



**Biennial report on reservoir safety  
1 January 2017 - 31 December 2018**

We are the Environment Agency. We protect and improve the environment.

We help people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion.

We improve the quality of our water, land and air by tackling pollution. We work with businesses to help them comply with environmental regulations. A healthy and diverse environment enhances people's lives and contributes to economic growth.

We can't do this alone. We work as part of the Defra group (Department for Environment, Food & Rural Affairs), with the rest of government, local councils, businesses, civil society groups and local communities to create a better place for people and wildlife.

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# Foreword

Although there have been no recent reservoir failures that have resulted in loss of life, it was the death of 21 people after the failure of two dams in 1925 that ultimately led to the Reservoirs Act 1975. This safety legislation is about minimising the risk of uncontrolled releases of water that could result in loss of life

Over the last two years we have seen improvements in the level of compliance with the Reservoirs Act 1975, but there is still work to do.

Non-compliance in 2017 and 2018 has been maintained at its lowest ever recorded levels across England due to a mixture of advisory and regulatory action taken.

All Environment Agency reservoirs were compliant during 2017 and 2018.

Our regulatory effort continues to be focused on those sites posing the highest risk to life.

We have issued more formal notices when compared to the last biennial report. Notably, we have issued more notices requiring the appointment of a supervising, inspecting or construction engineer, and have done so as soon as a non-compliance is reported. This has driven rapid corrections of such non-compliance and is sending a firm message to reservoir owners.

On a number of occasions we have routinely sought advice from engineers with regard to the safety of non-compliant reservoirs and have in two cases intervened using our emergency powers to make those reservoirs safe.

There were 23 reported incidents during 2017 and 2018. It was one of these incidents that required us to intervene to empty the reservoir. However, most incidents are limited in scale, are well managed by the reservoir undertaker and do not result in a complete failure of the dam or reservoir.

We intend to continue to exercise professional judgement as to whether to exercise our emergency and reserve powers in the interest of public safety.

A key to further reducing non-compliance will be to improve undertakers (reservoir owners and operators understanding of what is expected of them under the Act. We aim to do this by:

- gaining a better understanding of our customers, including owners, operators and engineers
- introducing more targeted communications
- engaging locally with communities and others involved with reservoirs so that they are more aware of reservoir safety



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Flood and Coastal Risk Manager - Reservoir Safety

# Contents

<b>Biennial report on reservoir safety 1 January 2017 - 31 December 2018.....</b>	<b>1</b>
<b>Foreword .....</b>	<b>3</b>
<b>Contents .....</b>	<b>4</b>
<b>1. Our Role.....</b>	<b>5</b>
<b>2. Background.....</b>	<b>6</b>
A risk based approach to enforcement .....	6
Risk designation of reservoirs.....	7
<b>3. Compliance status .....</b>	<b>8</b>
Serving enforcement notices .....	9
Other enforcement action .....	10
Environment Agency reservoirs .....	10
Incident reporting.....	10
<b>4. Court Judgements on Risk Designations .....</b>	<b>12</b>
<b>5. The Future .....</b>	<b>13</b>
<b>6. Appendices .....</b>	<b>14</b>
Appendix 1 – Steps taken by the enforcement authority to ensure that undertakers observe and comply with the requirements of the Reservoirs Act 1975 .....	14
Appendix 2 – Update on other third party non-compliant cases in England in appendix 1 of our 2015-2016 biennial report.....	19
Appendix 3 – Environment Agency compliance .....	20
Appendix 4 – Statistics, engineer appointments and safety measures.....	21
Appendix 5 – Statistics on reservoirs by dam category .....	23
Appendix 6 – Statistics on reservoirs by undertaker type .....	23
Appendix 7 – Good Practices Examples .....	24
Appendix 8 – Notes .....	27

# 1. Our Role

The Environment Agency is the enforcement authority under the Reservoirs Act 1975 ('the Act') for 1841 large raised reservoirs in England. We are also an 'undertaker' (owner and operator) for 214 large raised reservoirs in England. This biennial report looks at the work that we have done to secure compliance with the requirements of the Act between 1 January 2017 and 31 December 2018.

In Section 4 we describe the work that we will be doing over the next two years.

## **Under the Reservoirs Act 1975 we:**

- make sure that reservoir undertakers comply with the Act, by monitoring compliance and engaging with them at regular intervals
- maintain a register of all reservoirs under the Act
- make sure that undertakers appoint a construction engineer to design and supervise the construction or alteration of large raised reservoirs
- designate reservoirs as 'high-risk', if we think that human life could be endangered in the event of an uncontrolled release of water from the reservoirs
- make sure that undertakers appoint a supervising engineer for their high-risk reservoirs
- make sure that undertakers have their high-risk reservoirs inspected by inspecting engineers
- make sure that undertakers carry out any safety measures ('measures to be taken in the interests of safety') recommended by inspecting engineers, including investigations, studies, repairs and improvements
- when an undertaker does not comply with the Act, appoint engineers and commission safety work on their behalf. We charge undertakers for this
- appoint engineers and take any other action necessary in an emergency, to protect people and property against an escape of water from a reservoir
- make sure that undertakers report reservoir incidents and share lessons learnt from them
- make sure that we observe and comply with the requirements of the Act for our own reservoirs

## 2. Background

Although there have been no recent reservoir failures that have resulted in loss of life, it was the death of 21 people after the failure of two dams in 1925 that led to the passing of the Reservoir (Safety Provisions) Act 1930. This Act was updated and superseded by the Reservoirs Act 1975, which in turn was amended by the Flood and Water Management Act 2010.

The Water Act 2003 transferred the responsibility for enforcing the Reservoirs Act 1975 in England and Wales from local authorities to the Environment Agency. On 1 April 2013, Natural Resources Wales (NRW) became the enforcement authority for large raised reservoirs in Wales.

This biennial report is a requirement placed upon us to publish information on compliance with the legislation and the action we have taken to achieve it. We do so as a snapshot of compliance on 1 January every two years and include comparison to the situation two years previous.

### A risk based approach to enforcement

The main causes of non-compliance are:

- A supervising engineer has not been appointed. Every high-risk large raised reservoir must have a supervising engineer appointed at all times unless it is being supervised by a construction engineer
- An inspecting engineer has not been appointed to carry out the Section 10 inspection
- Safety measures identified by the inspecting engineer have not been completed by the specified date

We continue to focus on reservoirs that pose the greatest risk to public safety. Our top priority is to ensure that all reservoirs have a construction or supervising engineer appointed at all times, as these are the professional eyes that keep watch over a reservoir. We then make sure that reservoirs have an inspecting engineer appointed at the appropriate time to undertake a periodic statutory inspection, make sure the certificate and report are produced, and that safety measures are completed.

In the event of non-compliance our first step is to provide clear advice and guidance on the approach needed to comply in writing and / or by meeting the undertakers.

However, if advice, guidance and persuasion are unsuccessful then we will take formal enforcement action following the requirements of the Regulators' Code, which can be found at <https://www.gov.uk/government/publications/regulators-code>.

We apply the following principles:

- Act proportionately
- Have regard to the growth duty
- Be consistent
- Be transparent
- Target enforcement action
- Be accountable

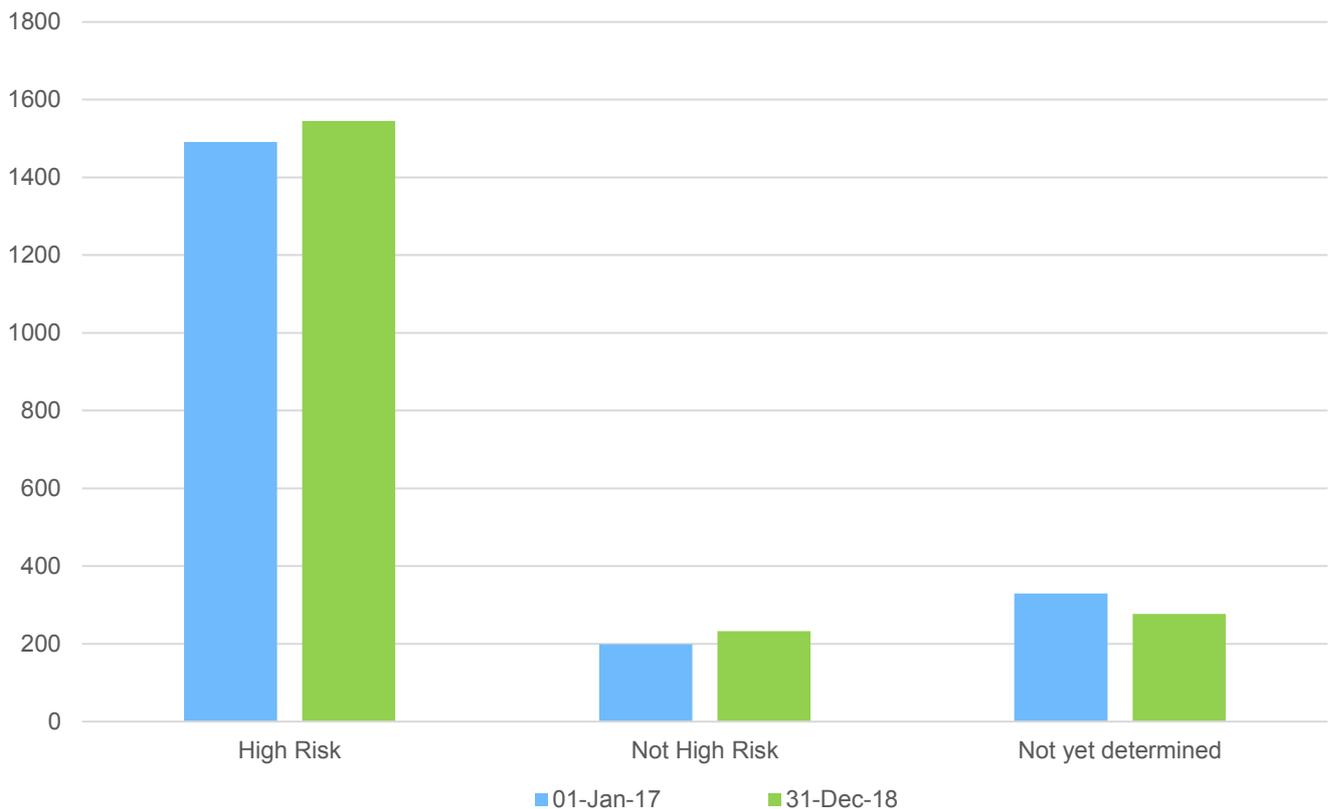
## Risk designation of reservoirs

The Environment Agency is required to assign a risk designation to each statutory large raised reservoir in England. The decision is based on the risk to life in the event of an uncontrolled release of water from a reservoir.

Only large raised reservoirs that are designated high-risk are subject to the full regulatory requirements of the Reservoirs Act 1975. 'Not high-risk' large raised reservoirs have a reduced level of regulation, with no statutory inspection or supervision requirements. However, other parts of the Act still apply and these reservoirs still need to be registered and incidents reported, in case of changes or information which may alter the risk designation, such as downstream development or alterations to the reservoir.

At any given time there will always be reservoirs for which a risk designation has not yet been determined. These include those which are newly constructed or registered, those which have a provisional designation assigned but are subject to representation by the reservoir undertaker prior to being finalised, or those for which a designation is under review.

**Figure 1: Reservoir risk designation status (number of reservoirs)**



### 3. Compliance status

In the two years since our previous biennial report we have seen a slight improvement in overall compliance with the Reservoirs Act 1975. More detail is provided in table 1.

There has been a noticeable decline in the number of reservoirs without a supervising engineer appointed, which is our highest priority in terms of reservoir safety. We have taken more enforcement action on this over the past two years, serving formal notice as soon as the non-compliance occurs and requiring the appointment to be made within 28 days of the notice. During 2017 we saw the first instance of there being zero reservoirs lacking a supervising engineer and this continued across much of 2018. As of 31 December 2018 there are three reservoirs without a supervising engineer compared to eight on 1 January 2017.

We have also taken more formal enforcement action on reservoirs where an inspecting engineer has not been appointed to undertake a periodic statutory inspection by the due date. In such cases we have served notice on undertakers to appoint an inspecting engineer within 28 days. As of 31 December 2018 there are eight reservoirs with an inspection due, but no inspecting engineer appointed, compared to 13 two years previously.

Compliance rates do fluctuate across time, but we believe more formal action on engineer appointments has brought improved compliance when compared to the situation previously, where informal reminders were generally issued before formal action was considered.

Table 1 summarises the the reasons reservoirs are non-compliant

**Table 1: reservoirs non-compliant on 1 January 2017 and 31 December 2018**

	Situation on 1 January 2017	Situation on 31 December 2018
Number of supervising engineer appointed	8	3 <sup>1</sup>
Inspection due, and no inspecting engineer appointed	13	8 <sup>2</sup>
Section 10 inspection overdue by more than a year, but an inspecting engineer has been appointed	7	6
Measures in the interests of safety that have not been completed by the deadline set by the inspecting engineer	48	55

<sup>1</sup> excluding 15 reservoirs awaiting a risk designation

<sup>2</sup> excluding 16 reservoirs awaiting a risk designation

**Table 2: Reservoir Information recorded between 1 January 2017 and 31 December 2018**

Number of newly constructed reservoirs	37
Number of supervising engineer appointments	513
Number of inspecting engineer appointments	435
Number of 10(5) certificates after the satisfactory completion of an inspection under Section 10 of the Act	385
Number of these 10(5) certificates which contained measures to be taken in the interests of safety	124
Number of section 10(6) certificates showing that measures to be taken in the interests of safety had been satisfactorily completed	148

### Serving enforcement notices

Where we are unable to persuade undertakers to make the relevant appointments or to complete the safety measures, one option is to serve an enforcement notice, giving a deadline to comply. Table 3 below shows the number of notices served whilst table 4 shows the number of notices served by undertaker type. Over the past two years we have served 24 notices at 22 reservoirs (see Appendix 1 for full details).

**Table 3: Number of notices served 1 January 2017 – 31 December 2018**

Notices served		
<b>Section of the Reservoirs Act 1975</b>	Non-compliance	Total number of notices served (1 January 2017 to 31 December 2018)
<b>8(1)</b>	No construction engineer appointed	1
<b>12(4)</b>	No supervising engineer appointed	8
<b>10(7)(a)</b>	No inspecting engineer appointed	4
<b>10(7)(b)</b>	Safety measures not carried into effect	9
<b>16(4)</b>	Emergency Powers	2
	<b>Total number of notices served</b>	<b>24</b>

**Table 4: Number of reservoirs by undertaker type where notices have been served**

<b>Notices served by undertaker type</b>		
<b>Undertaker type</b>	<b>Examples</b>	<b>Total number of undertakers</b>
<b>Private landowners and Trusts</b>	Individuals, estates, developers	12
<b>National Trust</b>	The National Trust	2
<b>Farms</b>	Farms and Fish Farms	4
<b>Local Authority</b>	County councils, Borough councils	2
<b>Industrial and Commercial</b>	Manufacturers and other businesses with reservoir assets	2
	<b>Total number of reservoirs</b>	<b>22</b>

## Other enforcement action

We have issued 12 formal written warnings to reservoir undertakers between 1 January 2017 and 31 December 2018. Two reservoirs are under investigation and further enforcement action may have to be taken.

In some cases we have chosen to issue advice and guidance to reservoir undertakers, which are cases where a formal warning or further enforcement action was not considered appropriate.

## Environment Agency reservoirs

The Environment Agency is the undertaker for 214 large raised reservoirs in England.

All Environment Agency reservoirs were compliant during 2017 and 2018.

## Incident reporting

Incident reporting has been mandatory since July 2013, in England, for all large raised reservoirs (those with a volume of at least 25,000 cubic metres above ground level).

Incident reporting for small raised reservoirs (reservoirs not covered by the legislation) in England remains voluntary.

As soon as practicable after commencing emergency measures, the reservoir undertaker must provide a preliminary report of the incident to the Environment Agency. Within one year, a full report must be provided.

Table 5 shows the number of incidents reported to us during the period, compared to the previous reporting period.

**Table 5: Number of incidents reported between July 2013 and 31 December 2018**

	<b>2017 - 2018</b>	<b>2013 - 2016</b>
<b>Total number of reported incidents</b>	23	21
<b>Incidents at large raised reservoirs</b>	21	20
<b>Incidents at small raised reservoirs</b>	2	1

We have not needed to take enforcement action to obtain incident reports, although we have issued reminders to undertakers where a report is due. Compliance with the regulations on incident reporting is generally seen to be good and improving. One reason for the improvement is that we issued a briefing note to all reservoir undertakers and panel engineer in December 2017 and have given a number of presentations to the industry, which have improved awareness of the regulations for reporting.

## 4. Court Judgements on Risk Designations

We had five appeals against our designations of five different reservoirs in the two years covered by this report. Four have been dismissed by the First Tier Tribunal. One is still being considered.

The Flood and Water Management Act 2010 amended the Reservoirs Act 1975. One of the amendments requires the Environment Agency to designate reservoirs based on the potential consequences of a dam failure.

Section 2c of the Reservoirs Act states that a reservoir is high-risk if the appropriate agency thinks that, in the event of an uncontrolled release of water from the reservoir, human life could be endangered. It is very important to note that this paragraph reflects the intention of parliament when it made the law.

## 5. The Future

Key to further reducing non-compliance will be through gaining a greater understanding of our customers and by building strong and effective relationships with them to improve their understanding of the regulations and the importance of compliance. Appendix 7 (page 24) shows some examples of good practices already being delivered. Reservoir owners and operators are a diverse group ranging from large organisations such as the Environment Agency and water companies, through to farmers, fishing clubs and individual landowners. The public living downstream of reservoirs are largely unaware of the risk posed by reservoirs situated upstream of them.

Not all owners and operators have the same level of legal and technical understanding. We will aim to focus the majority of our communications to target those owners and operators with a lower level of understanding of their responsibilities and those groups that have a poorer track record with regard to compliance.

We work closely with the reservoir engineering profession. We already engage with the British Dam Society (BDS) and Institution of Civil Engineers (ICE) through the BDS Conference, supervising engineers' forum and membership of the BDS committee and ICE Reservoirs Committee. We believe that even closer engagement with the dam safety industry is possible and would be beneficial as they are employed by reservoir owners and are a key factor in influencing and communicating the importance of compliance.

We have supported Defra with their review of the regulatory impact of phase 1 of the Flood and Water Management Act (2010) and assisted them in improving the evidence base related to the number and condition of reservoirs in England with a capacity between 10,000 and 25,000 cubic meters.

## 6. Appendices

### Appendix 1 – Steps taken by the enforcement authority to ensure that undertakers observe and comply with the requirements of the Reservoirs Act 1975

Reservoir	Undertaker	Type	Location	Number of enforcement notices served under Reservoirs Act 1975 section					Other enforcement action	Compliance status as of 31 December 2018	Offence
				8(1)	10(7)(a)	10(7)(b)	12(4)	16(4)			
Great Barr Lower Lake	BCG Lakes Limited	Private Landowners and Trusts	Near Walsall			1		1	Notice(s) of entry served to facilitate intervention under Section 16 emergency powers to make reservoir safe.	Non-compliant.	Failure to carry safety measures into effect by the due date.
Marlbrook Quarry Landfill	Link Property Developments Limited	Private Landowners and Trusts	Near Bromsgrove						Notice(s) of entry served to facilitate inspection under Section 16 (emergency powers). Warning letter sent. Undertaker interviewed under caution.	Non-compliant. Under investigation.	Failure to carry safety measures into effect by the due date.
RESERVOIR A	Private Individuals	Private Landowners and Trusts	Near Marsden			1			Warning letter sent	Discontinued	Failure to carry safety measures into effect by the due date.
RESERVOIR B	Private Individuals	Private Landowners and Trusts	Near Bolton						Undertaker interviewed under caution	Compliant	Failure to carry safety measures into effect by due date.
RESERVOIR C	Private Individuals	Private Landowners and Trusts	Terrington						Letter that warns sent with advice and guidance.	Discontinued	Failure to register and failure to appoint panel engineers.
Mill Lodge Reservoir	Blackburn Waterside Regeneration private Limited	Private Landowners and Trusts	Near Blackburn						Warning letter sent	Discontinued	Failure to carry safety measures into effect by due date.

RESERVOIR D	Private Individuals	Private Landowners and Trusts	Near Great Witley				1		No further action	compliant	Failure to appoint Supervising Engineer
Vicarage Farm	Collings Farm Partnership	Private Landowners and Trusts	Potton					1	Intervention under Section 16 emergency powers to make reservoir safe.	Non-compliant. Discontinuance incomplete.	Failure to carry safety measures into effect by due date.
Fenham Service Reservoir	Northumbrian Water Limited	Water Companies	Fenham						Section 21A notice served. (requiring information)	Compliant. Under investigation.	Failure to register. Failure to appoint panel engineers. Failure to report an incident.
Petworth Upper Pond	National Trust	National Trust	Near Petworth			1			Advice and guidance issued.	Compliant	Failure to carry safety measures into effect by due date.
Locko Park Lake	Locko Park Estates	Private Landowners and Trusts	Near Derby						Advice and guidance issued.	Compliant	Failure to carry safety measures into effect by due date.
West Wycombe Lake	National Trust	National Trust	Near High Wycombe			1			Advice and guidance issued.	Compliant	Failure to carry safety measures into effect by due date.
RESERVOIR E	Private individuals	Private Landowners and Trusts	Near Scorton						Warning letter sent	Compliant	Failure to carry safety measures into effect by due date.
Osmaston Farm Lake	Okeover Estate	Private Landowners and Trusts	Near Derby			1			No further action	Compliant	Failure to carry safety measures into effect by due date.
Whiteknights Lake	The University of Reading	Private Landowners and Trusts	Near Reading						Letter that warns sent	Compliant	Failure to carry safety measures into effect by due date.
Monk Lake 2	Monk Lakes Limited	Fish farms	Near Marden	1					Warning letter sent.	Compliant	Failure to appoint a Construction Engineer

Larkshall Farm / Twenty Five Million Gallon Reservoir	Messrs R.G. Abrey Farms	Farms	Near Thetford				1		No further action.	Compliant	Failure to appoint a Supervising Engineer
Narford Lake	Trustees of the Fountaine Settlement	Private Landowners and Trusts	Near King's Lynn				1		No further action.	Compliant	Failure to appoint a Supervising Engineer
Willow Park Lake	St Helen's Borough Council	Local Authority	Near Haydock						Warning letter sent.	Compliant	Failure to carry safety measures into effect by due date.
Spring Farm	Cooper Bros. (Wix) Ltd	Farms	Near Wix		1				Warning letter sent.	Compliant	Failure to appoint an Inspecting Engineer
Withins	Withins Reservoir Limited	Private Landowners and Trusts	Near Radcliffe						Advice and guidance sent.	Compliant	Failure to carry safety measures into effect by due date.
Burrator	South West Water Services Limited	Water companies	Near Plymouth						Interview under caution. Warning letter sent.	Compliant	Failure to carry safety measures into effect by due date.
Bayham Lake	Bayham Abbey residents Association Limited	Private Landowners and Trusts	Near Lamberhurst			1			Warning letter sent.	Compliant	Failure to carry safety measures into effect by due date.
Stradsett Lake	Stradsett Estate Trustees	Private Landowners and Trusts	Near King's Lynn		1				Warning letter sent	Compliant	Failure to appoint an Inspecting Engineer
Bedgebury Park Great lake	Columbia International SA	Private Landowners and Trusts	Near Tunbridge Wells		1				No further action.	Compliant	Failure to appoint an Inspecting Engineer
Tilgate Lake	Crawley Borough Council	Local Authority	Near Crawley			1			Ongoing	Non-compliant	Failure to carry safety measures into effect by due date.
Lilymere	Messrs RW and GR Bee partnership	Industrial and commercial	Near Kendal		1		1		No further action.	Risk designation reviewed. Deregulated.	Failure to appoint panel engineers.
Dartmouth Boating Lake	Sandwell Metropolitan Borough Council	Local Authority	Near West Bromwich						Warning letter sent	Compliant	Failure to carry safety measures into effect by due date.

Long Meadow Reservoir	H Weston & Sons	Farms	Nar Ledbury						Warning letter sent	Compliant	Failure to carry safety measures into effect by due date.
Melbury Lake	Ilchester Estate	Private Landowners and Trusts	Near Evershot						Safety measures completed within notice period	Compliant	Failure to carry safety measures into effect by due date.
RESERVOIR F	Private individuals	Private Landowners and Trusts	Near Harrogate			1			Ongoing.	Non-compliant	Failure to carry safety measures into effect by due date.
RESERVOIR G	Private individuals	Private Landowners and Trusts	Near Wolverhampton			1			Ongoing.	Non-compliant	Failure to carry safety measures into effect by due date.
Chalk Beck	D.H. Sanderson and Son Ltd	Farms	Beachamwell				1		No further action.	Compliant	Failure to appoint a Supervising Engineer
Birtle Upper	Pinnacle Living 2 Ltd	Industrial and Commercial	Near Birtle				1		No further action.	Compliant	Failure to appoint a Supervising Engineer
RESERVOR H	Private Individuals	Private Landowners and Trusts	Near Crewe				1		No further action.	Compliant	Failure to appoint a Supervising Engineer
Wharford Farm Balancing Lake	Halton Borough Council	Local Authority	Near Runcorn				1		No further action.	Compliant	Failure to appoint a Supervising Engineer
Stanford	Severn Trent Water	Water companies	Near Rugby						Advice and guidance provided	Compliant. Under investigation.	Failure to carry safety measures into effect by due date.
Barrow No. 1	Bristol Water plc	Water companies	Near Bristol						Under investigation	Compliant	Failure to carry safety measures into effect by due date.
Barrow No. 2	Bristol Water plc	Water companies	Near Bristol						Under investigation	Compliant.	Failure to carry safety measures into effect by due date.

Meriden No. 2	Severn Trent Water	Water companies	Near Coventry						Letter sent requiring information (not under caution)	Non-compliant. Under investigation	Failure to appoint an Inspecting Engineer.
Meriden No. 3	Severn Trent Water	Water companies	Near Coventry						Letter sent requiring information (not under caution)	Non-compliant. Under investigation	Failure to appoint an Inspecting Engineer.
Oldbury No. 1	Severn Trent Water	Water companies	Near Nuneaton						Letter sent requiring information (not under caution)	Non-compliant. Under investigation	Failure to appoint an Inspecting Engineer.
Whittle Dene Lower	Northumbrian Water Limited	Water companies	Near Newcastle upon Tyne						Under investigation	Non-compliant	Failure to carry safety measures into effect by due date.
Whittle Dene Northern	Northumbrian Water Limited	Water companies	Near Newcastle upon Tyne						Under investigation	Non-compliant	Failure to carry safety measures into effect by due date.
Whittle Dene Western	Northumbrian Water Limited	Water companies	Near Newcastle upon Tyne						Under investigation	Non-compliant	Failure to carry safety measures into effect by due date.
Whittle Dene Great Southern	Northumbrian Water Limited	Water companies	Near Newcastle upon Tyne						Under investigation	Non-compliant	Failure to carry safety measures into effect by due date.
Folkington	South East Water Limited	Water companies	Near Eastbourne						Under investigation	Compliant	Failure to carry safety measures into effect by due date.
Hallington West	Northumbrian Water Limited	Water Companies	Near Colwell						Under investigation	Compliant	Failure to carry safety measures into effect by due date.
Barcombe	South East Water Limited	Water companies	Near Lewes						Under investigation	Non-Compliant	Failure to carry safety measures into effect by due date.

**Appendix 2 – Update on other third party non-compliant cases in England in appendix 1 of our 2015-2016 biennial report**

Reservoir	Undertaker	Type	Location	Number of enforcement notices served under Reservoirs Act 1975 section					Enforcement outcome	Compliance status as of 31 December 2018	Comment
				8(1)	10(7)(a)	10(7)(b)	12(4)	16(4)			
Reservoir B	Private Individuals	Private Landowners and Trusts	Near Bolton						Undertaker interviewed under caution.	compliant	Safety measures completed
Whiteknights	University of Reading	Private Landowners and Trusts	Near Reading						Letter that warns sent	compliant	Safety measures completed
Locko Park Lake	Locko Park Estates	Private Landowners and Trusts	Near Derby						Warning letter sent	compliant	Safety measures completed
Great Barr Lower Lake	BCG Lakes Limited	Private Landowners and Trusts	Near Walsall			1		1	Notice(s) of entry served to facilitate intervention under Section 16 emergency powers to make reservoir safe.	Non-compliant	Safety measures underway. Undertaker is complying with deadlines set out in notice.
Marlbrook Quarry Landfill	Link Property Developments Ltd	Private Landowners and Trusts	Near Bromsgrove						Notice(s) of entry served to facilitate inspection under Section 16 (emergency powers). Warning letter sent. Undertaker interviewed under caution.	Non-compliant	Enforcement Authority considering options to address outstanding safety measures.
Withins	P&F Properties	Private Landowners and Trusts	Near Radcliffe						Advice and guidance sent	compliant	Safety measures completed
Reservoir C	Private Individual	Private Landowners and Trusts	Near Bolton						Warning letter sent	compliant	Undertaker appointed Supervising Engineer

Lucerne Lake	Ilchester Estate	Private Landowners and Trusts	Near Evershot						ongoing	Non-compliant	Safety measures underway
Melbury Lake	Ilchester Estate	Private Landowners and Trusts	Near Evershot						Warning letter sent	compliant	Safety measures completed
Langold Lake	Bassetlaw District Council	Local Authority	Near Worksop						No further action	compliant	Safety measures completed
Willow Park Lake	St Helens Borough Council	Local Authority	Near Haydock						Warning letter sent	compliant	Safety measures completed
Osmaston Farm Lake	Okeover Estate	Private Landowners and Trusts	Near Derby			1			No further action	compliant	Safety measures completed

Note: reservoirs B and C are specific to the 2015 - 2016 biennial report and do not reflect those listed in Appendix 1

### Appendix 3 – Environment Agency compliance

Reservoir	Location	Dates non-compliant	Offence	Current compliance status as of 31 December 2018	Steps taken
None	N/A	N/A	N/A	N/A	N/A

## Appendix 4 – Statistics, engineer appointments and safety measures

Reference	Description	Number on 31/03/2005	Number on 30/03/2007	Number on 02/04/2009	Number on 05/04/2011	Number on 05/04/2013	Number of 02/01/2015	Number on 31/12/2016	Number on 31/12/2018	Description
Statistics for all English reservoirs										
1	Total number of 'large raised reservoirs' (LRRs)	1,715	1,799	1,889	1,913	1,944	2,001	2,020	2,055	Comprises those reservoirs that are 'in operation', 'abandoned', and 'under construction'
2	Number of 'under construction' reservoirs	93	99	102	115	131	167	145	118	Includes both new reservoirs and those being modified
3	Number of 'abandoned' reservoirs	-	3	3	4	3	3	3	4	Although empty, an 'abandoned' reservoir is still capable of holding at least 25,000m <sup>3</sup> of water above natural ground level
4	Total number of 'discontinued' reservoirs	-	175	191	210	219	225	235	253	
5	Number of 'proposed' reservoirs	-	14	19	37	47	59	64	78	These are locations at which a LRR may be constructed in the future
6	Total number of undertakers	431	644	691	708	736	772	847	839	
7	Total number of LRRs for which the Environment Agency is the undertaker	124	161	180	189	198	209	211	214	Comprises those reservoirs that are 'in operation', 'abandoned', and 'under construction'
Supervising Engineer (SE) appointments										
8	Number of LRRs with no SE	44	40	6	4	10	8	8	3	
Inspecting Engineer (IE) appointments										
9	Number of LRRs for which the next Section 10 inspection (S10 Insp) report is overdue	115	166	138	46	12	76	91	105	All 'high risk' reservoirs have to be inspected periodically by an IE, at intervals no greater than ten years. This includes cases in which an IE has been appointed, but a 10(5) certificate has not yet been issued.
10	Number of LRRs for which the next S10 Insp report is overdue, for which an inspection and report is in progress	-	129	134	45	0	62	78	97	

11	Number of LRRs for which the next S10 Insp has been overdue for at least one year	51	29	64	10	0	14	11	12	
12	Number of LRRs for which the next S10 Insp has been due for at least one year, for which an IE has NOT been appointed	-	1	3	0	0	0	4	0	
13	Number of LRRs for which the next S10 Insp has been due for less than one year for which an IE has NOT been appointed	-	-	1	1	12	14	9	8	
Measures to be taken in the interests of safety (MIOS)										
14	Number of LRRs with MIOS, including those within the 'target period' set by the IE	278	277	303	267	199	172	272	196	MIOS are essential works identified by an IE during an inspection carried out under section 10 of the Reservoirs Act 1975. The undertaker is legally required to implement MIOS*
15	Number of LRRs with MIOS that are still outstanding even though the target period has elapsed	-	49	40	41	35	36	57	49	
16	Number of LRRs with MIOS for which there is no target date but which have been outstanding for at least five years	-	5	5	1	3	0	2	0	If MIOS are still outstanding five years after the section 10 report then it is quite likely that they have not been implemented 'as soon as practicable'

\* These figures do not necessarily represent non-compliance, just the total number of reservoirs that have safety measures identified, not all of which are outstanding beyond their target date. The figures will naturally vary according to how often engineers are identifying works that need doing at reservoirs, and we have no control over this. It is not necessarily a figure to be concerned about, unless the work is not done in time.

## Appendix 5 – Statistics on reservoirs by dam category

Distribution of dam category			
Dam category	Number of LRRs	% of total number of LRRs	Notes (Reference: Floods and Reservoir Safety; ICE1996)
A	693	33.7	Where a breach could endanger lives in a community
B	293	14.3	Where a breach could endanger lives not in a community or could result in extensive damage
C	438	21.3	Where a breach would pose negligible risk to life and cause limited damage
D	236	11.5	Special cases where no loss of life can be foreseen as a result of a breach and very limited additional flood damage would be caused
Not applicable	97	4.7	Historically, only impounding reservoirs have been assigned a dam category, which was originally for flood design purposes. Although this has changed, and the risks posed by all reservoirs are now being considered, some non-impounding and service reservoirs have not yet been assigned a dam category
Unknown	298	14.5	Section 10 Inspection reports, in which dam category information is normally supplied, are not available for all reservoirs (because before July 2013 and high-risk designations reports that did not contain MIOS, did not need to be submitted to the enforcement authority).
Totals	2055	100	

## Appendix 6 – Statistics on reservoirs by undertaker type

Distribution of undertaker type		
Undertaker type	Number of LRRs	% of total number of LRRs
Water Company	661	32.2
Private landowner	420	20.4
Agriculture (farms and fish farms)	287	14.0
Environment Agency	214	10.4
Local Authority	151	7.3
Industrial and Commercial	98	4.8
Other Government Agencies and Departments	72	3.5
Canal and River Trust	71	3.5
National Trust	44	2.1
Registered Charities	37	1.8
Totals	2055	100



## ii. Environment Agency - managing our large raised reservoirs

The Environment Agency is the Undertaker (operator) of 214 large raised reservoirs, 24 of which are under construction. These are designed to store flood water to protect people and property by holding back some of the river's flow during floods. The majority are completely dry for most of the time, only coming into action when a flood occurs, but some have wet areas at low flow to provide environmental benefits or to suit a dual purpose such as angling. We have supervising engineers in place for all of these reservoirs and employ All Reservoir Panel Engineers to carry out the statutory inspections required by law.

To improve our knowledge and the responsibilities and an undertaker, we have developed an internal training course that 'All staff in the management of reservoirs should pass. The completion of the course and assessment are recorded in our learning zone and this needs to be repeated every three years.

We have developed four additional training modules, each tailored to cover different key themes in reservoir management.

Module 1 – General awareness – For those who don't manage reservoirs directly, but would benefit from a high level awareness of reservoirs.

Module 2: Reservoir field awareness, sometimes referred to as 'eyes and ears' training.

Module 3 – Incident Management – Focused on procedures for Duty Staff and how to manage an incident at a reservoir site.

Module 4 – Project Management – Focus on the roles and responsibilities of the Project Manager when designing and building a new reservoir.

These modules are designed to help Environment Agency staff understand the importance of good reservoir management. The training is aimed at those who may visit reservoirs assets during the course of their work or manage staff that do

**Managing large raised reservoirs operated by the Environment Agency**

Operational Instruction 478\_05 Issued 05/09/2018

**What's this document about?** How to manage Environment Agency reservoirs in accordance with the Reservoirs Act 1975. This instruction does not apply to large raised reservoirs where a third party is the undertaker.

**Who does this apply to?** All staff involved with or responsible for managing reservoirs. Principally the following:

- Reservoirs Act Co-ordinators (RACs);
- Director of Operations;
- Area Manager;
- Asset Performance (AP) team;
- Field Teams;
- Operations Manager;
- National Operations Assurance team;
- Flood Resilience Team (FR);
- Area Flood and Coastal Risk Manager (AFORM);
- Project Managers for new or changed reservoirs;
- Catchment Engineers;
- ~~non-ECRM~~ staff who have responsibility for managing any large raised reservoir where we are the undertaker.

**Contact for queries and feedback** Any questions relating to the content of this document ~~should be directed~~ to David Trubshaw in the first instance. [david.trubshaw@environment-agency.gov.uk](mailto:david.trubshaw@environment-agency.gov.uk)

- Please give [feedback](#) for this document.

### iii. Severn Trent Water - reducing risk by routine surveillance

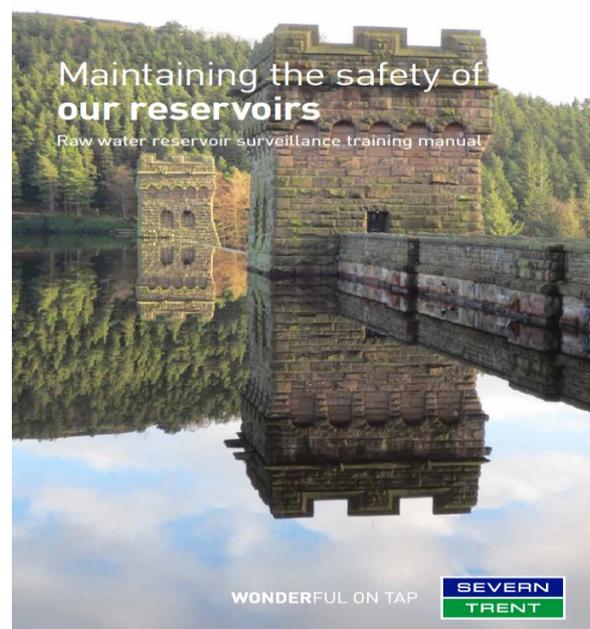
We're responsible for 83 statutory reservoirs. Our reservoirs are retained by dams with a varying risk profile, being of differing age, type and form of construction. Whilst we always strive to be fully compliant with legislation, we know that the time between formal inspections can be comparatively long and so we need to make sure we're constantly keeping an eye on the performance of our reservoirs in between those assessments. The potential always exists for progressive deterioration (for example to the internal structure of the dam) which could lead to risk of failure of a large reservoir between formal inspections.

We believe that critical intervention is provided by routine surveillance. This means that we can identify any potential deterioration of the structure and threat to the integrity of the reservoir in sufficient time for remedial action to be taken e.g. by emergency draw-down of the reservoir. In 2008, we adopted the surveillance frequencies recommended by DEFRA in an R&D paper. This is benchmarked against the surveillance regimes operated by other leading water companies who have adopted a similar standard. For example, for an older reservoir with an earth embankment, a trained operative will visit the site three times a week and complete a rigorous check of the performance of the dam and its critical structures such as the spillway.

We've devised a certified, surveillance training programme for our operators and supervisors, which has to be renewed every three years. The assessed training programme is supported by training manuals, and our raw water training manual is regarded as industry leading. It's now available on the British Dam Society website for use by all reservoir owners. Please see:-

<https://britishdams.org/educationcareers/about-dams/safety/>

We know that we have a huge responsibility when it comes to maintaining the integrity of our reservoirs and so our regular surveillance programme of work is incredibly important. We're really proud that the programme we've put in place for our staff is regarded so highly.



## Appendix 8 – Notes

### i. What is an ‘undertaker’?

This is an operator, user, owner or lessee of a reservoir. Undertakers are responsible for meeting the requirements of the Reservoirs Act 1975. For example, water companies, businesses, charities, fishing and sailing clubs and the Environment Agency are all reservoir undertakers. This can also be more than one person or company.

### ii. What are Panel Engineers?

Panel Engineers are a group of specialist civil engineers (“qualified civil engineers”) appointed by the Secretary of State who are experienced and qualified in reservoir safety. The Reservoirs Act 1975 requires them to oversee the safe construction, operation and maintenance of reservoirs and inspect their safety every ten years or more frequently if necessary. A Panel Engineer must be appointed when a new reservoir is built or repairs and changes are made to existing ones. Panel Engineers (qualified civil engineers) may be Supervising Engineers, Inspecting Engineers or Construction Engineers.

### iii. What is the role of the Supervising Engineer?

A Supervising Engineer is appointed to supervise the operation and maintenance of the reservoir at all times. This engineer is effectively the “eyes and ears” working on behalf of the undertaker.

### iv. What is the role of the Inspecting Engineer?

An Inspecting Engineer is appointed to inspect a reservoir (at least once every 10 years), identify and make recommendations in the interest of safety (a Section 10 Report) when appropriate, and in the role of a Qualified Civil Engineer is employed to supervise and certify their carrying into effect.

### v. What is the role of a Construction Engineer?

A Construction Engineer is appointed to supervise the construction or modification of a reservoir such that it increases its capacity.

### vi. What is a Section 10 Report?

A section 10 report is produced by an Inspecting Engineer following the inspection of a reservoir. The report includes a safe operating regime, any required maintenance works and works required ‘in the interests of safety’.

### vi. Data protection

We have listed those undertakers that are limited companies, local authorities and charities.

The Data Protection Act 1998 does not permit us to publish the names of private individuals, including partnerships and sole traders.

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