

LONDON RESILIENCE PARTNERSHIP

Drought Response Framework

London Resilience Partnership Drought Response Framework

Version 2.1, June 2019

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LONDON RESILIENCE GROUP

The London Resilience Group is jointly funded and governed by the Greater London Authority, London Local Authorities and the London Fire Commissioner. We are hosted by the London Fire Brigade. Our work, and that of the London Resilience Partnership, is overseen by the London Resilience Forum.

| Version Control | | | |
|------------------------|---------------|--|--------------------------------------|
| Version | Date | Change (owner) | |
| 0.1 | Oct 2014 | First draft prepared by Thames Water and EA. | Sarah Burchard |
| 0.2 | Dec 2014 | Comments from EA. | Sarah Burchard |
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| 1.0 | Feb 2015 | Comments from Thames Water. | Sarah Burchard |
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| 1.0 | 21 Aug 2015 | Comments from EA. | Susan Price |
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| 2.0 | April 2019 | Updates to content. | Sarah Burchard |
| 2.1 | June 2019 | Amendment to table, page 13. | Toby Gould |

Critical Information

| | |
|---|---|
| Who is the national lead? | Defra |
| Who is the London co-ordination lead? | London Resilience Group (LRG) |
| Who initiates the London Drought Response Framework? | Activated following discussion between EA, Water Companies and LRG |
| Who notifies London partners of a developing drought or a drought? | London Resilience Group (LRG) |
| What communication methods will be used? | Weekly London Resilience partnership teleconference and London Common Operating Picture (COP) |
| When will the London Drought Response Framework be reviewed? | Standard review timescale: Every three years Next review no later than 2022 |
| Key Partner responsibilities | <p>EA:</p> <ul style="list-style-type: none"> • Manages natural water resources in England • Monitors the water situation • Produces drought plans • Issue abstraction licences to Water Companies <p>Water Companies:</p> <ul style="list-style-type: none"> • Abstract water under license from the EA to provide drinking water • Required to prepare drought plans <p>Defra:</p> <ul style="list-style-type: none"> • Approves statutory Water Company drought plans • Considers applications from the EA and Water Companies for drought management measures |
| Who will coordinate the media response? | Water Companies (in liaison with EA) |
| Delivery of regional measures | LRG will share information with the London Resilience Partnership and coordinate the appropriate response |

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1.1 Aim and objectives

This document informs the London Resilience Partnership with regard to the assessment of risk and management of associated impacts during a drought event with a view to:

- Improving understanding of the risks associated with drought, and the need to plan for it.
- As drought emerges, promoting the need for reducing / optimising the use of water resources and therefore strengthening resilience to drought.
- Identifying and, where possible, minimising potential adverse impacts to individuals, groups and organisations.
- Ensuring a co-ordinated and joined-up approach to drought related communications

1.2 Scope

This framework is designed for use in a situation where a prolonged period of below average precipitation is such that there is a high likelihood that progressive drought management measures will be introduced anywhere within the London LRF area.

It should be read in conjunction with the specific drought response plans which are published by the water companies concerned, and which are available on each of the company's websites.

This document does not cover issues relating to interruptions to the public water supply during 'normal' operating conditions.

1.3 Plan Ownership, Authorisation and Administration

The Drought Framework is owned by the London Resilience Forum and is produced and maintained by Thames Water on behalf of the Partnership.

1.4 Audit and Amendments

This framework is subject to review in line with the Partnership work plan, reflecting the alterations made to any Partnership plans as well as the creation of any new plans. All amendments to this document have been cleared by the London Resilience Programme Board on behalf of the London Resilience Forum.

1.5 Publication and Distribution

This framework will be published on [Resilience Direct](#) and the [London Prepared](#) website and is available to all. In addition, copies of the plan will be circulated to all members of the London Resilience Partnership.

1.6 Data Protection

Any requests relating to this document under the Freedom of Information Act should be directed to the Public Liaison Unit at the Greater London Authority.

1.7 Links to other Partnership Documents

This Framework should be used in conjunction with the suite of LRF documents (Available on [Resilience Direct](#) and the [London Prepared](#)).

- Strategic Coordination Protocol
- London Media Emergency Plan
- Strategic Coordination Protocol
- Severe Weather Framework
- Identification of the Vulnerable
- Communications Plan

This document indicates, wherever possible, where these other plans are relevant.

2. Background

2.1 London Context

The residential population of London is around 8.78 million and increasing. This population is augmented by a daily inflow of commuters, tourists and other visitors, the number of which fluctuates according to day, week, season and even year. Official water consumption statistics show that the population of London uses around 161 litres of water per person per day.

London’s water supply is derived mainly through surface water abstraction (supported by a series of large bunded storage reservoirs) which makes up around 80% of the overall supply. The remaining 20% is drawn from groundwater. Abstraction from both rivers and groundwater is licensed by the Environment Agency (EA) who seek to balance the human demand for water against the needs of the natural environment.

Overall, the volume of water available for human consumption is a factor of the global water-cycle, which in recent years appears to have become more extreme and less predictable. Indeed, studies have shown that Southeast England has less water available per head than Ethiopia, Syria or Somalia and it is predicted that over the next few decades climate change, population growth and the need for environmental protection could increase the pressure on this resource still further, and in doing so increase the likelihood of a drought event occurring in London.

2.2 Description of Drought

There is no absolute definition of drought. Drought is a situation which occurs within a defined geographical area (catchment) when a prolonged period of below average precipitation leads to low groundwater and soil moisture levels and reduced river flow. The combination of these causes both environmental stress and a significant reduction in the amount of water available for human consumption.

Drought evolves over a period of time – usually months, if not years – during which time there are clear indicators of increasing risk.

Droughts may differ in duration and intensity and these factors will influence the options available for response. The table below sets out the LRFs four main levels of drought which are based on impact. It should be noted that there is no ‘accepted’ definition of these levels of drought, and that currently the Environment Agency (EA) recognises ‘severe’ as opposed to ‘extreme’ drought.

| Drought level | Description | Customer impact |
|---------------|-------------------------|--|
| 0 | BaU | None |
| 1 | Prolonged dry weather | Water supply as 'normal' but customers are encouraged to voluntarily reduce their water usage. |
| 2 | Drought | Water supply as 'normal' but some restrictions on discretionary water using activities. |
| 3 | Severe drought | Water supply as 'normal' but with restrictions on some recreational and commercial activities. |
| 4 | Extreme drought | Impacts to the 'normal' water supply, including potentially significant reductions in water pressure and/or water quality. |
| 2 | Recovering from drought | Water supply as 'normal' but some restrictions on water using activities. |
| 0 | BaU | Water supply as 'normal'. |

Water supply normal = meeting or exceeding water quality, supply pressure standards with no restrictions on use.

2.3 Weather forecasting

Currently the Met Office is only able to provide detailed and accurate weather forecasts for periods of up to five days. It is likely that in the short-term new computer systems and other technological advances will be able to extend this accurate forecasting ability to 10 days but even these timescales are not sufficient to help with accurate drought forecasting because droughts emerge and recede over a period of months or years.

The Met Office also provides 3 month weather predictions to help water companies and the Environment Agency to model ground and surface water levels against a range of possible weather patterns. This in turn helps to manage expectations and guide forward planning. However such long term weather forecasts cannot be relied upon and drought planning requires the assessment of how much rain has fallen in a month on month basis, and monitoring of the situation in line with the reasonable worst case scenario.

2.4 Drought Response Summary

As a potential drought emerges, the EA and water companies will work with national and local government agencies in order to identify risks and possible mitigation, and roll out the introduction of progressive drought management measures. These include:

- Programme of increased public awareness combined with an appeal to reduce water use.
- Temporary Use (i.e. hosepipe) Ban - introduced by individual water companies.
- Drought Permit - granted to water companies by the EA this licenses abstraction from new sources, or modifies existing abstraction licences.
- Ordinary Drought Order (ODO) - granted by the Secretary of State for a period of up to 6 months (extendable) to either the EA or water companies. This allows for changes to the way in which water is held, treated, supplied, used and / or discharged.
- Emergency Drought Order (EDO) - granted to the EA or water companies for a period of up to 3 months (extendable) by Defra. As ODO (above) plus allows water companies to prohibit or limit the use of water or to reduce the pressure at which the piped water is supplied.

2.5 Activation

In the event of a Prolonged Dry Weather situation which is likely to impact on London, this plan will be activated following a joint multi-agency discussion between the EA, the water company (ies) involved and the LRG using the process outlined in the Strategic Coordination Framework.

3. Planning

3.1.1 Roles and responsibilities for water resource management and drought planning

Multi-agency planning for drought takes place on a national, regional and local level with national and regional planning led by the Environment Agency and local planning led by the water company and / or Local Resilience Forum concerned.

National Drought Planning

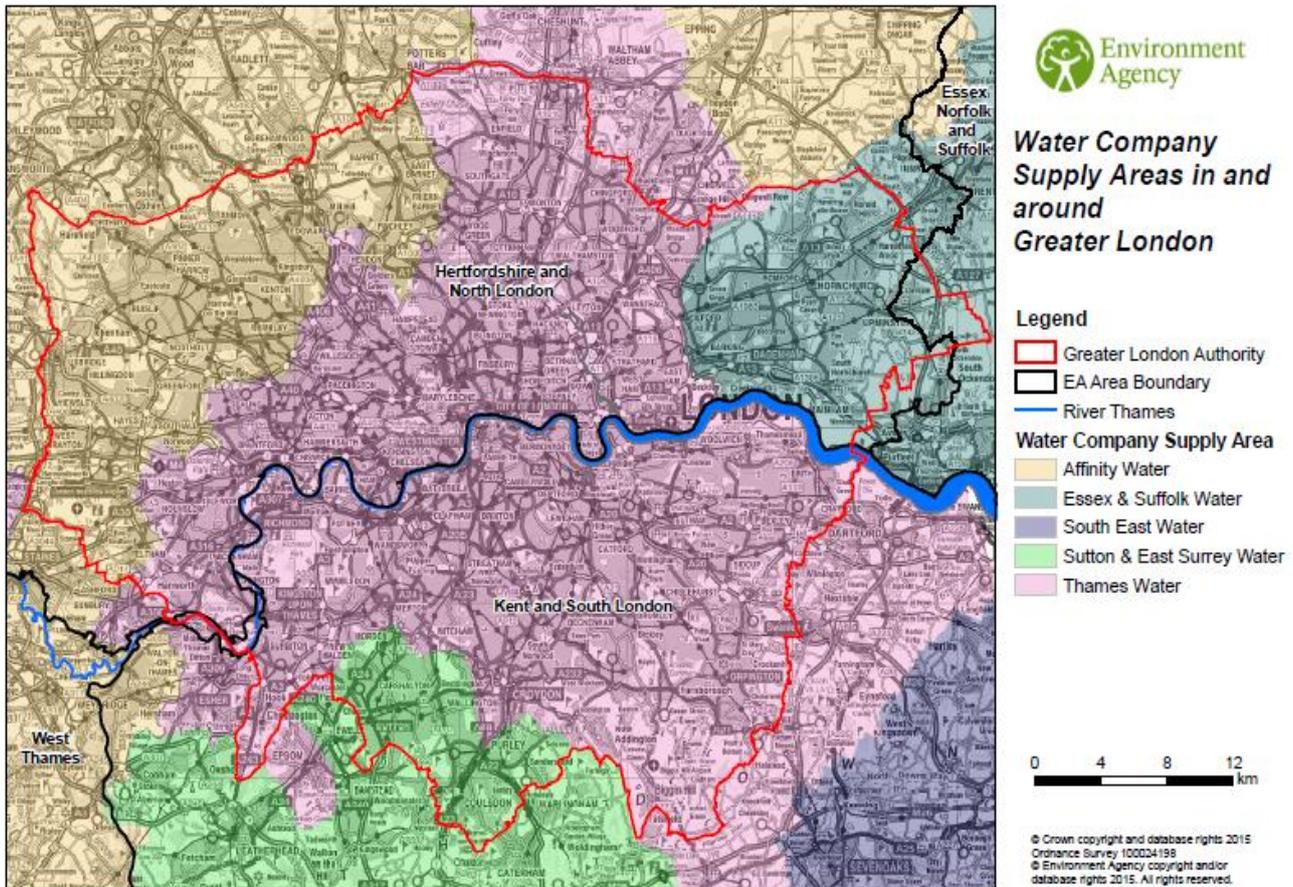
The National Drought Group (NDG) will usually start meeting in the early stages of a drought, i.e. prolonged dry weather level for anywhere in the country. The NDG is responsible for producing a cross-sector view of national drought issues. They will coordinate the delivery of drought management activities, communications and risk mitigation. The group will also address contingency planning and action in relation to water conservation issues, resource sharing and scenario planning for escalation. The group will commission specific working groups to address any issues as necessary.

The NDG will identify issues for decision; for example by Defra on policy matters, Environment Agency on regulatory issues and NDG on communications and contingency planning. The group is chaired by the Chief Executive of the Environment Agency who will report to the Secretary of State. The NDG will include senior decision makers from the principal stakeholders. Members include central government departments, Water Companies, Water UK and other groups such as National Farmers' Union and the Association of Drainage Authorities. If the drought escalates regulators such as Ofwat and Drinking Water Inspectorate will also be included.

If a drought major incident is declared SCGs in the affected region will start to meet and nationally COBR may convene. In this case the NDG will form an advisory body to COBR. SCGs across a specific region in relation to drought may wish to convene a ResCG in which the SCGs work together across boundaries. Locally SCGs will report directly up to COBR if convened for drought, as per normal structures. For further information see Drought Response: our framework for England.

3.1.2 Regional Drought Planning

Within the London LRF area there are two Environment Agency Areas (Hertfordshire & North London area and Kent & South London area) and four water companies - Affinity Water; Essex and Suffolk Water; SES Water and Thames Water. The map below shows the boundaries of these organisations in relation to the Greater London Authority.



3.1.3 The Environment Agency

The EA has a duty to manage natural water resources in England including rivers and aquifers. In order to do this the EA routinely measures, monitors and reports on the water situation and the prospect of shortages. This information is updated monthly and published online at the below link.

The EA works with water companies and others to manage the impacts on people, business and the environment. As part of these duties drought plans are produced which sets out how the EA manages its response to drought.

3.1.4 Water Companies

Water companies are ultimately responsible for planning for and managing water supplies to meet the needs of customers. In order to do this they remove water from the natural environment under license from the EA in order to provide public water supply. They are legally obliged to produce a plan every 5 years to show how they will:

- Manage the needs of future populations.
- Deal with climate change.
- Develop – where needed – new water supply resources.

In addition water companies are required to prepare and maintain drought plans. The Greater London Authority (GLA) is one of the statutory drought plan consultees. Non-statutory consultees include local interest groups, conservation groups, industry representatives, charities and other water companies.

The Water Industry Act 1991 defines a drought plan as ‘a plan for how the water undertaker will continue, during a period of drought, to discharge its duties to supply adequate quantities of wholesome water with as little recourse as reasonably possible to drought order or drought permits’ i.e. these are plans to show how water companies will maximise the efficiency of their resources and their water supply service in order to avoid restrictions during times of low rainfall.

They do not address the issue of how water could / would be provided during periods of Severe or Extreme drought.

Drought plans are approved by Defra. However, in view of the risks posed by climate change, the challenges of population growth in London and the need to promote a sustainable city, the London LRF has chosen to look at the risks and impacts associated with more severe levels of drought.

3.1.5 The Local Resilience Forum

Under the Civil Contingencies Act 2004 Local Resilience Forums have a duty to assess risks and make plans to respond to emergencies within their geographical area.

Guidance on the type and severity of risk planned for is provided by National Government via the National Risk Register however, in view of the risks posed by climate change, the challenges of population growth in London and the need to promote a sustainable city, the London LRF has chosen to look at the risks and impacts associated with more severe levels of drought than the current national guidance which plans to 'drought'.

3.1.6 Partners

Partner organisations should use the information contained in this plan to produce a water efficiency plan that enables them to reduce consumption during Prolonged Dry Weather and to maintain services in the event that drought restrictions are introduced.

3.2 Risk Mitigation

Under 'normal' conditions, water companies, the EA, national, regional and local government and regulators are required to work together to increase the security and sustainability of water supplies for London.

Strategies include:

- Reducing leakage
- Optimising water resource management and regional coordination.
- Reducing demand: all water companies within the London LRF are required to promote water efficiency measures as part of their day to day activities. These include investment in the development and supply of water efficient goods and the installation of smart water meters.

In addition to these measures water companies work together to:

- Increase the options for sharing supplies via bulk transfer and abstraction license trading within catchments.
- Develop new technologies to facilitate the sustainable use of water resources both during 'normal' supply conditions and times of drought.

In addition to drought planning on a water company level the water companies in the South East of England, which are subject to common climatic conditions, are working together on a regional drought plan. This work seeks to identify short, medium and long-term measures which can be put in place in order to reduce the risk of and mitigate the effects of Severe and Extreme drought by actions such as sharing water between different water companies and even regionally. At the time of writing this plan this work is in its infancy but updates will be included in later versions.

LRF partners may also choose to promote the sustainable use of water, for example through the planning process.

4. Activation of partnership response

4.1 Activation

It is recognised by the London LRF partnership that the optimum time to take action to mitigate the potential impacts of drought is during the Prolonged Dry Weather stage. However, it has been difficult to assess the frequency and commitment that this would involve as the category is a fairly recent development and there is insufficient data available for full evaluation. In addition there is the issue that a prolonged dry weather would not necessarily lead to the emergence of a full drought – conditions may instead return to ‘normal’.

Therefore it is agreed that:

- On identification of Prolonged Dry Weather by the EA in conjunction with the water company or companies concerned, either fully or partially within the London LRF area, the EA will inform the London LRF.
- The LRF will add ‘Drought’ as an agenda item to the London LRF weekly partnership teleconference call in order to facilitate a discussion on risks and associated impacts.
- Partner organisations will use this information to trigger consideration of their own water use and conservation options.
- Partners will refresh their knowledge of appropriate water company drought plans.

This will enable the partnership to track the potential development –or not- of a drought and to respond accordingly.

In the event of the situation changing from ‘Prolonged Dry Weather’ to ‘Drought’, the information will be communicated to the London LRF who will convene a meeting of the EA, the water company or companies affected, local authority representatives and emergency services.

If drought plan measures are implemented, all agencies should review their business continuity plans to ensure that they are able to maintain their core business activities.

4.2 Communications

Drought communications will be led by the water company or companies working with the EA to ensure that they are consistent and coordinated. They should be supported by the partnership in line with the London LRF Communications Plan.

5. Partnership Drought Response Measures

The following table highlights the activities relating to each level of drought response.

| Drought level | Customer impact | Water company activities | London Resilience Partnership activities |
|----------------------------------|--|--|--|
| L0: no drought | None | Routine activities to increase security and sustainability of water supplies. | Business as Usual |
| L1: Prolonged Dry Weather | Water supply as 'normal' but customers are encouraged to voluntarily reduce their water usage. | Enhanced water efficiency campaign. Enhanced Leakage reduction programme. Consideration of risks and mitigation associated with introduction of Temporary Use Bans (TUBs). | <p>Add 'Drought' as an item for discussion to the LRF weekly conference call (see Appendix III for guidance on specific issues to include) Consider own and public water resource use and need to trigger partner water conservation plans.</p> <p>AS POSSIBILITY OF PROGRESSING TO 'DROUGHT' BECOMES LIKELY: EA to consider use of joint messaging and liaise with London Resilience Communications Group to establish role of the group Refresh familiarity with London and where applicable, regional drought plans Review / activate business continuity arrangements for core activities</p> |

| Drought level | Customer impact | Water company activities | London Resilience Partnership activities |
|----------------------------------|---|--|---|
| <p>L2: Drought</p> | <p>Water supply as 'normal' but some restrictions on discretionary water using activities.</p> | <p>As above plus actions as set out in the relevant water company's drought plan including but not limited to: Increase in public communications to promote the water conservation message Implementation of a Temporary Use Ban (TUB) Preparation for the application of an Ordinary Drought Order (should it be needed)</p> | <p>Convene multi-agency meeting for consideration of strategic risks and impact mitigation in order to deliver the partnership strategic objectives:</p> <ul style="list-style-type: none"> • Protect life • Protect health, safety and welfare • Promote public confidence through communication and engagement • Minimise risk of adverse effects to London's infrastructure, people and businesses • Consider the potential for community tension <p>London Resilience Communications Group to activate, to ensure coordinated communication in support of EA and water company Establish a Recovery Group</p> |
| <p>L3: Severe Drought</p> | <p>Water supply as 'normal' but with restrictions on some recreational and commercial activities.</p> | <p>Application for Ordinary Drought Order (ODO) - granted by the Secretary of State for a period of up to 6 months (extendable) to either the EA or water companies. This allows for changes to the way in which water is held, treated, supplied, used and / or discharged. Extensive working with LRFs and other organisations to identify and mitigate potential risks associated with introduction of ODOs, and EDOs in the event that they are required.</p> | <p>Implementation of risk mitigation strategies in line with objectives set out for L2 (above).</p> |

| Drought level | Customer impact | Water company activities | London Resilience Partnership activities |
|------------------------------------|--|--|---|
| L4: Extreme Drought | Impacts to the 'normal' water supply, including potentially significant reductions in water pressure and/or water quality. | Emergency Drought Order (EDO). Granted to the Environment Agency or water companies for a period of up to 3 months (extendable) by Defra. As ODA (above) plus allows water companies to prohibit or limit the use of water and to reduce the pressure at which the piped water is supplied. Working with LRFs and other organisations to mitigate impacts particularly to 'vulnerable' people. | As Above It should be noted that response to a severe drought is likely to be COBR led with a requirement for regular reporting to the cabinet office via Defra. |
| L2: Recovering from drought | | Cautious relaxation of water restrictions in line with drought plans / risks Implementation of actions to facilitate a return to service as normal Identification and documentation of learning | Transfer from 'response' to 'recovery' in line with reduction of risks. Identification and documentation of multi-agency learning. |
| L0: No drought | | Implementation of learning. Update of drought plans as appropriate. | Implementation of learning. |

Water supply normal = meeting or exceeding water quality, supply pressure standards with no restrictions on use.

6. Risks and Issues

Risks and issues arising from a drought will depend largely on the severity and duration, the actions taken by the water supply company (ies) to maintain services and the population affected. The table below sets out some of the key risks and impacts but is by no means exhaustive. Risks should be assessed in context at the time of any drought.

A more detailed list of possible direct and indirect impacts of drought by sector can be found in Appendix 4.

| Risk | Lead agency (if known) |
|---|-------------------------------|
| Loss of public confidence with regard to water resource management and / or the safety of the public water supply | Water companies |
| Loss of piped water supplies due to reductions in pressure, rota cuts or emergency breach of mains | Water companies |
| Requirement to provide water by alternative means and / or issue of boil notices | Water companies |
| Loss of water / wastewater assets due to land movement | Water companies |
| Impacts on wastewater services due to reduction in flow / volume / concentration | Water companies |
| Civil unrest caused by restricted access to water supply | Police |
| Increase / change to individual or institutional vulnerability arising directly or indirectly from drought or drought management measures e.g. individuals who require large volumes of water for medical reasons | NHS and local authority |
| Anxiety / stress caused by direct and indirect impacts | NHS and local authority |
| Impacts on businesses / industry (who, what, why?) | Greater London Authority |
| Negative impacts on fire-fighting and emergency response caused by lack of water | London Fire Brigade |
| Loss of private water supplies: | Local authorities |
| Impact on environment including plants, animals (especially wild animals) and soil | Environment Agency |
| Tourism and leisure | Local authorities |
| Impacts on agriculture, farming and livestock | Defra |
| Impacts on community facilities / garden projects | Local authorities / charities |
| Damage to infrastructure (e.g. roads, tunnels, rail transport, public and private buildings including housing stock) arising from land movement | All |
| Increase in short term food prices depending on size of area impacted and duration of event | Defra |
| Impact on shipping due to low water levels in rivers | Ports Authority, LRG and EA |
| Increase risk of wild fires etc | London Fire Brigade |

7. Recovering from Drought

Issues relating to recovery from drought will be a function of the timing, location and nature (depth, scale and duration) of the event and are likely to be both temporary and permanent in nature.

Details of the recovery process are contained in the [London Recovery Management Protocol](#).

8. Exercising and Review

All responders should have a clear understanding of their role and responsibility throughout any incident where the procedures outlined in this document have been invoked. This should be achieved through training and exercising at all levels. Training should take place prior to exercising the plan. The experience from exercises and incidents should contribute to reviews of the document.

The London Resilience Team maintains a list of lessons identified through exercises and incidents on behalf of the wider partnership. These are identified, recorded and implemented in accordance with the partnership's lessons learned policy. The status of these lessons is reported to London Resilience Programme Board, and the London Resilience Forum.

8.1 Responsibilities for Training and Exercising

8.1.1 Agency specific

Agencies are responsible for ensuring that they are able to carry out the roles and duties described in this document. It is expected that this will include role specific training and an appropriate level of knowledge of multi-agency procedures.

8.1.2 Partnership wide

The following will support a consistent approach to multi-agency cooperation approach across the London Resilience Partnership:

- A Capability Awareness Package accompanies the document. This is prepared by the Lead Agency responsible for developing the capability. The package provides basic information about the capability for all responders.
- The LRF Training and Exercising Group will coordinate:
 - Briefing and workshops hosted by the London Resilience Team.
 - Partnership wide exercises at the sub-regional and pan-London level.

8.1.3 Record keeping

Agencies are to maintain records of their training programmes as evidence. The LRF will, from time to time, carry out an audit of multi-agency training across the partnership to ensure a consistent approach. The Lead Agency for each Partnership work stream is to document the development of the capability through the record of exercises, testing and activation attached to this document.

Appendix 1: Water resource planning legislation

Water Industry Act 1991 and Water Act 2003

(s.63 of the Water Act 2003 inserted new sections 39B & 39C into the Water Industry Act 1991)

<http://www.legislation.gov.uk/ukpga/2003/37/section/63>

(s.62 of the Water Act 2003 inserted new sections 37B-D into Water Industry Act 1991)

<http://www.legislation.gov.uk/ukpga/2003/37/section/62>

Drought Plan Direction 2005

<http://www.defra.gov.uk/environment/quality/water/resources/documents/plan0510.pdf>

Drought Plan Regulations 2005

<http://www.legislation.gov.uk/uksi/2005/1905/contents/made>

Drought Direction 1991

<http://www.defra.gov.uk/environment/quality/water/resources/documents/droughtdirection1991.pdf>

Flood and Water Management Act 2010

(s.36; amends the Water Industry Act 1991 by substituting a new s.76)

<http://www.legislation.gov.uk/ukpga/2010/29/contents>

Water Use (Temporary Bans) Order 2010

<http://www.legislation.gov.uk/uksi/2010/2231/made>

Environmental Assessment of Plans and Programmes Regulations 2004 and (Wales) Regulations 2004

(from Strategic Environmental Assessment Directive 2001/42/EC)

<http://www.legislation.gov.uk/uksi/2004/1633/contents/made> (England)

<http://www.legislation.gov.uk/wsi/2004/1656/contents/made> (Wales)

Conservation of Habitats and Species Regulations 2010

<http://www.legislation.gov.uk/uksi/2010/490/contents/made>

Wildlife and Countryside Act 1981

(as amended by the Countryside and Rights of Way Act 2000, Section 28G)

<http://www.legislation.gov.uk/ukpga/2000/37/contents>

Appendix 2: Links to Water Company Drought Plans

Affinity Water:

<https://stakeholder.affinitywater.co.uk/drought-management.aspx>

Essex and Suffolk Water:

<https://www.eswater.co.uk/your-home/environment/drought-plan.aspx>

Sutton and East Surrey Water:

<http://www.waterplc.com/pages/about/publications/water-resources-and-drought-reports/drought-plan/>

Thames Water:

<https://corporate.thameswater.co.uk/about-us/our-strategies-and-plans/our-drought-plan/drought-plan-update-2017>

Appendix 3: Suggested issues for discussion at London Resilience Partnership weekly teleconferences

- Background - (Precipitation levels for previous XXX months and effects on groundwater / river levels)
- Location of emerging drought - (Catchments and London water supply areas potentially affected)
- Human water supply and demand issues and environmental impacts
- Short / medium term weather forecasts and associated implications for water supply
- Specific issues - (e.g. risks to sensitive or protected environment; possible increases in demand for water due to season, weather or planned activities)
- Consider if there is a need for an enhanced partnership teleconference, or Strategic Coordinating Group (SCG)
- Questions?

Appendix 4: Possible impacts of Extreme Drought by Sector

The following tables contain information identified during a limited number of ‘deep dive’ sessions looking at the possible impacts of extreme drought by sector. The information contained is not exhaustive, and it is expected that this information will be supplemented and updated as and when available.

Transport Sector (excluding air transport)

Direct impacts:

| Impact | Cause / Pathway |
|--|---|
| H&S | Water needed to cool machinery, train washing; Loss of staff sanitation; If combined with hot weather, possible danger to maintenance staff, road workers (knock on implications for transport of ‘alternative’ water supplies) |
| Loss of staff | Staff absenteeism as they adapt to maintaining health / hygiene on reduced amount of water or non-potable water; Hygiene related illness amongst staff and immediate families |
| Loss of transport facilities (eg station closures) | Loss of fire-fighting capability leading to station closures. |
| Loss of / restrictions on train speed | Re-ballasting or work on tracks may have to stop because requires water. |
| Loss of / restrictions on road and rail transport | Restrictions on maintenance of roads / rail as they often use asphalt and / or concrete which require a lot of water. |
| Loss of / restrictions on road and rail transport | Ground shrinkage and desiccation can destabilise embankments, crack roadways and destabilise viaducts. |
| Reduction in revenue | Restrictions on cleaning (external as well as internal) may reduce the acceptability and therefore use of public transport (evidence from recent campaigns to clean up trains / busses) |
| Loss of buildings and facilities | Loss of water / low pressure (hygiene) |
| Loss of buildings / facilities | Odour problems from canals / river / sewers |
| Loss of buildings / facilities | Difficulty in receiving / managing ‘alternative water’. No clear responsibilities for ensuring that it is distributed and used fairly / appropriately. |
| Loss of canal transport | Drop in water levels |

Indirect impacts:

| Impact | Cause / Pathway |
|---|--|
| Loss of staff | Due to closure of schools and loss of other education / care facilities meaning that staff would have to stay at home to look after family; |
| Loss of transport links | Falling trees / branches as trees die from drought. |
| Loss of / restrictions on road and rail transport | Ground movement due to drying out can directly impact roads / railways but can also burst water mains leading to further damage / destabilization. |
| Loss of / restrictions on road and rail transport | Increased flood risk resulting from rain falling on hard, dry ground and loss of trees. |
| Damage to roads / railways | Trees reduce the impact of rainfall on road and rail structures. Loss of trees due to drought and drought management measures (eg fixing leaking water pipes) can have a detrimental effect on roads / railways. |
| Loss of facilities / transport | Loss of supply chain |

Local Authorities and Communities

Direct impacts to local authority services:

| Impact | Cause / Pathway |
|---|---|
| Loss of buildings | Low pressure, water unable to reach higher floors and / or loss of cooling systems |
| Reduction in staff | Closure of nurseries, schools and day care facilities, increase in illness due to reduced hygiene |
| Increased demand for both adult and children social care | Children, especially from poorer families will be under pressure to take home water given out at schools and not consumed |
| Increase in demand for adult and children social care | Increase in chronic sickness in the community and hospitals and health facilities become overwhelmed and day care / surgery units are closed |
| Increase in demand for adult and children social care | Increased poverty in the community due to increase in food prices, shortages of fresh food and reduction in school meals – often the main source of nutrition for children in poorer families |
| Increase demand to investigate scams / illegal selling of water | |
| Reduced flexibility in working | Loss of public transport |
| Increased work load | Increase in population needing support. This is difficult to manage at the best of times because the vulnerable population can change on a daily basis. |
| Direct increase cost | Installing water saving devices / low pressure pumps |
| Reduction in recycling – increase in waste | Public not using water to clean containers (eg cartons, cans) which means that they cannot be recycled |

Impacts to communities / indirect impacts to local authorities:

| Impact | Cause / Pathway |
|--|--|
| Loss of recreational services including parks and recreation centres, community sports facilities (golf, cricket, etc.) and therapeutic centres for mental health patients | Closure of facilities due to fire regulations or unavailability of water |
| Loss of income from public events such as concerts. | Closure of facilities due to fire regulations |
| Increased air pollution from community waste sites | Reduction in hosing down to suppress dust and fire; increased in fires due to spontaneous combustion |

| | |
|--|---|
| Increase in domestic abuse and other 'temper driven' crime | Tempers get shorter when people are very hot and under increased pressure due to financial and other issues |
| Breakdown of communities and polarisation of society | Better off families will be able to buy water in from commercial sources / outside area impacted leading to an increased sense of 'us and them' |
| Increase in hygiene issues particularly amongst poorer communities | Loss of paddling pools which for some children are the nearest to water / baths that they get |
| Reduction in social interaction | No longer inviting people round in case they consume you water |
| Increased poverty / illness particularly in poorer communities | Loss of jobs (eg labour on building sites), increase in food costs, and poor hygiene. |
| Increase in anxiety and mental health issues and worsening of conditions particularly for patients living with families / in the community | Suffers of autism and other conditions such as dementia and OCD find it very hard to deal with any change to their lives / daily routines. Such changes require a long lead in time and careful management. Families of suffers will need help and support which will fall between the health sector and local authorities. |
| Increase in petty and other crime | Mental health patients not taking medication, poverty, polarisation of society, water shortages. |

Public Health

General public:

| Impact | Cause / Pathway |
|---|---|
| Increase in stomach upsets / diarrheal infections (at the extreme: cholera) | Poor / reduced hand washing (including use of gel / wet wipes which do not clean as well as soap); changes to sewage (more concentrated) and the ability of the sewerage network to move it to processing facilities with a reduction in water content; not washing food such as fruit and salad; Changes in mineral content of water (wholesomeness) |
| Increase in dental problems | Reduction in tooth brushing, closure of dental surgeries |
| Skin problems e.g. eczema and rashes | Use of gel / wet wipes for cleaning |
| Increase in complications of illnesses such as diabetes | Requires consumption of large volumes of water which may not be readily available or because sufferers are just not drinking enough due to the drought |
| Increase in dehydration especially in the very young and very old | Need more water than average to maintain body temperature and hydration |
| Anxiety | Poor understanding of risk and how to cope |
| Reduced mental health | Loss of work (e.g. catering, hospitality, construction sectors which will be particularly hard hit) |
| Reduced physical health | Reduction in water related recreation such as swimming pools (hydrotherapy) |
| Hyperthermia | Loss of heating (combi-boilers) during cold weather due to drop in water pressure |

Direct impacts to health services:

| Impact | Cause / Pathway |
|---|--|
| Loss of primary care facilities (Dr and Dental surgeries) | Not classes as 'sensitive' customers they would be dependent on BC plans for to maintain water supplies |
| Increased 'in house' sickness due to loss of chilled water services | Availability of all 'alternative water' supplies would be challenged and may be taken under government control |
| Loss of ambulance services | Ambulance stations do not currently class as 'sensitive' customers and they may suffer from loss of decontamination facilities |
| Loss of equipment | Change in water quality |
| Loss of lab facilities for diagnosis | Not classed as 'sensitive customers' they would be reliant on BC plans to maintain services |

| | |
|---|---|
| Loss of laundry services | Not 'sensitive' customers |
| Loss of catering / food | Not 'sensitive' customers |
| Increase in costs | Food, catering, laundry, staff |
| Loss of facilities (showers, boilers, etc.) | Low water pressure / limited water supply |

Indirect impacts to health services:

| Impact | Cause / Pathway |
|--|--|
| Increased sickness in general population | Loss of water, change in water quality (e.g. mineral content), lack of hygiene, etc. |
| Change in illnesses presented (e.g. cholera) | Impacts of extreme drought on sewage quality and flow, poor hygiene, etc. |
| Increase in water-borne diseases | Reduction in quality of water in 'natural' and recreational environment e.g. rivers / lakes which people may go into to cool down |
| Lack of 'appropriate' knowledge, training, experience | Change in diseases presented |
| Loss of diagnostic services | Closure of lab facilities |
| Increase in demand on A&E | Closure of primary care services |
| Closure of operating theatres | Closure of sterilisation facilities (not 'sensitive' customers) |
| Closure of wards | Lack of clean bedding (laundries are not 'sensitive' customers) |
| Closure of facilities | E.g. Chemo suites due to reduction in water availability Loss of air cooling systems |
| Increase in malnutrition – in and outside hospitals | Closure of catering facilities (not 'sensitive' customers) and food outlets, reduction in fresh food such as fruit and salad due and increase in prices due to drought |
| Increase in chronic conditions | Loss of day surgery units which are not classified as 'sensitive' customers |
| Reduction in staff numbers | Due to increased sickness in general population, need to look after family and closure of some school facilities; Lack of clean uniforms; Increase in mental and physical health issues; Loss of transport facilities |
| Increased demand on health education | Public need for support and knowledge on how to cope; need to change how services are delivered (culture) |
| Increased demand for care from those patients who might otherwise have been cared for at home, in nursing / care homes | Loss of water pressure to site esp. high rises, loss of water / change in wholesomeness affecting patients in care / nursing homes |

| | |
|--|---|
| Increase demand for hospital births | Lack of water at home for home births, closure of specialist birthing units / facilities |
| Increase in demand for support for dialysis patients | Unable to dialyse at home |
| Increased demand for casualty services | Increased risk of fire, road traffic accidents (dirty windscreens) |
| Impacts to hospital waste disposal | Unable to use 'normal' methods such as macerators which require relatively large volumes of water |
| Increased demand for dental care | Closure of dental practices |
| Increase in respiratory diseases | Severe drought will lead to a decrease in air quality due to loss of vegetation and increase in dust (no dust suppression facilities) |
| Increase in bed blocking | Unable to discharge patients to homes where there is limited access to water |

The Natural Environment

Direct impacts:

| Impact | Cause / Pathway |
|---|---|
| Increase in odour problems | Lack of dilution, water movement |
| Increase in waste site fires | Dryness |
| increase in wild fires | dryness |
| Loss of water amenity (rivers, lakes, ponds) | Increase in growth of blue-green algae |
| Increase in fish kill | Reduction in oxygen levels in water |
| Loss of species on designated sites (e.g. SSSIs) | Heat, lack of water, loss of species |
| Loss of amenity land (woodlands, mountain bike trails; golf courses, parkland) | Need to protect soil, species |
| Loss of navigation | Drying up of rivers and canals |
| Economic impacts to protectors of the natural environment and providers of outdoor recreation | Loss of ability to use amenities; Increased cost of protection of species and environment; Cost of recovery |
| Loss of hydro-electric power | Lack of water / low flow |

Indirect impacts:

| Impact | Cause / Pathway |
|------------------------------|--|
| Increase in dust | Inability to water down |
| Increase in waste | Decrease in recycling due to inability to wash containers |
| Increase in air pollution | Fires |
| Increase in invasive species | Warming of water and loss of native species |
| Increase in flood risk | Loss of vegetation, potential growth of vegetation in dried up river beds. |

Appendix 5: Water Company Activities

| Drought level | Description | Customer impact | Thames Water activities | Affinity Water activities | SES Water activities | Essex and Suffolk Water activities |
|---------------|-----------------------|--|--|---|--|--|
| 0 | BaU | None | Routine activities to increase security and sustainability of water supplies. | Normal operations | Normal operations | Business as usual including ongoing hydrological monitoring |
| 1 | Prolonged dry weather | Water supply as 'normal' but customers are encouraged to voluntarily reduce their water usage. | Enhanced water efficiency campaign. Enhanced Leakage reduction programme. Prepare to bring on line 'standby' resources e.g. desalination plant. Consideration of risks and mitigation associated with introduction of Temporary Use Bans (TUBs). | External media campaign. Internal awareness campaign. Preparation for implementation of TUBs. | External media campaign on water efficiency and leakage. Internal awareness campaign and increased resources on leakage. Preparation for TUBs depending on season (with sprinkler ban before hosepipe ban). | Enhanced water efficiency messaging ramping up to formal Appeal for Restraint. |
| 2 | Drought | Water supply as 'normal' but some restrictions on discretionary water using activities. | As above plus: use of 'standby' water resource options such as desalination plant introduction of TUBs (hosepipe) Bans. application (to EA) for Drought Permits enabling abstraction from new sources or modifying existing abstraction licenses. | Increase active leak detection and reduction diverting resources from planned work if necessary. Fast-track infrastructure investments as appropriate. Implement TUBs. Monitor effectiveness of actions. Prepare for introduction of ODOs. | As above plus introduction of TUBs. Application (to EA) for Drought Permits enabling abstraction from new sources or modifying existing abstraction licenses depending on season. Consideration of use of mothballed sources and transfers. | As above plus introduction of Phase 1 Temporary Use Bans. This ban applies mainly to the domestic use of water and stops the use of a hosepipe or sprinkler for any garden watering or cleaning. |

LONDON RESILIENCE

| Drought level | Description | Customer impact | Thames Water activities | Affinity Water activities | SES Water activities | Essex and Suffolk Water activities |
|---------------|-----------------|--|---|--|---|--|
| 3 | Severe drought | Water supply as 'normal' but with restrictions on some recreational and commercial activities. | <p>As above plus: application for Ordinary Drought Order (ODO) - granted by the Secretary of State for a period of up to 6 months (extendable) to either the EA or water companies. This allows for changes to the way in which water is held, treated, supplied, used and / or discharged.</p> <p>Extensive working with LRFs and other organisations to identify and mitigate potential risks associated with introduction of ODOs, and EDOs in the event that they are required.</p> | <p>As above plus: Implement pressure control schemes. Arrange for additional bulk transfer from neighbouring water companies (if available). Apply for and implement ODOs. Prepare for EDOs.</p> | <p>Application for and implement Ordinary Drought Order (ODO) - to restrict non-essential usage in non-household properties. Extensive working with LRFs and other organisations to identify and mitigate potential risks associated with introduction of ODOs, and EDOs in the event that they are required.</p> | <p>As above plus Drought Permits (to increase supplies) and Drought Order Ban - this extends the Phase 1 TUB to non-domestic and commercial customers.</p> |
| 4 | Extreme drought | Impacts to the 'normal' water supply, including potentially significant reductions in water pressure and/or water quality. | <p>Emergency Drought Order (EDO). Granted to the Environment Agency or water companies for a period of up to 3 months (extendable) by Defra. As ODO (above) plus allows water companies to prohibit or limit the use of water and to reduce the pressure at which the piped water is supplied.</p> | <p>As above. Implement EDOs. Apply for extensions as required. Implement Emergency Plan if necessary.</p> | <p>As above. Implement EDOs. Apply for extensions as required. Implement Emergency Plan if necessary.</p> | <p>As above plus Emergency Drought Order allowing pressure reduction at customer tap.</p> |

Water supply normal = meeting or exceeding water quality, supply pressure standards with no restrictions on use.

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LONDON RESILIENCE GROUP

The London Resilience Group is jointly funded and governed by the Greater London Authority, London Local Authorities and the London Fire Commissioner. We are hosted by the London Fire Brigade. Our work, and that of the London Resilience Partnership, is overseen by the London Resilience Forum.