any modifications being planned at an open reservoir, think about the risk assessment at the design stage so that adequate arrangements can be put in place before any risks materialise.

Further Reading

Relevant Legislation

Health and Safety at Work etc Act

Management of Health and Safety at Work Regulations

Occupiers Liability Acts

Health and Safety (Safety Signs and Signals) Regulations

BS 5499-11:2002 Part 11 Water Safety Signs

Useful Websites

<http://www.nationalwatersafety.org.uk/>

<http://www.hse.gov.uk/>

<http://www.vscg.co.uk/>

<http://www.water.org.uk/>

<http://www.rospa.com/>

HSE leaflet INDG163 "[Five Steps to Risk Assessment](#)",