Department for Environment Food & Rural Affairs

Evaluation of the Impact of the First Phase of the FWMA-2010 Reservoir Provisions in Relation to Large Raised Reservoirs

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Evaluation of the Impact of the First Phase of the FWMA-2010 Reservoir Provisions in Relation to Large Raised Reservoirs

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Executive Summary

Following the floods of 2007 and the subsequent Pitt Review, changes were implemented to the Reservoirs Act 1975 by the Flood and Water Management Act (FWMA) 2010.

This report has been prepared to provide evidence to feed into a Post Implementation Review of the changes in legislation.

One of the main changes to reservoir safety management was the introduction of a risk designation process for all Large Raised Reservoirs in England. The process would permit the partial deregulation of reservoirs which were not considered to be high risk. The criteria for a reservoir being 'high risk' was prescribed in the FWMA 2010 as where *"in the event of an uncontrolled release of water from the reservoir human life could be endangered"*.

Other changes to reservoir safety management included mandatory submission of reports, statutory incident reporting, provisions for statutory maintenance and enhanced powers for the Supervising Engineer.

An Impact Assessment of the changes to the legislation was undertaken by the Department for Environment, Food & Rural Affairs (Defra) in 2011. One of the impacts identified was the substantial potential savings through partial deregulation based on the assumption that around 55% of Large Raised Reservoirs would be partially deregulated. This was based on an assumption that most Category C and D reservoirs would be partially deregulated.

The risk designation process was implemented by the Environment Agency in England. The outcome of the process has been that, of the LRRs that have been designated, only 12%, rather than the predicted 55%, of reservoirs have been designated as 'not high risk'. Evaluation of the categorisation and risk designation processes has revealed that they are not compatible, and that it should not necessarily have been expected that Category C reservoirs would be designated 'not high risk'. However, all Category D reservoirs should have been designated 'not high risk' and it must be concluded that either the original categorisation was incorrect or that the inundation maps used to inform the risk designation process were over conservative.

The approach taken by the Environment Agency in making risk designations has been fully supported by three First Tier Tribunals which have all found in favour of the designations proposed by the Environment Agency.

The 2011 Impact assessment reported a best estimate of a 50-year Present Value net saving of £101.7m through implementation of the changes to the Reservoirs Act. Due to the reduced number of reservoirs which have been partially deregulated, the current estimated 50-year Present Value net saving is only £21.7m.

This study has included interviews with a broad selection of reservoir undertakers to canvas opinion on the impacts of the changes in legislation. The general opinion is that fewer reservoirs than anticipated had been partially deregulated, and therefore the potential benefits of the FWMA 2010 have not yet been met. The principal beneficiaries of the changes to the legislation appear to be individual or small businesses where the cost of employing Panel Engineers is significant. Larger organisations, such as water companies, have been largely unaffected by the changes. Reservoir owner groups have not reported significant queries from their members, which suggests the changes have not had an adverse effect on the reservoir industry as a whole.

1 Introduction

This report is the deliverable for Aim 1 / Objective 1 of the Defra research project entitled *Applying a Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs* (FD2701).

1.1 Project Background

Since the 1980s, reservoir safety in Great Britain (England, Scotland and Wales) has been legislated by the Reservoirs Act 1975 (the 1975 Act) which placed legal duties on those owning or operating reservoirs (undertakers) of more than 25,000 m³ storage capacity above natural ground, i.e. Large Raised Reservoirs (LRRs).

The Water Act 2003 amended the Reservoirs Act 1975 and changed the enforcement role from 136 Local Authorities to the Environment Agency in England and Wales.

In 2013, the 1975 Act was amended by Schedule 4 of the Flood and Water Management Act 2010 (FWMA 2010) for England. The amendments were enacted in Wales in 2016. Independent legislation was passed in 2014 for reservoirs in Scotland (Reservoirs (Scotland) Act 2011) and enacted in 2016.

1.2 Post Implementation Review

The purpose of this report is to provide evidence for a Post Implementation Review of the FWMA 2010 Schedule 4. The report will address Defra's aims, objectives and research questions, which are repeated verbatim below.

1.2.1 Aim

The aim of the review is to evaluate the impact of the changes implemented in the first phase of the FWMA 2010 reservoir provisions in relation to LRRs.

1.2.2 Objective

The objective of the review is to provide evidence to feed into a Post Implementation Review of the first phase of the FWMA 2010 reservoir provisions. This will focus on the impact of the changes and current risk methodology, including the effectiveness and suitability of the current risk assessment for LRRs.

1.2.3 Research questions

The review will seek to answer the following research questions:

1. To collect and refine evidence on the number of LRRs that have been fully regulated and the impact of the changes to reservoir legislation implemented under Phase 1 of the Flood and Water Management Act 2010, in particular:
   a. The number of LRRs that have been registered and designated as high risk
   b. Are the regulations delivering the benefits originally identified
   c. Costs and benefits to reservoir undertakers and regulatory authorities
2. Evaluate the effectiveness of the current regulations in relation to the risk methodology and high risk designation processes in England.

1.3 Methodology

The following methodology has been adopted:

- Synthesis of legislation and industry guidance, and an understanding of the need for change to reservoir safety management.
- A review of the Defra Impact Assessment for Schedule 4 of FWMA 2010.
- A review of the implementation of the FWMA 2010, including a review of the risk designation process and comments on its effectiveness.
- Gather information from the Environment Agency on the nature of undertakers at reservoirs that have been partially deregulated. Gather information from the Environment Agency on the location of partially deregulated reservoirs.
- Conduct an interview with the Environment Agency as the enforcement authority for England.
- Conduct interviews with membership organisations such as the Country Land and Business Association (CLA), National Farmers Union (NFU), Angling Trust and three major water utility companies. The purpose will be to understand the extent to which partial deregulation has, or might, lead to cost reductions in reservoir management.
- Conduct interviews with a selection of partially deregulated reservoir owners to determine what partial deregulation has meant in terms of monitoring and surveillance and whether previously prescribed monitoring requirements have been continued.
- Conduct interviews with undertakers whose reservoir is used for the purposes of a small business. This will cover regulated and partially deregulated reservoirs. The interviews will seek to understand the impact of the process on the costs of the business and whether those costs are significant in terms of business viability.
- Hold discussions with emergency planners to gain their view on the designation process and how the changes to these reservoirs might affect the effectiveness of a response during emergency conditions.
- Summarise the results of the interviews and draw conclusions from the study.

The structure of this report is as follows:

1. Introduction (this section)
2. Summary of the Reservoirs Act 1975
3. A review of the factors that led to the need for a change to reservoir safety management
4. Summary of the Flood and Water Management Act 2010
5. A review of Defra's Impact Assessment for the implementation of FWMA 2010
6. A review of the implementation of the FWMA 2010
7. Analysis of the Environment Agency's LRR database with regards to risk designations
8. Interviews with key stakeholders – proposed methodology
9. Interviews with key stakeholders – results
10. Implementation review
11. Conclusions

2 Reservoirs Act 1975

2.1 Introduction

The 1975 Act, as amended by the FWMA 2010, is the primary piece of legislation which provides the legal framework to promote and maintain the safety of reservoirs in England.

A summary of the 1975 Act is provided below, to provide a baseline for the forthcoming review of the FWMA 2010.

2.2 Summary of the 1975 Act

Prior to 2013 there were approximately 2,600 reservoirs which fell under the ambit of the 1975 Act, and of those approximately 2,000 were located in England. The reservoir portfolio, and therefore the risk that these reservoirs pose to the public, varies greatly; approximately 80% are embankment dams with the remainder concrete and service reservoirs; approximately 70% were built before 1900 and some date from as early as the 12th century (ICE; 2014b).

The 1975 Act names four groups responsible for reservoir safety. Their roles are summarised below. These groups remain responsible for reservoir safety under the current legislation.

Table 1: Roles and Responsibilities under the Reservoirs Act 1975

Group	Roles and Responsibilities
Undertaker	Generally, the owners or the operators of the reservoir, have ultimate responsibility for safety.
Enforcement Authority	The Environment Agency in England. Duties are mainly of an administrative and legal nature, although it does have both reserve and emergency powers.
Qualified Civil Engineer	The design and supervision of reservoir construction and alterations, the supervision of measures in the interests of safety, inspection of reservoirs and the ongoing supervision of reservoirs are the responsibility of qualified civil engineers.
Secretary of State	Secretary of State (Defra) has oversight of enforcement authorities, appointments of QCEs, and drafts Statutory Instruments

Source: A Guide to the Reservoirs Act 1975; 2nd Edition (ICE; 2014b)

Reservoir undertakers are responsible for reservoir safety. Reservoirs which fall under the remit of the 1975 Act are those with a volume of water more than 25,000 m^3 above natural ground. They require an inspection by a Qualified Civil Engineer (QCE), as appointed by Defra in consultation with the Institution of Civil Engineers (ICE), every ten years (hereafter referred to as Inspecting Engineers). The Inspecting Engineer must be on the All Reservoirs Panel, the Non-Impounding Panel or the Service Reservoir Panel as appropriate, and make recommendations for works if required in the interest of public safety. The reservoirs also require an annual statement and visit(s) by a Supervising Engineer. The Supervising Engineer works with the reservoir undertaker to ensure the ongoing maintenance of the reservoir. If there is a serious defect in the structure, the Supervising Engineer can call for an inspection by an Inspecting Engineer.

Dams are categorised based on their impact to lives downstream (ICE; 2015a) as greater standards are required against dam failure for dams with a high consequence if they fail. Dam

categories are summarised below. Although dam categories are not explicitly defined in the 1975 Act, the categorisation assists with the implementation of the principles of the Act.

- Category A – where a breach could endanger lives in a community (taken to be ten persons)
- Category B – where a breach could endanger lives not in a community (less than ten persons) or could result in extensive damage
- Category C – where a breach would pose negligible risk to life and cause limited damage
- Category D – 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.

Different dam categories have different safety check and design flood conditions, and different freeboard requirements, all to ensure a defined level of security against dam failure by flood events. The importance of dam categories is discussed in Section 5.

2.3 Water Act 2003

The Environment Agency took over the role of enforcement authority for the 1975 Act from 136 Local Authorities in England and Wales in October 2004, following the introduction of the Water Act 2003. Other powers granted by the Water Act 2003 include:

- The Environment Agency can serve a written notice on the undertaker to appoint a QCE.
- The Environment Agency can appoint a QCE and carry out matters in the interests of safety where the undertaker fails to do so.
- The Environment Agency can take emergency action to protect people and property against an escape of water from a large raised reservoir, where it considers this is required.
- The Environment Agency can enter a reservoir site for any purpose connected with its enforcement powers.
- The Secretary of State can direct that flood plans are produced.

The role of the Environment Agency in reservoir safety legislation is discussed in Section 3.

2.4 Discussion

It can therefore be seen that the Environment Agency, as enforcement authority, has a significant role to play in reservoir safety management in England. Panel Engineers (Inspecting Engineers and Supervising Engineers) bridge the gap between the enforcement authority and reservoir undertakers, and solely provide the technical expertise necessary to manage reservoir safety.

Dam categories (ICE; 2014b) have historically been the tool used to communicate the perceived threat posed by a reservoir. Of particular importance to this study is the definition of Category C and Category D dams, where negligible risk to life (at “flood-threatened areas that are inhabited spasmodically, such as footpaths across the flood plain and playing fields”) or no loss of life is anticipated.

3 The Need for Change

3.1 Introduction

From 2004 the role of the enforcement authority was taken over by the Environment Agency. This change afforded a more consistent approach to reservoir safety and ideas were developed for improvements in the legislation.

The floods in the summer of 2007 further highlighted that there was a need for change. For example, the near failure of Ulley Reservoir, near Rotherham, which led to the closure of the M1 motorway and the evacuation of 1,000 people (Cabinet Office; 2008) demonstrated the need for flood plans to be available to emergency responders.

Three key documents have been identified as providing evidence for the need for change. These are summarised below.

3.2 Environment Agency Biennial Report (2005 to 2007)

In the 2007 biennial report (Environment Agency; 2007) the Environment Agency presented the legislative changes they would like to see:

- Better risk-based definition of a reservoir within the Act
- Funded powers to act at reservoirs with no owner
- Mandatory post-incident reporting
- More flexible enforcement powers
- Better quality assurance of inspection reports
- Better enforcement powers for reservoir flood plans
- Better regulation of disused mine and quarry tips and canals

3.3 Pitt Review 2008

The Pitt Review (Cabinet Office; 2008) provided a comprehensive review of the lessons to be learned from the summer floods of 2007.

In terms of the effective management of dams and reservoirs, the Pitt Review focussed on the following topics:

- Balancing the needs of security and safety
- The nature of the risks of dam failure
- Reservoir flood plans
- Achieving a risk-based approach
- A new legislative framework for reservoir safety
- Succession in the civil engineering profession.

The recommendations with regards to reservoirs are reported below:

- **RECOMMENDATION 57:** The Government should provide Local Resilience Forums with the inundation maps for both large and small reservoirs to enable them to assess risks and plan for contingency, warning and evacuation and the outline maps be made available to the public online as part of wider flood risk information.

- **RECOMMENDATION 58:** The Government should implement the legislative changes proposed in the Environment Agency biennial report on dam and reservoir safety through the forthcoming flooding legislation. These changes included:
  - Funded powers to act at reservoirs with no owner
  - Mandatory post-incident reporting
  - Better quality of inspection reports
  - Better regulation of canals and disused mine and quarry tips
  - A new legislative framework for reservoir safety.

These recommendations highlighted the need to change reservoir safety legislation in England.

3.4 Environment Agency Proposals to Defra for Legislative Change 2008

The Environment Agency prepared a response to Sir Michael Pitt's Recommendation 58 (Environment Agency; 2008). The response sets out the Environment Agency's proposals for changes to reservoir safety legislation.

Below is a summary of the Environment Agency's overview for legislative change:

Table 2: Summary of EA's proposals to Defra for legislative change

Subject	Summary and reasons for change (where given)
What is a reservoir	The principles of the 1975 Act to be retained, however exclude situations where water is inadvertently retained behind road and rail embankments during a flood
Reservoir undertakers	Provide clarity on a named, responsible person or business, that is capable of exercising day-to-day control. This will keep a sequential approach to defining the undertaker, but be more robust
Risk based approach	Currently the Act is not risk-based, and there are a number of reservoirs below the volumetric threshold that are poorly maintained and constitute a high hazard. Propose to introduce a risk-based approach with proportionate levels of engineering input and a legal obligation on undertakers to register with the Environment Agency all bodies of water retaining 5,000m^3 above the natural level. Risk levels to include: • High hazard – probable loss of life and/or major property/infrastructure damage • Significant hazard – possible loss of life and/or major property/infrastructure damage • Low hazard – very low probability of loss of life. Minor property/infrastructure damage
Service reservoirs	Only regulate those that constitute a significant or high risk such as Victorian brick arch/vaulted service reservoirs
Regulatory role	Maintain a light touch with proportionate intervention only where there is non-compliance
Charging	Introduce a charging system to recover EA's administration costs
Registration regime	Establish a register of all artificially retained bodies of water above 5000m^3. Undertakers at significant and high hazard reservoir to be charged a scaled annual fee based on risk category to cover administrative costs
Risk categorisation	Current categorisation does not consider risk. Determine risk category of reservoirs by considering

Subject	Summary and reasons for change (where given)
	both consequence (social, economic, environmental factors) and probability (dam type, height, age etc.)
Impact on regulated community	The removal of the burden of formally employing panel engineers (Supervising and Inspecting Engineers) at all Category D reservoirs and some Category C reservoirs. In addition, it will remove the requirement for programmed inspections by an Inspecting Engineer at all but the high hazard reservoirs
Process for registration	To instigate a new process for registration
Appeal against risk ranking	To instigate a process to appeal against risk ranking
Referee	Appointment of a referee (new QCE to review a previous Section 10 Inspection Report)
Construction of new reservoirs and alterations to existing	These two issues are still to be finalised: • Construction of new low hazard reservoirs, and whether they are subject to the same rigours as high hazard reservoirs • The Act does not address the financial contribution by downstream developers on necessary upgrades and improvements to secure public safety on existing reservoirs.

Source: (Environment Agency; 2008)

The document goes on to recommend a number of legislative changes to meet the above objectives. The report also provides further commentary on the summaries given in Table 2.

With particular reference to risk designation and partial deregulation, the Environment Agency recommended that all reservoirs which pose a risk to life (i.e. reservoirs that are category A and B) should come under the legislation; reservoirs which are confirmed to not pose a risk to life (i.e. category C and D) should be removed from regulation.

The Environment Agency also recommended that all reservoirs above a minimum volume of 5,000 m^3 should be registered and given a risk score to categorise them as ‘high’, ‘significant’ or ‘low’ risk, as defined above, based on factors that indicate the likelihood of failure (for example, dam type, dam age, dam height, and upstream reservoirs) and the consequence of failure (i.e. number of lives that would be lost).

The risk score defines the level of regulation needed: ‘high’ risk reservoirs would be required to have Inspecting Engineers and Supervising Engineers; ‘significant’ risk would only require a Supervising Engineer and ‘low’ risk would only need to be registered with the enforcement authority.

The Environment Agency predicted that up to 10,000 reservoirs may need to be registered, but that the number of ‘high’ and ‘significant’ risk reservoirs would be similar to that under the 1975 Act. Supervising Engineers and Inspecting Engineers would be involved in the risk designation process.

Confirmation of these proposals is reported in the Environment Agency’s biennial report for 2007 to 2009 (Environment Agency; 2009a).

3.5 Discussion

Initial proposals from the Environment Agency for a fully risk-based approach to reservoir safety regulation was supported in the findings of the Pitt Review following the summer of 2007 floods.

The review referenced evidence that indicated that certain small raised reservoirs (SRRs, i.e. reservoirs of less than 25,000 m^3 capacity) could pose a risk to people, property and infrastructure. The 1975 Act did not regulate such reservoirs.

In response to Pitt's Recommendation 58, the Environment Agency made the case for legislative change to Defra. Within this request, the Environment Agency made clear their proposed methodology for a risk based approach to enforcement which envisaged three tiers of risk (high, significant, low) which would remove the regulatory burden at all Category D reservoirs and some Category C reservoirs.

To understand the implications of the recommendations, Defra undertook an Impact Assessment in 2011. The subsequent impacts of the implementation of the FWMA 2010 will be compared to this Impact Assessment. A detailed review of the Impact Assessment is provided in Section 5 and Section 10 of this report.

4 Flood and Water Management Act 2010

4.1 Introduction

The Environment Agency's recommendations following the Pitt Review fed into the drafting of revised legislation for reservoirs.

Initially a completely new Act was drawn up by Defra lawyers, however as parliamentary time was limited, an amended Act was promoted.

However, it should be noted that the legislation was drafted independently by the government and not all of the Environment Agency's recommendations were implemented.

4.2 Summary of FWMA 2010

The 1975 Act was amended in 2010 by Schedule 4 (Reservoirs) of the FWMA 2010 (HMSO; 2010). The amendments have been widely reported in the industry, so only a succinct summary will be provided below.

Table 3: Amendments to the 1975 Act by FWMA 2010 (ICE; 2014a) (ICE; 2014b) (ICE; 2014c)

Component	Description
Definition of Large Raised Reservoir	Section A1(1) defines a large raised reservoir as the structure which impounds the water and the body of water itself. There are several exclusions, including mine/quarry tips, canals, roads and railways embankments which inadvertently store flood water. The threshold remains at 25,000 m^3
Registration requirements	It is the undertaker's responsibility to register the reservoir with the Environment Agency and failure to do so is a criminal offence.
Risk designations	Registered LRRs will be designated as 'high risk' or not 'high risk' by the Environment Agency. A LRR is designated as 'high risk' if the Environment Agency thinks that, in the event of an uncontrolled release of water from the reservoir, human life could be endangered. A not 'high risk' reservoir will remain on the public register and be subject to the construction, discontinuance, and incident reporting of the 1975 Act as amended by FWMA 2010. Risk designations are discussed in further detail in subsequent sections of this report.
Inspections (Section 10)	The Inspecting Engineer must provide the inspection report to the Environment Agency within 6 months of the inspection or notify the Environment Agency with a written statement of the reasons for any delays. The Inspecting Engineer may make recommendations of measures to be taken with regard to the maintenance of the reservoir. These recommendations, under section 10(3), relate to maintenance works, which if not undertaken could lead to deterioration of the reservoir to such an extent as to impair safety and are now enforceable by the Environment Agency. Recommendations made in the interest of safety must be completed within a timescale set by the Inspecting Engineer.
Supervision (Section 12)	The Supervising Engineer must provide a statement under subsection 12(2A) at least once every 12 months. The Supervising Engineer may direct the undertaker to carry out a visual inspection of the reservoir at specified intervals for the purpose of identifying anything that might affect the safety of the reservoir.
Flood plans	Undertakers are directed to prepare flood plans that would set out the action they would take in order to control or mitigate the effects of flooding likely to result from any large uncontrolled escape of water from the reservoir.

Component	Description
Discontinuance	Section 13 has been extended by Schedule 4 to ensure that the discontinuance process is now subject to an Interim Certificate, issued by the QCE responsible for the design and supervision of the discontinuance. The purpose of this certificate is to protect against an uncontrolled release of water during the discontinuance process, when the reservoir structure can be expected to be impaired.
Certificates and reports	New prescribed forms for certificates, inspection reports and Supervising Engineer's reports. Completed certificates and reports to be sent to the Environment Agency.
Power to require information	Environment Agency can serve notice on an undertaker to provide requested information
Incident reporting	Legal requirement for undertakers
Criminal liability	Noncompliance with the Act is a criminal offence.

It should be noted here that there are key components of the FWMA 2010 which are not yet enacted (Defra; 2015) and therefore are not considered further in this report. These include:

- Lowering the threshold for regulation to 10,000 m³
- Considering the risk from unregulated cascades
- Requirements for preparation of flood plans

However, it should be also noted that lowering the threshold to 10,000 m³ has been enacted in Wales under Welsh legislation from 1st April 2016. Studies undertaken to date (2015e) suggest that there are approximately 342 reservoirs with a capacity of 10,000 m³ or greater that are now legislated. Of these, 109 have a capacity of between 10,000 and 25,000 m³. Capacity has still to be confirmed on a further 438 reservoirs.

4.3 Statutory Instruments

The implementation of the FWMA 2010 is enacted by Statutory Instruments (ICE; 2014b) as set out in Table 4:

Table 4: Statutory Instruments of the FWMA 2010

SI Number	SI Name	SI Description
SI 2011 No. 2204	The Flood and Water Management Act 2010 (Commencement No.4 and Transitional Provisions) Order 2011 (England and Wales)	Allows the Minister to enact the FWMA 2010
SI 2013 No. 1590	The Flood and Water Management Act 2010 (Commencement No.2, Transitional and Savings Provisions) (England) Order 2013	Covers the first phase of implementation
SI 2013 No. 1676	The Reservoirs Act 1975 (Referees) (Appointment, Procedure and Costs) (England) Rules 2013	Allows the appointment of a referee to investigate a complaint
SI 2013 No. 1677	The Reservoirs Act 1975 (Capacity, Registration, Prescribed Forms, etc.) (England) Regulations 2013	Allows the definition of 'top water level', capacity calculation, registration requirements, notification of changes to the English register of reservoirs, maintenance of the register, reports by the Environment Agency to the Secretary of State, prescribed records, certificates of panel engineers, forms of reports and directions by panel engineers, and reports to the Environment Agency.
SI 2013 No. 1896	The Reservoirs Act 1975 (Exemptions, Appeals and	The meaning of large raised reservoirs, appeals on risk

SI Number	SI Name	SI Description
	Inspections) (England) Regulations 2013	designations, periodical inspections, and review by the Secretary of State.

Source: (ICE; 2014b)

4.4 Consultation with Industry

In July 2013, Defra published *Reservoir Safety in England and Wales, Report of the Consultation on the Implementation of Amendments to the Reservoirs Act 1975: the policy to be implemented in England* (Defra; 2013a; 2013b).

The consultation ran for 12 weeks between February and May 2012 and sought views on the UK and Welsh Governments proposals to commence the provisions within Schedule 4 of FWMA 2010 and to seek views on the content of the supporting secondary legislation.

72 responses were received and the responses were used to inform the implementation of the amendments.

4.5 Discussion

It is apparent that not all the Environment Agency's recommendations from 2008 were included in the final drafting of the FWMA 2010. However, in addition to the Environment Agency's recommendations, Defra also consulted with the reservoir industry where 72 responses were received and considered.

A key recommendation that was adopted in the FWMA 2010 was the risk designation of reservoirs, whereby an LRR is designated as 'high risk' if, in the event of an uncontrolled release of water from the reservoir, human life could be endangered. It will be seen in Section 5 that dam category plays an important part in the 2011 Impact Assessment. However, it should be noted here that dam category is not a component of the FWMA 2010.

The proportion of reservoirs designated 'high risk' or 'not high risk' has a significant influence on the costs and benefits of the FWMA 2010 amendments. The costs and benefits were considered in detail in Defra's 2011 Impact Assessment.

5 Impact Assessment

5.1 Introduction

In 2011, Defra released an Impact Assessment (IA) for commencing Schedule 4 of the FWMA 2010 (Defra; 2011).

The IA covered the introduction of the risk-based approach to the regulation of reservoir safety, in place of the perceived prescriptive approach in the 1975 Act. The IA considered the 1975 Act to be prescriptive as applying the full suite of the 1975 Act is disproportionate for low risk Large Raised Reservoirs (LRRs).

The IA stated that… *"The policy objective is to provide a high level of protection to the public from the continued operation of high risk Large Raised Reservoirs (LRRs); and to provide for deregulation of those where the public is not at significant risk."*

The IA also stated that… *"the rationale for the risk-based policy is largely to correct a regulatory failure: current regulation does not properly account for the risk associated with different reservoirs and as a result forces an over-allocation of resources devoted to safety of LRRs."*

These statements provide a useful context for the IA.

5.2 Scope of IA

The IA considers the costs and benefits of applying a risk designation to LRRs. For reservoirs designated as 'low risk' it was assumed there would be a relaxation of routine regulation. For reservoirs designated as 'high risk' it was assumed they would continue with the same levels of regulation (as per Section 2 of this report).

Note that the IA refers to 'high risk' and 'low risk' reservoirs. 'Low risk' being reservoirs where the public are not at "significant risk", where there can be a relaxation in regulation. The definition of 'low risk' is discussed in further detail below. For consistency with the IA, the terms 'high risk' and 'low risk' will be adopted here.

5.3 Calculation of Costs

The main objective of the IA was to compare the current/baseline scenario i.e. regulation under the 1975 Act (see Section 2 of this report) with the costs and benefits of implementing the amendments to the 1975 Act (see Section 4 of this report).

5.3.1 Reference Case

The reference case ("do nothing" scenario) assumed that it costs £6,800 per year to regulate LRRs regardless of risk designation. These costs were considered to be the result of legislation, or incurred voluntarily, in order to maintain the reservoir as a working asset. The IA assumed a total number of LRRs of 1,824 which therefore generates an annual cost of £12.4m to regulate LRRs in England. Assuming a 50-year asset life, the 50-year Present Value cost of this regulation is in the region of £304.1m (3.5% discount rate).

5.3.2 One-Off Costs

The IA stated a one-off cost of £60 to register a reservoir with the Environment Agency. With 1,824 LRRs in England, this resulted in a one-off cost of £109,440. It is understood that the £60

is assumed to be an hour of an undertaker's time (based on an 8-hour day of £480/day) to confirm the details of the reservoir to the Environment Agency.

5.3.3 Annual Costs

A number of assumptions were made when calculating the annual costs. These are summarised below:

- Costs of remedial works to reservoirs was annualised based on an assumed asset life of 50 years.
- Supervising Engineer and record keeping costs £1,500 a year for 'high risk' reservoirs. For 'low risk' reservoirs, it is assumed that 10% of undertakers will continue to employ a Supervising Engineer despite there being no legal requirements to do so. These costs appear consistent with the current industry standard.
- Inspections by an Inspecting Engineer costs £300 a year (or £3,000 over ten years which is the cycle for Section 10 inspections under the 1975 Act). For 'low risk' reservoirs, it is assumed that 10% of undertakers will continue to employ an Inspecting Engineer despite there being no legal requirements to do so. These costs appear consistent with the current industry standard.
- To determine the cost of remedial works to maintain a reservoir at the appropriate safety standards (including capital investment and expert engineers) a sum of £250,000 was assumed, that being the cost of decommissioning a reservoir with reference from the Environment Agency. This was annualised to £5,000 a year based on an asset life of 50 years. The IA noted that to state a cost for typical remedial works is nearly impossible due to the variance. Therefore, a representative average cost was obtained by estimating the unavoidable costs that an owner would be willing to pay to maintain the reservoir so that it is safe and operational. The sum of £5,000 is a significant proportion of the cost saving calculation, and is discuss in further detail below.
- For 'low risk' reservoirs it is assumed that only half of undertakers will undertake remedial works where there is no legal requirement to do so, to reduce common law liabilities and maintain a business asset.
- Assumed that 1,008 of 1,824 (55%) reservoirs would be 'low risk', referenced from reservoir flood mapping. There is no further reference to where this analysis was undertaken, however it is understood that 'high risk' was assumed to be categories A and B and 'low risk' was assumed to be categories C and D.
- The cost of enforcement was assumed to reduce as a result of partial deregulation. No cost of enforcement is considered in the IA.

5.3.4 Dam Category

The 1975 Act makes no mention of categorisation of reservoirs; it simply states that a reservoir is a Large Raised Reservoir if the escapable volume is greater than 25,000 m^3.

In 1978 a guide titled Floods and Reservoir Safety was published by the Institution of Civil Engineers. A primary purpose of this publication was to provide guidance on the flood standards to be adopted for reservoirs. To this end it was proposed that LRRs were categorised as follows:

Category A:	Where a breach could endanger lives in a community
Category B:	Where a breach could endanger lives not in a community or could result in extensive damage

Category C:	Where a breach would pose negligible risk to life and cause limited damage
Category D:	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

A key point to appreciate is that, in the case of Category C, there is no definition provided for "negligible risk to life"; it is left to the Inspecting Engineer to decide on the category based on their judgement. There is therefore latitude for the Inspecting Engineer to consider that a low level of inundation to a property would constitute negligible risk to life.

In 2008, and with particular reference to risk designation and partial deregulation, the Environment Agency recommended that all reservoirs which pose a risk to life (as mentioned, this was anticipated to be reservoirs of category A and B type), should come under the new legislation. Whereas reservoirs which are confirmed to not pose a risk to life (anticipated to be categories C and D type) should be removed from regulation. It can be seen above that the definition of dam category is critical to the assumptions of the 2011 IA, however there is no discussion on the definition of dam category in the document. The only reference to the number of reservoirs and the split between 'high risk' and 'not high risk' is that the numbers are… "[breakdown] derived from Government reservoir flood mapping project."

It is understood that for the purposes of costing the benefits of the FWMA 2010, 'high risk' was assumed to be categories A and B and 'low risk' was assumed to be categories C and D. This seemed a reasonable assumption in the absence of any risk designation guidance at the time. However, it should be noted that, in 2008, the Environment Agency suggested that only reservoirs which are confirmed to not pose a risk to life should be removed from regulation. This left an opening for category C and D dams to be designated 'high risk' on the basis that that a breach could endanger life.

The IA states that the Environment Agency will make designations according to whether an uncontrolled release of water could threaten human life. The definition of the designations is:

- "High risk reservoirs" – any reservoir subject to the revised Act, which if it failed, could result in the loss of life in downstream populations.
- "Other ("Low risk") reservoirs" – any reservoir subject to the revised Act, which if it failed, is not expected to result in the loss of life because of the absence of downstream populations.

However, the definition of dam categories C and D does not wholly concur with the above definition of 'low risk' from the IA. This is particularly true of Category C, who's definition is where a breach would pose "negligible risk to human life and so includes flood-threatened areas that are 'inhabited' only spasmodically, such as footpaths across the flood plain and playing fields" (ICE; 2015a). Using this definition, a Category C dam is one which poses (albeit it negligible or statistically insignificant) risk to human life in buildings and minor transport routes such as footpaths. This is not the same as "not expected to result in the loss of life because of the absence of downstream populations". Therefore, the assumption that all Category C dams will be 'low risk' is not appropriate.

It should be noted here that the definition of Category D is for "cases where no loss of life can be foreseen as a result of a breach" (ICE; 2015a). This concurs with the above definition of 'low risk' and therefore the assumption that all Category D dams will be 'low risk' appears appropriate.

5.4 Calculation of Benefits

Benefits were considered for 50 years from 2011. Due to the uncertainty in costing the benefits, three scenarios were developed with the following reported benefits (cost savings in Present Value):

- Low savings scenario = £68.6m
- High savings scenario = £134.8m
- Best estimate = £101.7m

The difference between the scenarios is the assumptions of the likely percentage of undertakers that will retain Supervising and Inspecting Engineers, and who will undertake remedial works where there is no legal requirement to do so.

The IA anticipates savings to 1,008 'low risk' LRRs due to a relaxation of supervision, record keeping, inspection and remedial works. The cost is reduced from £6,800 per reservoir per year (baseline) to between £1,340 (high savings scenario) and £4,020 (low savings scenario). The reported "best estimate" cost is £2,680 per reservoir per year.

The new regulations are reported to generate an annual cost of £8.25m to regulate 'high risk' and 'low risk' LRRs in England. Assuming a 50-year asset life, the "best estimate" 50-year Present Value cost of this regulation is in the region of £202.4m, including the one-off cost to register the reservoirs.

This is a 50-year Present Value net saving of £101.7m when compared to the baseline cost of £304.1m. The basis of these values is clarified in Table 12.

5.5 Discussion

The IA makes the following statements regarding the definition of a 'low risk' reservoir:

- *"Designation of a reservoir as low risk theoretically increases likelihood of breach. Increase in likelihood of actual breach is not possible to quantify against the base of very low likelihood for all reservoirs and risks are mitigated through use of emergency powers by emergency response authorities. Damages would be limited as low risk designation equates to possible breach not putting at risk lives in urban areas. Costs of damages to others' property would fall to the owner under common law*."
- *"The likelihood of reservoir failure is very low. However, reservoir failure would result in catastrophic-type flooding according to embankment height, water volume and topography and present real risks to life where people live and work downstream. Where there are no such populations, deregulation through designation of the reservoir as low risk is now possible*."
- *"In cases where the risk to life is assessed as negligible, a reservoir could be designated as low risk."*
- *"Any reservoir subject to the revised Act, which if it failed, is not expected to result in the loss of life because of the absence of downstream populations."*

From the above, the definition of a 'low risk' reservoir is one that does not put lives at risk/result in loss of life. This definition concurs with those put forward in Section 2 (dam categories in ICE; 2014b) and Section 3 (risk levels in Environment Agency; 2008). As can be seen later in this report, it is not the definition of 'not high risk' that was ultimately adopted in the risk designation process.

There are some assumptions which significantly influence the perceived cost benefits:

- The IA stated a one-off cost of £60 to register a reservoir with the Environment Agency. There is no discussion surrounding the cost of the representation and appeals process, which is discussed further in Section 6 of this report. It will be seen that in some instances the final cost of receiving a risk designation is greater than one hour of an undertaker's time.
- Under the preferred scenario the cost of enforcement was assumed to reduce as a result of partial deregulation. However, there is no discussion surrounding the cost to government to implement the changes to reservoir safety management. This will be explored in the interview with the enforcement authority. This is currently perceived to be a significant cost, particularly for the Environment Agency.
- The savings to the 1,008 assumed 'low risk' reservoirs is due to relaxation of engineering supervision, record keeping, inspection and ongoing remedial works. The remedial works is a significant proportion of the assumed savings:
  - The cost of remedial works is £250,000 based on decommissioning of the reservoir, or £5,000 over the 50-year asset life. In the context of the other annual costs (Supervising Engineer, record keeping and Inspecting Engineer) this is a significant sum of money (£5,000 of the £6,800 reported to regulate LRRs in the reference case) and may exaggerate the perceived savings of deregulation. An assumed cost of £250,000 for the decommissioning a reservoir appears to be on the lower end of the possible range. However, if the sum of money adopted in any future IA is greater than £250,000 it will further exaggerate the perceived savings of deregulation.
  - It is noted that attempting to put a cost on hypothetical remedial works is challenging and always open to scrutiny. However, it is also noted that decommissioning the reservoir is not the same as remedial works, as once the decommissioning is complete the asset is out of operation and no longer subject to the Act.
- For 'low risk' reservoirs it is assumed that only half of undertakers will undertake remedial works where there is no legal requirement to do so, and so incur the £5,000 annual cost. The evidence gathered in this study will evaluate this assumption.
- It is assumed that only 10% of undertakers will continue to employ a Supervising Engineer and Inspecting Engineer despite there being no legal requirements to do so. The evidence gathered in this study will evaluate this assumption.

The next sections of this report will collect and present evidence to allow the evaluation of the IA in Section 10.

6 Implementation of FWMA 2010

6.1 Introduction

This section will summarise the implementation of the FWMA 2010 to date, namely significant changes to:

- Risk designation
- Inspections and supervisions
- Reporting

6.2 Risk designation

6.2.1 Context

Schedule 4 of the FWMA 2010 (clause 2C) defines the meaning of 'high risk reservoir' as follows (HMSO; 2010):

1. The Environment Agency may designate a large raised reservoir as a high-risk reservoir if -
   a. the Agency thinks that, in the event of an uncontrolled release of water from the reservoir, human life could be endangered, and
   b. the reservoir does not satisfy the conditions (if any) specified in regulations made by the Minister.

If a reservoir is designated as 'high risk', the full provisions of the 1975 Act, as amended by Schedule 4 of the FWMA Act 2010, applies.

It is very important to note that, although the term 'high risk' is used, the concept of endangerment presupposes an uncontrolled release of water from the reservoir (probability of 1). As such, the risk designation process does not take any account of the plausible probability of the dam failing. This is sometimes referred to as a 'consequence-based risk approach' and differs from the 'fully risk-based approach' originally proposed by the Environment Agency and the Pitt Review as discussed in Section 3 above. The adopted risk designation process is discussed in more detail below.

6.2.2 Industry Consultation

In August 2013, the Environment Agency published a Briefing Note entitled *Our response to the consultation on 'high-risk' reservoirs* (Environment Agency; 2013a). The Briefing Note explained how consultation with industry influenced the risk designation process. This is summarised below. It can be seen that the definition for "endangered" was influenced by this consultation.

- The original proposal was to base the designation on the current dam category (A to D) and the likely loss of life evaluation (as made by the National Reservoir Flood Mapping project in 2010). The Environment Agency received a significant and well-informed response which influenced the methodology. It will be seen later in this section that dam category was not adopted in the risk designation guidance, following the 2013 consultation. The reason for dropping dam categories from the risk designation guidance is not reported in the reference (Environment Agency; 2013a).

- To consider secondary impacts which would endanger human life in the designation assessment. For example, where a railway line could be damaged by a reservoir breach, putting people travelling by train at risk.
- Listening to concerns regarding sole use of Likely Loss Of Life (LLOL), the methodology should also consider the Population At Risk (PAR) downstream of a reservoir, setting the threshold of 200 persons or 20 businesses as discussed above.
- Whilst the reservoir flood maps are recognised as being very important, concerns were raised about their accuracy and reliability related to the digital terrain models used and the potential impact of obstructions on the extent of flooding, particularly when large quantities of debris and trash are mobilised in a dynamic and rapidly changing flood. Other sources of information were recognised as also having importance.
- Including a threshold for unit discharge at any individual property to reflect the risk of structural damage. If a threshold of 3 $m^3/s/m$ is exceeded at any downstream property then the reservoir will be designated as 'high risk'.
- The period for representations was reduced from twelve months to three months, with no set timescale for determining the final designation.
- The self-assessment approach to representations was chosen, providing the undertaker with the evidence used to make the provisional designation to enable them to make their own assessment prior to deciding to accept or challenge the provisional designation.

6.2.3 Published Guidance

Clause 2C of the 1975 Act, as modified by the FWMA 2010, prescribes that a reservoir should be designated high risk if, "*in the event of an uncontrolled release of water from the reservoir, human life could be endangered*". The regulations did not specifically define "endangered".

To address this, the Environment Agency published the document *Reservoir Risk Designation Guidance* in August 2013 (Environment Agency; 2013b). The guidance was informed by the consultation process detailed in section 6.2.2. The guidance set out the following criteria for 'endangered':

- The LLOL is calculated to be greater than or equal to one.
- In the case of individual properties, the rate of water flow is greater than or equal to 3 $m^3/s/m$. A value of 3 $m^3/s/m$ is considered to represent the threshold at which structural damage to properties is expected to begin.
- The LLOL is calculated to be between 0.8 and 1 and there is a significant population at risk of flooding downstream. A "significant population at risk (PAR) of flooding downstream" will normally be considered by the Environment Agency to be wherever there are more than 200 people or 20 businesses within the downstream flood extent. However, there may be circumstances when the Environment Agency chooses to apply the precautionary principle where there are less than 200 people or 20 businesses. Examples of residential, business or recreational areas include, but are not limited to: houses, flats, hospitals, prisons, offices, warehouses, permanent caravan parks, caravan and camping sites, places of work, sporting venues, places of worship and parks.

It can be seen here that dam category does not play a role in risk designation.

For the avoidance of doubt, the Health and Safety Executive (referenced online) advises that the precautionary principle should be invoked when:

- There is good reason to believe that harmful effects may occur to human, animal or plant health or to the environment;

- The level of scientific uncertainty about the consequences or likelihood of the risk is such that the best available scientific advice cannot assess the risk with sufficient confidence to inform decision-making.

It was stated in the guidance that the Environment Agency would determine the LLOL, Population at Risk (PAR), the rate of water flow at individual properties and damage to infrastructure by considering:

- The last Inspecting Engineer's Section 10 report;
- The site-specific reservoir flood map produced by the Environment Agency;
- The associated downstream assessment conducted for the Environment Agency's reservoir inundation mapping study 2009;
- Any other material that is relevant.

That said, it must be appreciated that the guidance is silent on how LLOL is to be determined. Whilst the 2009 reservoir inundation mapping study generated estimates of LLOL, the guidance left open the possibility of considering a fatality rate of 1.0 as a means of using LLOL to determine if "human life could be endangered" based on the PAR. This is discussed further in Section 6.2.4.

The 2009 flood maps were a critical piece of information. The flood map specification (Environment Agency; 2009b; 2016) adopted the methodology for calculating LLOL from the Interim Guide to Quantitative Risk Assessment (ICE; 2004). The methodology can be summarised as (Mott MacDonald; 2013):

- Identification of every property at risk from the reservoir breach. This is achieved by superimposing the contents of the National Property Database on the detailed reservoir flood map.
- Assumption of 2.4 residents per property
- Determination of maximum flood hazard at each property from the Reservoir Inundation Mapping (RIM) hydraulic modelling (where flood hazard is defined as Velocity (V) x Depth (D)).
- Evaluation of LLOL at each property using the Brown and Gosden algorithm (ICE; 2004).
- Summation of LLOL for each property to give an overall value at each reservoir location.

Two scenarios are considered: one with no flood warning and one with a 60 minute flood warning.

The reservoir flood maps did not consider LLOL at locations or features typically considered when the precautionary principle was enacted (e.g. roads or footpaths). However, when considering the provisional designation, it is understood that the reservoir flood maps were used to give an indication of LLOL at paths, roads, etc. If the reservoir was clearly 'high risk' or 'not high risk' then the precautionary principle was not required. If the provisional designation was uncertain, then site-specific calculations of LLOL were required.

To achieve this, Table 4 – Hazard to People Classification using Hazard Rating of Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose (Defra; 2008) was adopted. The table allows the designation of a hazard rating based on flow depth and velocity, with an allowance for debris, as follows:

- Less than 0.75 – Very low hazard - Caution
- 0.75 to 1.25 – Danger for some – includes children, the elderly and the infirm
- 1.25 to 2.0 – Danger for most – includes the general public

- More than 2.0 – Danger for all – includes the emergency services

For receptors that are less well-defined in UK guidance, such as hazard ratings for passenger vehicles, additional guidance was referenced (e.g. USBR; 1988).

It is understood that the figures may have been consulted for receptors that are less well-defined in UK guidance, such as passenger vehicles

New estimates of PAR, fatality rates, and LLOL have been calculated using the methodology set out in the Guide to Quantitative Risk Assessment for UK Reservoirs (Defra; 2013c).

This process allows human endangerment to be determined at features such as footpaths for a range of people with different mobility abilities.

It should be noted here that the reservoir flood maps had been produced for the purposes of emergency planning and are considered in industry to be potentially quite conservative in their estimation of flood extents. That said, it was nevertheless accepted that they could be used to inform the risk designation process, recognising that for the great majority of reservoirs this was the only information available on the likely extent of flooding from dam breach. The specification for reservoir flood mapping is currently in the process of being amended to produce revised reservoir flood maps, and is discussed in further detail below.

6.2.4 Risk Designation Process

The procedure used for making recommendations for the provisional risk designation was as follows:

- A QCE applied the methodology prescribed in the Risk Designation Guidance (Environment Agency; 2013b).
- The Environment Agency reviewed all supporting evidence at risk designation panel meetings and gave its considered opinion to the Flood and Coastal Risk Management (FCRM) Manager for Reservoir Safety.
- The FCRM Manager for Reservoir Safety made their provisional designation recommendation.

Early in the process it became apparent that a cautious application of the guidance was considered to be appropriate by the panel. A ‘not high risk’ designation was only agreed by the panel where there was no clear evidence that a life could be endangered by the reservoir breach. Implicitly this meant that endangerment was being interpreted as there being a reasonable *possibility* of a loss of life rather there being a *probable* loss of life above a prescribed threshold. This approach was mentioned in the published guidance:

> “*Where there is an absence of clear evidence that human life could not be endangered, the reservoir will also be provisionally designated high risk. Only where there is clear evidence that human life could not be endangered in the event of an uncontrolled release of water will the reservoir not be designated as high risk*.”

It is not clear whether it was originally envisaged that this paragraph would represent the primary consideration in favour of the probability-based metrics but it inevitably resulted in a increase in the number of reservoirs provisionally designated as ‘high risk’ compared with what had originally been anticipated in the IA as ‘low risk’. The methodology applied was in keeping with the published guidance but it can be stated that less importance was placed on the probability metrics in deciding the designations than might be implied by the guidance document.

6.2.5 Undertaker Rights of Representation and Appeal

The risk designation process was completed in the following steps (ICE; 2015d):

1. The Environment Agency makes a provisional risk designation for each large raised reservoir (as discussed above).
2. The undertaker had three months to make a representation to the Environment Agency if they did not agree with the provisional designation, by providing evidence to support a challenge.
3. Following this representation period for each reservoir, the Environment Agency made its final risk designation.
4. If still in disagreement, reservoir undertaker could appeal to the First Tier Tribunal. A small number of cases have been heard at the tribunal to date.

Anyone may request that the Environment Agency carries out a review of a reservoir's risk designation at any time after the final designation is made.

Local Resilience Forums (LRF), who are responsible for preparing off-site reservoir emergency plans, and Lead Local Flood Authorities (LLFA) are notified of both provisional and final reservoir designations.

Where a reservoir is designated as not 'high risk', the details of the reservoir remain on the public register of statutory reservoirs and the risk is periodically reviewed by the Environment Agency or when information is received that prompts a specific review (for example, new building developments downstream of the reservoir).

6.2.6 First Tier Tribunals

To date, there have been four First Tier Tribunals, three of which have found in favour of the Environment Agency and their risk designation procedure. The fourth one found against the Environment Agency on a security technicality and is being appealed. The three favourable appeals themselves are summarised below, to give an indication of the appellants grievances and the Judge's considerations and ultimate decision.

- Appeal Reference NV/2016/0008 – the basis of the appeal was that there is a causeway across the reservoir which potentially reduces the breach volume to 9,000 m^3. Also, in their opinion the extent of flooding shown in the flood inundation map is excessive and does not take into account local variations of topography. The Environment Agency response was that, given the intention of reservoir safety legislation is to protect human life, and given that the Environment Agency's interpretation of the legislation is to apply the precautionary principle and designate reservoirs as 'high risk' where there is no clear evidence to the contrary, the reservoir is 'high risk' no matter how slight the risk to the single residential property (downstream of the reservoir). It was noted by the Environment Agency that "the occupants of the single residential building and users of the railway line are not involved in the designations process or aware that the standard of protection against a dam failure …could be reduced. Noting that new flood maps would be issued in 2017, the Environment Agency proposed that this reservoir could be added to the priority list for re-modelling. Agreeing with this, the Judge concluded "I find the evidence indicates human life at the single dwelling could be endangered. I also consider that, on the state of the current evidence, it is not possible to discount as entirely fanciful the risk to life in respect of the two residential buildings…". Note that no representation was made for this reservoir.
- Appeal Reference NV/2016/0009 – the basis of the appeal was that the flood map used are not "bespoke or accurate indications of the dam break flood", "still no proof has been

presented to show that a release would result in the loss of human life", the reason for designation "is purely a matter of opinion which is not supported by any evidence or proof, hence my objection to this decision". The Consultant Reservoir Engineer for the Environment Agency concluded that a LLOL of greater than one was plausible given the properties at risk, and that the maximum unit discharge is significantly higher than the threshold value of 3 $m^3/s/m$. Therefore, the reservoir remains 'high risk'. Note that no representation was made for this reservoir.

- Appeal Reference NV/2016/0010 – the basis of the appeal was the use of 2009 flood maps and a recent Section 10 Inspection report which stated that a farmhouse and buildings could flood "to a shallow depth…and cause localised flooding of the minor public roads. No other damage is foreseen apart from flooding of agricultural land". The Environment Agency responded that application of the precautionary principle will occur where there is no evidence to support 'not high risk'. The Judge considered this approach correct and in accordance with Parliament's intention in enacting the amendments to the 1975 Act. The Judge notes that "shallow flooding of a farmhouse and buildings is contemplated (by that report). In such a scenario, it is not fanciful to envisage a child, on the ground floor of the residence, being endangered or, indeed, other persons, regardless of age, as a result of the interaction between water and the electricity supply of the farmhouse and buildings". Also "whilst I have some doubt as to whether flooding of footpaths, apparently at some distance from the reservoir, would, in the circumstances, satisfy the test in section 2C(1)(a), it is plain that a number of residential buildings could be affected by an uncontrolled release of water from Dene Lake. I also agree that flooding of vehicular roads involves risks of a different order to those involving footpaths". Note that no representation was made for this reservoir.

The appeals decisions clearly direct the Environment Agency towards an onerous definition of where "human life could be endangered". Appeal Reference NV/2016/0010 in particular makes clear that any inundation of a property could constitute endangerment to life. This is potential more onerous than the threshold for Category C, as described in Section 5.3.4.

6.2.7 Updated Flood Maps

As mentioned in the above appeal hearing, the Environment Agency is updating the reservoir flood maps for England (ICE; 2016). The legislative background for the maps is the Flood Risk Regulations Act 2009 which transposed the EU Floods Directive 2007 into law in England and Wales. The Regulations required the Environment Agency to prepare and publish flood hazard maps relating to significant risk of flooding from reservoirs by December 2013, and review them at intervals no greater than every six years. The Environment Agency acknowledges the increasing scrutiny the maps have faced as they are used for multiple purposes. This scrutiny was apparent in the risk designation and appeals process and it is noted that risk designations will be revisited in light of the new flood maps.

6.2.8 Implications of 'Not High Risk' Designation

If the reservoir is designated as 'not high risk', the reservoir will continue to be listed on the public register but the undertaker is not required to comply with all the regulatory controls of the amended 1975 Act. Of the provisions which mostly affect the costs borne by the undertaker, the key controls which are no longer mandatory are:

- The appointment of a Supervising Engineer to visit the reservoir regularly and prepare written statements on an annual basis
- The appointment of an Inspecting Engineer to complete periodic detailed safety inspections and reviews

- The carrying into effect of any outstanding measures to be taken in the interests of safety in the latest Inspecting Engineer's report
- Compliance with any monitoring provisions to read instruments and to take water level information.

6.3 Other changes to the 1975 Act

6.3.1 Inspections and Supervisions

The changes to be implemented by Inspecting Engineers are (ICE; 2015c):

- The Inspecting Engineer must provide the inspection report to the Environment Agency within 6 months of the inspection or notify the Environment Agency with a written statement of the reasons for any delays.
- The Inspecting Engineer may make recommendations of measures to be taken with regard to the maintenance of the reservoir.
- The Inspecting Engineer must include details as to whether all the recommendations included in the previous report have been taken and what recommendations remain outstanding or why they are no longer required.
- Recommendations made in the interest of safety must be completed within a timescale set by the Inspecting Engineer.

The changes to be implemented by Supervising Engineers are (ICE; 2015c):

- The Supervising Engineer must provide a statement at least once every 12 months.
- The Supervising Engineer may direct the undertaker to carry out a visual inspection of the reservoir at specified intervals for the purpose of identifying anything that might affect the safety of the reservoir.
- In the annual statement, the Supervising Engineer should make reference to any recommendations of maintenance from the previous Section 10 inspection.

The Environment Agency supplied additional guidance (Environment Agency; 2017) after it became clear that some Supervising Engineers were unclear about the required frequency of visits to 'high risk' reservoirs and the timing and content of statements.

There is no required frequency of visits and that is a matter for the Supervising Engineer.

There are two requirements for the frequency of statements:

- Section 12(2) – the Supervising Engineer should pay particular attention to any "matters that need to be watched" as per the annex to the final certificate or the latest Inspecting Engineer's report. At least once a year, the Supervising Engineer must give the undertaker a written statement of action/s required.
- Section 12(2A) and 12(2B) – at least once every 12 months, the Supervising Engineer must provide the undertaker with a written statement of any steps to be taken to maintain the reservoir in accordance with the last Inspecting Engineer's maintenance recommendations. Such statements must be provided at least once every 12 months.

The required timing and content of statements is not necessarily linked to the timing of site visits. This gives supervising engineers flexibility in deciding the frequency and timing of their visits.

From discussions with Inspecting and Supervising Engineers these changes have been well received in the industry. It has been noted that completing the inspection and reporting of

service reservoirs within six months has its limitations if the complete service reservoir is not available for inspection within the timeframe. Recommendations of maintenance are a useful tool and set timescales for matters in the interest of safety are seen as essential.

6.3.2 Reporting

The Prescribed Form of Record has been modified to incorporate additional information.

The mandatory contents of Section 12 Supervising Engineers statements and Section 10 Inspection reports has been modified.

There is also a new requirement for incident reporting, with requirements for the undertaker to provide a full report on the incident within 1 year providing the details of the incident and lessons to be drawn from it (ICE; 2015b).

6.4 Discussion

There are some key conclusions to be drawn from this analysis of the implementation of the FWMA 2010:

- The Environment Agency may designate a LRR as a 'high risk' reservoir if they believe that, in the event of an uncontrolled release of water, human life could be endangered. As discussed below, this is a different definition to that assumed in the IA (see Section 5) which defined 'low risk' as a reservoir that does not put lives at risk/result in loss of life.
- This definition of 'high risk' presupposes an uncontrolled release of water from the reservoir (probability of 1) and considers the consequence only. This approach differs to the risk-based approached proposed by the Environment Agency in the lead up to the FWMA 2010 (see Section 3).
- As the FWMA 2010 did not define "endangerment" the Environment Agency's interpretation was:
  - LLOL is calculated to be greater than or equal to one.
  - In the case of individual properties, the rate of water flow is greater than or equal to 3 $m^3/s/m$.
  - LLOL is calculated to be between 0.8 and 1 and there is a significant PAR of flooding downstream, normally considered to be where there are more than 200 people or 20 businesses within the downstream flood extent.
  - There may be circumstances when the Environment Agency chooses to apply the precautionary principle where there are less than 200 people or 20 businesses e.g. at houses, flats, hospitals, prisons, offices, warehouses, permanent caravan parks, caravan and camping sites, places of work, sporting venues, places of worship and parks within the flood inundation area.
- It is apparent that the current definition of 'not high risk' is not the same as that proposed by the Environment Agency (Environment Agency; 2008) or Defra (Defra; 2011) before the drafting of the FWMA 2010. The impact of this is discussed further in Section 10.
- The resulting definition of 'high risk' was not made in isolation. In August 2013, the Environment Agency published a Briefing Note entitled *Our response to the consultation on 'high-risk' reservoirs* (Environment Agency; 2013a). The Briefing Note explained how consultation with industry influenced the risk designation process and it can be seen that the definition for 'endangered' was influenced by this consultation.
- Early in the risk designation process it became apparent that a cautious application of the guidance was considered appropriate by the risk designation panel and endangerment

became interpreted as a reasonable possibility of loss of life rather than a probable loss of life.

- During implementation, there have been four First Tier Tribunals, three of which have found in favour of the Environment Agency and their risk designation procedure and interpretation of the FWMA 2010. This should give confidence that the current risk designation process accepted both in the reservoir industry and the legal administration of the FWMA 2010.
- Regarding the other key amendments brought about by the FWMA 2010, it is apparent that defined timescales are an important tool for enforcement and that their implementation has been well received.
- The Environment Agency has been able to offer further guidance to Panel Engineers during the implementation of the amendments to the 1975 Act, such as further advice to Supervising Engineers (Environment Agency; 2017).

7 Data Analysis of LRRs

7.1 Introduction

This section will present the risk designation data obtained from the Environment Agency's reservoir database. The tabulated data as received is presented in Appendix A.

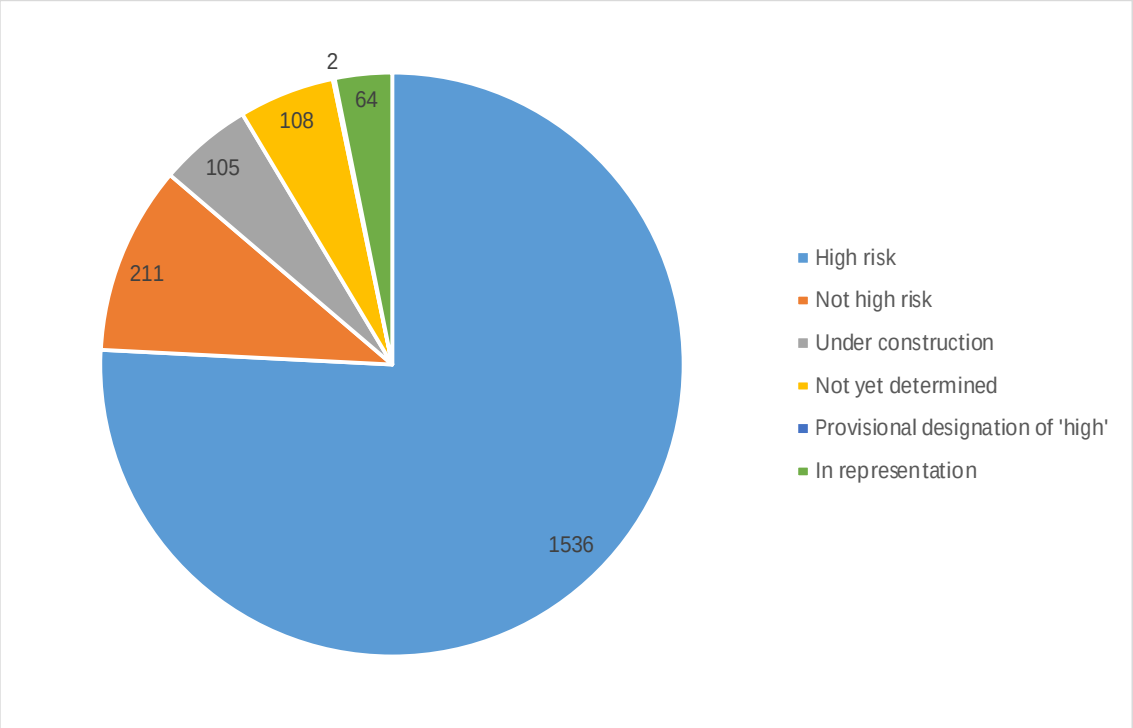
7.2 Risk Designation of LRRs

7.2.1 General

At the time of writing this report, there are 2,026 LRRs in England under the enforcement of the Environment Agency.

The population has the following risk designation profile:

Figure 1: Risk designations of LRRs



Source: Environment Agency data

It can be seen that the majority (75%) are 'high risk' reservoirs. 10% of the population has been designated 'not high risk'. There is only a small proportion that are yet to be receive a final designation. Of the reservoirs which have been designated, 12% have been designated 'not high risk'.

7.2.2 LRRs by Dam Category

The distribution of risk designation by dam category type is tabulated below. It can be seen that the majority of 'not high risk' reservoirs are Category D, with very few Category A and B dams.

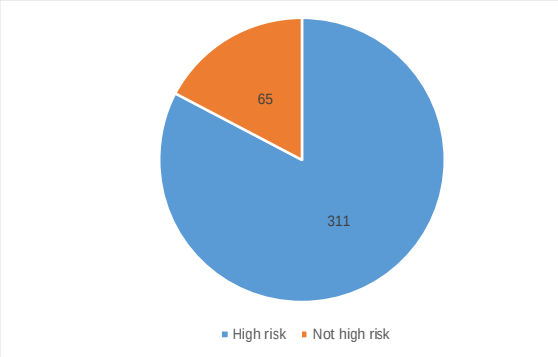
Note that 'not applicable', 'not known' and 'blanks' are fields from the Environment Agency data base and are reported here for completeness, as they typically relate to non-impounding and service reservoirs.

Table 5: LRRs by dam category and risk designation

Dam Category	High-risk	Not high-risk	Under construction	Not yet determined	Provisional designation of 'high'	In representation	Total
Category A	667	1	8	7	1	2	686
Category B	267	6	3	5	0	2	283
Category C	311	65	5	22	1	26	430
Category D	97	108	0	9	0	19	233
Not Applicable	76	6	3	4	0	3	92
Not Known	118	25	80	57	0	12	292
Blanks	0	0	6	4	0	0	10
Total	1536	211	105	108	2	64	2026

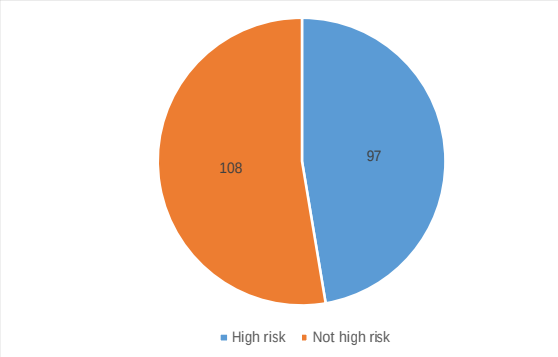
Source: Environment Agency data

Figure 2: Category C LRRs



Source: Environment Agency data

Figure 3: Category D LRRs



Source: Environment Agency data

7.2.3 LRRs by Undertaker Type

The distribution of risk designation by undertaker type is tabulated below. It can be seen that water companies are the largest reservoir undertaker type with 650 LRRs. Water companies portfolio of reservoirs also contains a significant proportion (92%) of 'high risk' reservoirs. Private landowners and trusts have the largest proportion (35%) of 'not high risk' LRRs followed by farms (27%). It should be noted that undertaker type is defined in the Environment Agency data base.

Table 6: LRRs by undertaker type and risk designation

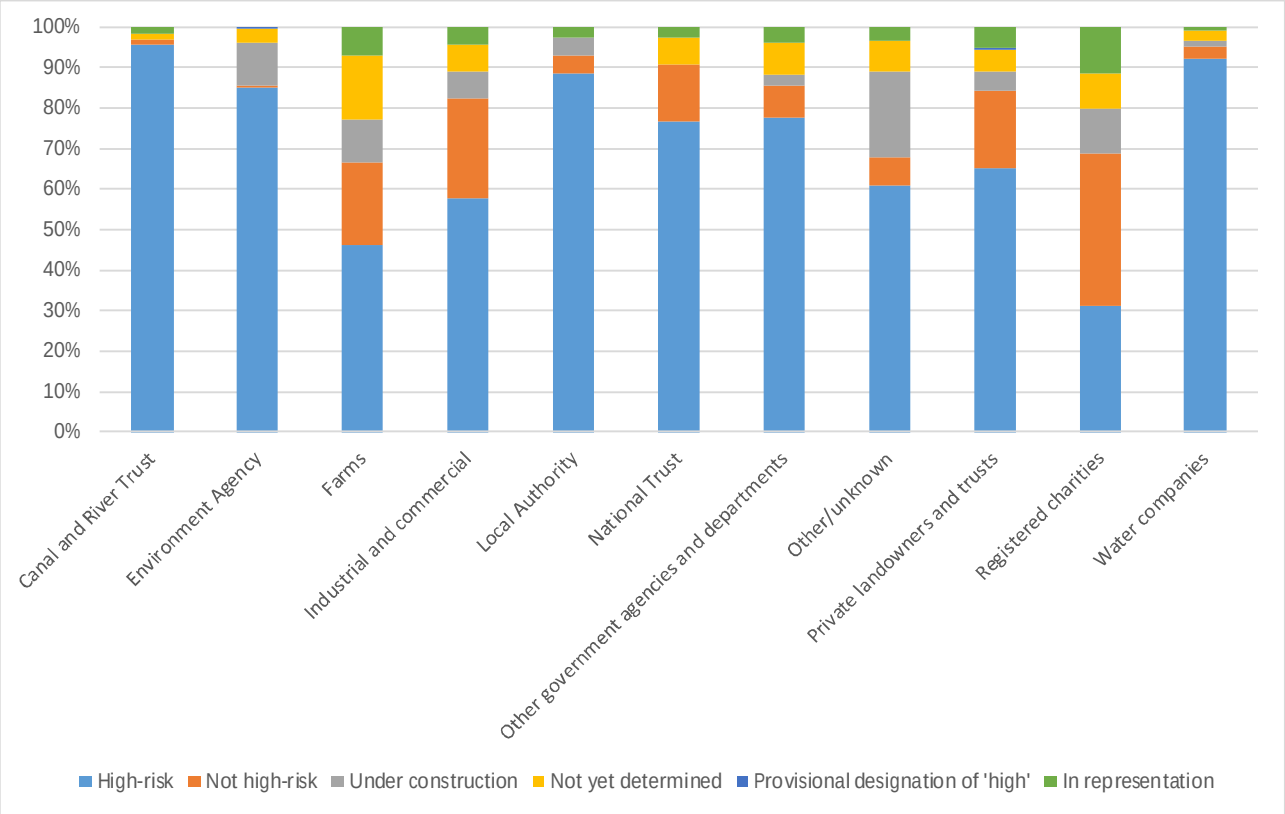
Undertaker Type	High-risk	Not high-risk	Under construction	Not yet determined	Provisional designation of 'high'	In representation	Total
Canal and River Trust	68	1	0	1	0	1	71
Environment Agency	180	1	22	7	1	0	211
Farms	128	57	29	44	0	19	277

Undertaker Type	High-risk	Not high-risk	Under construction	Not yet determined	Provisional designation of 'high'	In representation	Total
Industrial and commercial	53	23	6	6	0	4	92
Local Authority	132	7	6	0	0	4	149
National Trust	33	6	0	3	0	1	43
Other government agencies and departments	59	6	2	6	0	3	76
Other/unknown	17	2	6	2	0	1	28
Private landowners and trusts	257	75	19	21	1	21	394
Registered charities	11	13	4	3	0	4	35
Water companies	598	20	11	15	0	6	650
Total	1536	211	105	108	2	64	2026

Source: Environment Agency data

This indicates that 1747 reservoirs have been designated to date. The above data is presented in the figure below.

Figure 4: LRRs by undertaker type and risk designation



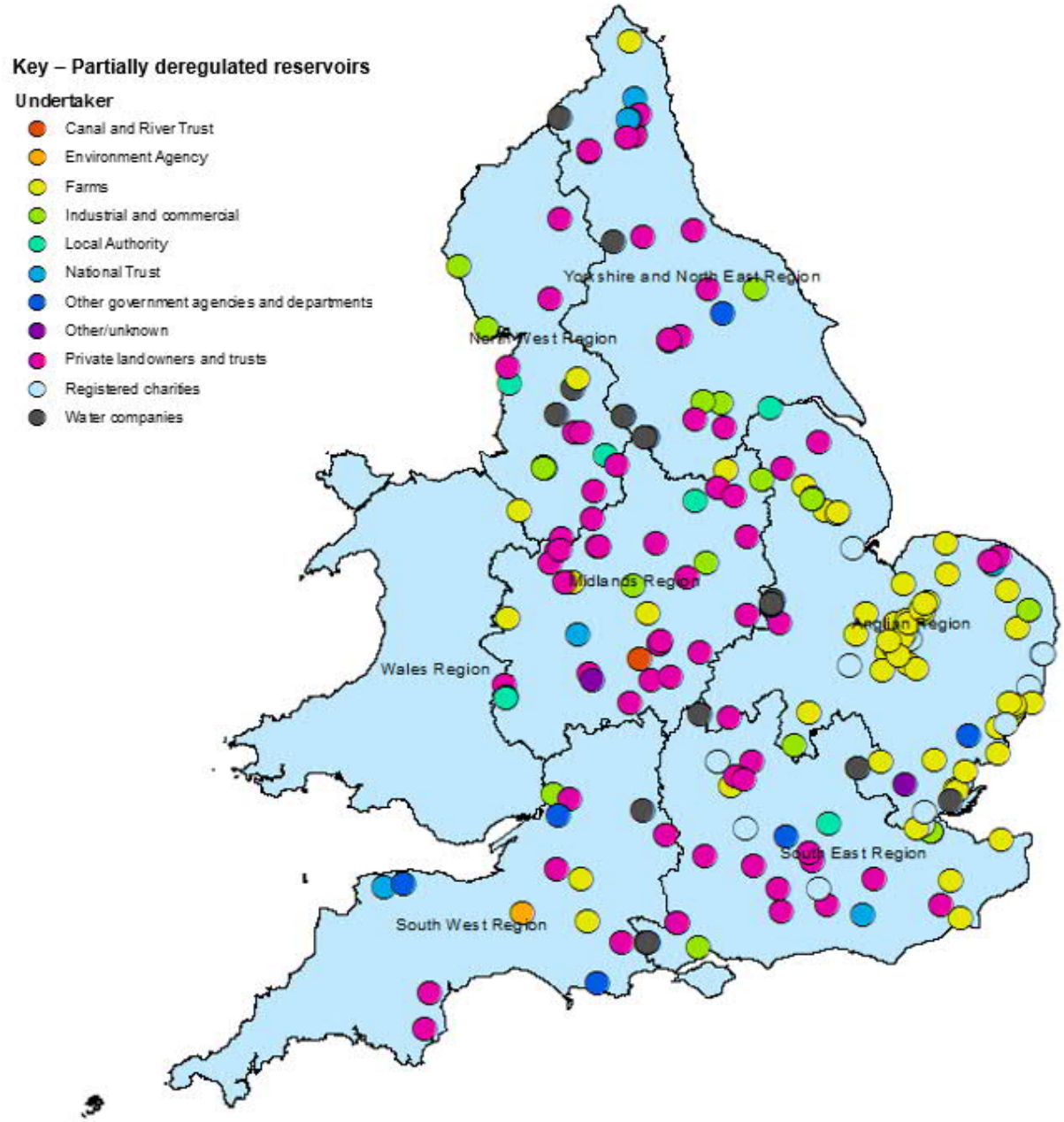
Source: Environment Agency data

7.2.4 Geographic Location of 'Not High Risk'

The geographic location of 'not high risk' reservoirs is shown below. There is a reasonably uniform distribution of 'not high risk' reservoirs across England.

It is apparent that 'private landowners and trusts' comprise a large proportion of the 'not high risk' population. Also that there is a significant number of partially deregulated 'farms' reservoirs located to the east of England.

Figure 5: Location of 'not high risk' reservoirs



Source: Environment Agency data

7.3 Basis of 'High risk' Designation

As described in Section 5.3.4, it was anticipated that Category A and B reservoirs would be designated 'High risk' and the results, as shown in Table 3, were largely as expected (see Table 3). It is however informative to understand why Category C and D reservoirs were also designated as 'high risk' when it was assumed this would not happen. To this end the Risk Designation Decision Forms for 60 randomly selected Category C reservoirs and 20 randomly selected Category D reservoirs were analysed to determine the primary receptor which gave rise to the risk designation. The results are shown below.

Table 7: Primary receptor for 'High risk' designation of Category C and D reservoirs

Primary Receptor	Category C	Category D
Residential Property(s)	43	12
Commercial Property(s)	3	-
Public amenities	1	1
A Road	4	3
B Road	3	-
Unclassified Road	3	2
Railway	1	1
Footpaths or Nature Reserve	2	1
Total	60	20

The analysis indicates that 72% and 60% of the Category Cs and Ds respectively were designated 'high risk' on account of the potential impact on residential properties. Taking account of all receptors which could merit a Category B classification (i.e. all except unclassified roads and footpaths / nature reserves), these percentages increase to 92% and 85% respectively.

Within these assessments, a 'high risk' designation was based on the "Precautionary Principle" (see Section 6.2.3) on 16 Category C Reservoirs and 2 Category D reservoirs. Of these 18 uses of the "Precautionary Principle", 5 initial "not high risk" designations (all Category C reservoirs), which were proposed by the Qualified Civil engineer were revised to "high risk" by the Risk Designation Panel. The use of the "Precautionary Principle" suggests that further development of the flood maps and / or site visits could be useful to better inform the risk designation process.

7.4 Discussion

The key quantity to take from the preceding sections is that only 12% of the 1747 reservoirs designated to date have been designated 'not high risk'. This compares with a value of 55% which was stated in the Impact Assessment on the assumption that all Category C and D reservoirs should be designated 'not high risk'.

Analysis of Risk Designation Decision forms has revealed that the majority of 'high risk' designations for Category C and D reservoirs can be attributed to inundation of residential properties or inundation of other receptors which could merit a Category B classification.

The disparity with Category C reservoirs appears to be largely due to the procedural differences between the categorisation of reservoirs by Inspecting Engineers and the risk designation process. In categorising a reservoir, the Inspecting Engineer has flexibility in the interpretation

the meaning of “negligible” (in the context of risk to life) and is able to form an opinion based on a visit to the dam. By contrast the majority of the risk designations are processed without a site visit, and assumes a ‘high risk’ designation unless there is clear evidence that life is not endangered. It would therefore appear quite reasonable that some Category C reservoirs would be designated ‘high risk’.

The situation with Category D reservoirs is less clear. In this case it can only be surmised that either the Inspecting Engineer failed to correctly assess the impact of a breach or that the inundation maps were more conservative in their assessment outcome. It is not possible to provide an opinion on which is more likely.

8 Stakeholder Interviews – Methodology

8.1 Introduction

In order to understand the impact of the FWMA 2010 on those involved in reservoir safety, this study has undertaken a series of interviews with key stakeholders. Broadly speaking, the interviews had the following objectives:

- Gather evidence from those affected by the legislation changes.
- Review the impact of the changes in regulatory controls
- Understand how the changes have impacted reservoir management
  - monitoring and surveillance
  - maintenance
  - appointment of Supervising and Inspecting Engineers
- Understand the costs associated with the changes
- Understand how the changes have affected safety and emergency planning

8.2 Interview Sample

A summary of the proposed interview sample is provided below. Individual undertakers, businesses and emergency planners remain anonymous.

Table 8: Proposed interviews

Stakeholder Type	Stakeholder Name	Proposed No. of Interviews
Membership organisations	CLA NFU Angling Trust	3
Water companies	Various	3
Individual undertakers (‘not high risk’ reservoirs)	Various	30
Small business owners	Various	10
Emergency planners	From GOV.UK Local Resilience Forums contact details	5
Enforcement authority	Environment Agency	1
		52 in total

8.2.1 Membership Organisations

The following membership organisations were contacted:

- Country Land and Business Association (CLA) is an organisation for owners of land, property and businesses in rural England and Wales. This interview will provide an insight in to the impact on rural communities.
- National Farmers Union (NFU) is an organisation for farmers and growers, who are often individual undertakers of reservoirs.
- Angling Trust represents all game, coarse and sea anglers and angling in England and Wales. Anglers are another significant undertaker group of LRRs.

8.2.2 Water Companies

Three water companies were selected for interview. These water companies were selected as they have 'not high risk' reservoirs within their wider portfolio of reservoirs. A regional spread of water companies was achieved.

8.2.3 Individual Undertakers

Thirty individual reservoir undertakers were initially selected for interview. The sample of interviewees was derived from the population of partially deregulated reservoirs. The population has been reduced to a series of subsets of reservoir undertaker types, and each interviewee has been selected from the subsets so that there is a regional representation of reservoirs. Key stakeholders such as the Environment Agency and water companies were removed from the dataset. The "unknowns" were also removed.

The process is summarised below:

1. From a total number of 2,026 reservoirs, a population of partial deregulated reservoirs was identified from data provided by the Environment Agency. A population of 188 was identified.
2. The percentage of partial deregulated reservoirs by undertaker type was calculated. This was then multiplied by the sample size of 30 to determine the representation of undertaker type within the sample. Note that the sample was adjusted as required to give a minimum of 1 interviewee per undertaker type.
3. In order to determine individual interviewees within the undertaker subsets, the subsets were proportionally distributed across the regions of England.
4. Once in the region, the individual interviewee was selected at random (whereby each member of the subset has equal chances of being selected).

For example, Farm Reservoirs represent 32% of the partial deregulated reservoir population. Therefore 32% of the sample size of 30 is 9.6 (rounded to 10). Of these deregulated Farm Reservoirs, 70% are in the Anglian region. Therefore 70% of the subset sample, 7 out of 10, have been selected in the Anglian Region. The selection of the 7 reservoirs has been at random.

The reservoir undertaker types adopted in the analysis are listed below. It should be noted that undertaker type is defined in the Environment Agency database.

- Farms
- Industrial and Commercial
- Local Authority
- National Trust
- Other government agencies and departments
- Private landowners and trusts
- Registered charities

The regions adopted are the historic Environment Agency regions:

- Yorkshire and Northeast
- North West
- Midlands
- Anglian
- South East

- South West

The purpose of the interviews was to identify and understand any changes in behaviour towards reservoir safety management of 'not high risk' reservoirs.

Although the intent was to interview 30 undertakers, a further 10 individuals were contacted by letter as reserves, taking the total number of contacts to 40.

Based on the response rate of around 40%, a second round of 40 individuals were contacted in order to aim for the intended 30 completed interviews. The final number of completed interviews was 26 and deemed acceptable for the purpose of this study.

8.2.4 Small Business Owners

Ten Small Business Owners (SBOs) were initially selected using a similar process as above. The sample was selected from the full reservoir population ('high risk' and 'not high risk') to understand the impact of the risk designation process on the costs of the business and whether those costs are significant in terms of business viability.

Although the intent was to interview 10 SBOs a further 5 SBOs were contacted by letter as reserves, taking the total number of contacts to 15. Based on the response rate of around 33%, a second round of 15 individuals were contacted in order to aim for the intended 10 completed interviews. Due to limited engagement during this second round, the final number of completed interviews was 5. This was deemed acceptable for the purpose of this study.

8.2.5 Emergency Planners

Reservoirs designated 'not high risk' were mapped against the Local Resilience Forum (LFR) boundaries of England. Ten LRFs which have 'not high risk' reservoirs were contacted (either direct or via county councils) using publicly available contact details. Three emergency planners were available for interview. These interviews aim to understand the impact of the changes of the FWMA 2010 to emergency planning and response.

8.2.6 Enforcement Authority

The Environment Agency, as enforcement authority, was interviewed for a particular understanding of the implementation of the risk designation process.

8.3 Interview Topics

Topics of conversation were discussed and agreed with the project's Advisory Group (comprising key stakeholders identified by Defra) and Project Group (comprising Defra and the Environment Agency). Prior to the interviews, questionnaires were prepared as prompt sheets. These prompt sheets, and the responses from stakeholders, are appended to this report. The majority of interviews were undertaken by telephone call, following an introductory letter sent to all undertakers. In some instances, interviews were undertaken face to face where appropriate.

A general summary of the interview topics is provided below.

- A general discussion on the undertaker's understanding of the changes implemented by the FWMA 2010.
- How the risk designation process was received and implemented by undertakers.
- The attitudes of undertakers to the safety management of 'not high risk' reservoirs.
- To identify the costs incurred during the risk designation process, and the subsequent savings of owning a 'not high risk' reservoir.

- The increased burden on membership organisations offering advice to members
- Whether the changes have affected LRF responses to emergency incidents.
- Any challenges encountered by the enforcement authority.

Note that discussions surrounding Small Raised Reservoirs (SRRs) were undertaken primarily to inform the next stage of the Defra research project.

9 Stakeholder Interviews – Results

9.1 Introduction

The discussions held during the stakeholder interviews are provided in summary below. The full responses are provided in Appendix B. Key conclusions from each interview are identified and presented as evidence for the Post Implementation Review.

Note that interviews with individual undertakers, businesses and emergency planners are presented as anonymous.

Table 9: Interviews undertaken

Stakeholder Type	Stakeholder Name	Number of Interviews
Membership organisations	CLA NFU Angling Trust	3 / 3
Water companies	Various	3 / 3
Individual undertakers ('not high risk' reservoirs)	Various	26 / 30
Small business owners	Various	5 / 10
Emergency planners	From GOV.UK Local Resilience Forums contact details	4 / 5
Enforcement authority	Environment Agency	1 / 1
		31 in total

9.2 Membership Organisations

9.2.1 Effect on the organisation

What were the intended benefits of the regulation changes and have these been achieved?

There is an understanding that the intended change was to introduce a more risk-based approach to reservoir safety management and therefore reduce the cost to regulate all reservoirs above 25,000 m³.

Have your members sought advice and have you distributed information?

Since the changes were implemented neither the Angling Trust nor NFU has received a significant number of queries regarding LRRs.

The Angling Trust undertook consultations with angling associations and it is generally seen that they are competent reservoir undertakers. The NFU posted articles in newsletters and magazines and made Environment Agency information available to its members. Noted that LRRs tend to be on large farms that tend to have a good understanding of relevant legislation.

For both organisations, the pertinent issue for their members will be the reduction in threshold to 10,000 m³ if implemented.

For the CLA, the majority of enquiries regarding reservoirs are from landowners and farmers who wish to build new or additional water storage.

9.2.2 Effect on reservoir undertakers

The NFU has not been made aware of any significant effects to reservoir undertakers.

In the opinion of the Angling Trust, a very small minority of undertakers are likely to maintain Supervising Engineers and Inspecting Engineers, however regular monitoring and surveillance is good practice and no significant cost.

9.2.3 Costs

Did you incur costs as part of the reservoir risk designation process / implementation of the FWMA2010?

The representative of the Angling Trust was a member of the advisory group for Defra's implementation of the FWMA 2010 and, with time and expenses, likely incurred in the region of £10k cost during the process. The NFU incurred no additional cost as all queries fall to the existing advisory team.

Do you think the changes will bring about significant cost savings to your members and their businesses?

For Angling Clubs that save money through a 'not high risk' designation, the cost can be significant. It is noted that in some instances, the Angling Club may lease the reservoir but still be classed as the undertaker under the Act and therefore have to pay the costs. This seems unreasonable. In other instances, clubs may be renting/leasing the reservoir from Water Companies and so will not be paying for reservoir safety management responsibilities.

It may be that farmers feel that costs for Supervising Engineers and Inspecting Engineers for LRRs is significant, however the cost will be of greater significance to owner of SRRs.

9.2.4 Risk designation process

Assumption is that members are happy as there are very few queries.

9.2.5 Other

In the opinion of the interviewee, are reservoir undertakers of partially deregulated reservoirs still aware of their responsibilities?

Very much dependent on the capabilities of the club/fishery. Farms with LRRs tend to be larger farms who more likely rely on professional advice for legal matters, so likely to still be aware / have advisors that can assist.

Are there any notable disadvantages of the change in regulations?

The Angling Trust is disappointed that there was not a change in undertaker definition, whereby clubs that lease reservoir waters do not become the "undertaker" and therefore legally required to adhere to the 1975 Act.

The CLA welcomes the partial deregulation of reservoirs over 25,000 m^3 on the basis of risk, and were keen to see a fair appeals process, however are opposed to reducing the volumetric threshold.

9.3 Water Companies

9.3.1 General overview

From your understanding, what were the intended / expected benefits of the regulation changes?

- General expectation was that 'not high risk' LRRs would be partially deregulated and 'high risk' SRRs would be regulated and that the regulatory burden would remain the same.
- That the Pitt Review, following the 2007 floods, suggested that there are some reservoirs below the threshold of 25,000 m³ that posed a risk to the public, and some reservoirs above the threshold did not. So, the amendments are to address the balance of risk to the public.
- That the legislation was to move to a 'risk based' approach and to consider smaller assets outside the ambit of the 1975 Act which could still pose a risk to life.

In your view, are the regulations delivering these benefits?

The general opinion is that the regulations have been more conservative than anticipated, which has led to fewer numbers of 'not high risk' reservoirs. This may, in part, be due to the application of the precautionary approach and using a consequence based risk designation process.

9.3.2 Management of partially deregulated reservoirs / changes in behaviour

The following changes in behaviour were noted:

- In-house Supervising Engineers will visit a 'not high risk' reservoir every 12 months where it is every 6 months at a 'high risk' reservoir. There will no longer be Inspecting Engineer visits unless a problem develops at the site. Monitoring and surveillance remains the same as there are Operations staff on site, however the PFR will no longer be maintained.
- All reservoirs are subjected to surveillance as they are operational assets, however visits to 'not high risk' reservoirs are less formal and undertaken by in-house Supervising Engineers. There will be no Section 10 inspections for 'not high risk' reservoirs and the PFR will be retained but no new information added.
- 'Not high risk' reservoirs continue to have a Supervising Engineer, and in some cases, there are periodic 'inspections' by an Inspecting Engineer. A proactive programme of monitoring and surveillance remains in place, and the requirements from the last Section 10 report are adhered to. The PFR is continued.

9.3.3 Costs

For water companies, they are not anticipating significant cost reductions if there are in-house Supervising Engineers. The savings will come from the cost of a Section 10 inspection, which is only typically £2k to £4k over a ten-year period. This is not significant for a water company.

Did you incur costs as part of the reservoir risk designation process / implementation of the FWMA2010?

The majority of the costs were associated with staff time.

What was the difference in cost before and after partial deregulation?

Maintenance activities that were undertaken before the FWMA 2010 are still being done (e.g. grass cutting) as the reservoir is still a company asset regardless of risk designation under the 1975 Act. Therefore, there is no reduction in cost. This is a theme through all Water Company interviews.

One example of not having to record water levels for the PFR at the 'not high risk' sites is a cost saving as new instrumentation would have been required.

Will the overall cost change be significant in terms of the costs to the business?

Generally, no. However, if there had been a cost to register each reservoir then this could have been significant.

9.3.4 Risk designation

How has the change been perceived in your organisation?

In all three companies, there has been no significant change.

One water company already has portfolio risk assessment for all LRRs which is more detailed than the risk designation process and adopts probability and consequence to determine risk.

How would you rate the simplicity of the risk designation process?

There is a mixed response:

- At one water company, it was noted that almost all of the 'not high risk' reservoirs required a representation to get partially deregulated. This was due to inaccurate flood maps which predicted much worse consequences.
- At another water company, the process appeared haphazard and very time consuming.

9.3.5 Other comments

Have there been any notable disadvantages to the changes brought about by the FWMA2010?

The partial deregulation designation has made it difficult to secure internal funding should work be required, as there is no legal driver and no Health and Safety driver (consequence of failure does not endanger life).

Do you have any further comments on reservoir risk management?

- Typically, water companies know the risks posed by their assets and so risk designations were largely anticipated.
- Acknowledged that the Environment Agency had a difficult task and appeared under-resourced.
- Inundation maps were developed for a different purpose than risk designation. With a new map specification in progress, the hope is that the reservoirs do not need re-designation with the new flood maps.
- There is no risk management standard that has been accepted and adopted by all undertakers – this would inevitably lead to issues should it ever be tested following a serious incident.

9.4 Individual Undertakers

9.4.1 General overview

Are you aware of the changes to reservoir risk legislation brought about by the FWMA 2010, and from your understanding what are the benefits?

There is generally a good understanding of the new requirement for a risk designation, however other parts of the FWMA 2010 are not generally known. In some instances, the undertaker sees the changes as the introduction of red tape bureaucracy, in other cases it is seen as a reduction

in bureaucracy and a fairer allocation of resources. The main benefits reported were the reduction in site visits from Panel Engineers and the reduction in cost this brings. In several cases, the management of the reservoir will not be changing hence there are limited benefits.

What is your perception of the risk posed by LRRs to those living downstream?

There is a good understanding of the concept of risk posed by LRRs. The majority of undertakers believed their reservoir would be 'not high risk' due to the absence of houses in the flood plain in the valley downstream. Other impacts of a breach that were mentioned include impact on roads, reputational damage and flooding of crops. Some discussions involved the likelihood of the risk occurring i.e. structural integrity of the dam.

9.4.2 Risk designation process

How would you rate the simplicity of the risk designation process?

This question was given a 0 to 5 response, with 0 as "complex" and 5 and "very simple". The responses are collated below.

Table 10: Simplicity of risk designation process

Response	No. of Undertakers	Typical Comments
0 to 1	4	• Long process with poor communication • Panel Engineers are the best placed to assign risk designation not the Environment Agency • Frustration that outstanding S10 Measures were enforced whilst awaiting designation
2 to 3	3	• Process was relatively straight forward but took a long time
4 to 5	17	• Occasions where a Panel Engineer was employed for advice • Letter received from the Environment Agency was phrased well • One comment that it was too simplistic
No response	2	• Did not engage with the process • Hired a firm to complete on their behalf, cannot remember details

Was the risk designation anticipated? Was a successful representation made?

All the undertakers interviewed except 1 No. expected 'not high risk' designations. 16 No. undertakers expected the reservoir to be 'not high risk' and it was, therefore no further action was required. 9 No. undertakers expected a 'not high risk' designation and required a representation. All 9 were successful with no appeals required. The 1 No. that anticipated 'high risk' was designated 'not high risk'.

Did you seek assistance during the process?

A large number of undertakers (17 No.) sought advice from their Supervising Engineer during the process.

9.4.3 Management of partially deregulated reservoirs

Have you retained a Supervising Engineer?

15 No. undertakers stated that they would no longer use the services of a Supervising Engineer, mainly citing cost savings and the legal requirement having gone. In some instances, it was apparent that the Supervising Engineer's contact details would be retained for any future issues with the reservoir.

11 No. undertakers (42%) have decided to retain the services of the Supervising Engineer, citing the desire for technical expert advice, preventing the need for significant capital works in the future and 'peace of mind'. In some cases the services were retained for consistency as there is a 'high risk' reservoir on site. In several cases it was discussed that the frequency of inspections would likely reduce, potentially to every 2 or 3 years.

Have you retained an Inspecting Engineer?

Only 4 No. undertakers (15%) would retain an Inspecting Engineer. The other undertakers would not, but in some instances, would seek advice from their Supervising Engineers where necessary.

Have you changed your frequency of monitoring and surveillance?

Only 2No, of the undertakers have changed the frequency of monitoring and surveillance (in both cases reduced). The other have maintained their routine; frequency between undertaker can vary, from every day if based on site to fortnightly to monthly.

Will you keep and maintain the Prescribed Form of Record (PFR)?

15 No. undertakers (58%) stated that they maintain the PFR. 7 No. undertakers stated that they will keep records on a different system, but acknowledge that monitoring is necessary and ongoing. Other responses were 'unknown' or that records are not kept.

9.4.4 Costs

Did you incur costs as part of the risk designation process?

The following costs were reported during the risk designation process:

- £1,000 for farmer's time and consultant
- £300 to £700 for Panel Engineer / Consultant time
- Surveyor costs (which could also be inferred as Panel Engineer) reported between £350 and £3,000
- £5,000 staff time to prepare for representation

In all other cases, the reported costs were zero or unknown.

Typical costs

The following typical costs were reported:

- Supervising Engineer costs - £500 to £1,200
- Inspecting Engineer costs - £2,000 to £4,000
- Typical remedial works in the region of:
  - New spillway '<£10k'
  - Relining parts of the reservoir basin '£10k to £100k'
  - New spillway and wave protection '£10k to £100k' (£40k)

- Replace sluice gates '£10k to £100k'
- Structural improvements including bank reinstatement '£10k to £100k'
- Wave erosion protection '<£10k'
- Tree removal '£10k to £100k'

6 No. undertakers (23%) confirmed that the cost of Panel Engineers is significant in terms of operating their organisation.

9.4.5 Reservoir legislation

Are you aware of your remaining responsibilities for the partially deregulated reservoir?

There was a mixed response to this question but typically the undertakers are aware of public liability and have the required insurance.

Are there any notable disadvantages of the change in regulations?

2 No. undertakers reported a disadvantage;

- The statutory element of remedial works meant it was easier to secure funding; now there may be a potential reduction in budget from the organisation for the reservoir management and maintenance.
- Now there is less emphasis on the landowner to inspect

9.4.6 Other comments

- Several interviewees wished to discuss method of producing the flood inundation maps and subsequent accuracy.
- One interviewee commented that SRRs should be included in the Act.

9.5 Small Business Owners

One 'not high risk' and four 'high risk' reservoir undertakers were interviewed as SBOs.

9.5.1 General overview

Are you aware of the changes to reservoir risk legislation brought about by the FWMA 2010, and from your understanding what are the benefits?

There is a general understanding from SBOs that reservoirs have been designated, however the details of the FWMA 2010 and the intended benefits are not known.

What is your perception of the risk posed by LRRs to those living downstream?

There is a good understanding that reservoirs pose a risk to those living downstream.

9.5.2 Risk designation process

How would you rate the simplicity of the risk designation process?

One SBO responded with a score of 2/5 as they found the process unnecessarily complicated, with an unduly technical form to complete. Another SBO also found the process difficult.

Two of the SBOs did not engage with the process and one SBO left the process to the Supervising Engineer.

Was the risk designation result anticipated?

All five SBOs received a provisional 'high risk' designation. Four anticipated 'not high risk' and only one ended up as 'not high risk'. One SBO anticipated 'high risk' as it is a Category A dam.

Was a representation made?

Despite four SBOs anticipating 'not high risk', only one SBO made a representation. It was successful, taking approximately one year to achieve with the majority of the work undertaken by the Supervising Engineer.

Two SBOs stated they were reluctant to engage with the government on the issue, one believing it would be a time consuming and costly exercise.

Did you seek assistance during the process?

No advice was sought from the Environment Agency or representative bodies.

9.5.3 Reservoir management of partially deregulated reservoirs

Only one SBO interviewed was designated 'not high risk'. This undertaker will not retain a Supervising Engineer but would contact previous Supervising Engineer if they were concerned. The undertaker will not maintain an Inspecting Engineer, monitoring and surveillance, or the PFR. It should be noted that this reservoir is also not in commercial use.

9.5.4 Costs

Did you incur costs as part of the risk designation process?

None of the SBOs incurred a cost. One SBO received free advice from their Supervising Engineer.

Are the costs associated with satisfying reservoir legislation considered significant in terms of operating your business?

The costs are considered significant in those SBOs that responded.

What major works have occurred in the last 30 years?

One SBO had recently required significant remediation works to the dam, including improvements to a northern spillway and the total rebuild of a southern spillway. The reported cost was in excess of £500,000. It should be noted that this dam is Category A and would likely pose a significant risk to human life in the event of a failure.

9.5.5 Reservoir legislation

What does "high risk" mean to you?

The SBOs interviewed had an understanding of the risk the reservoir may pose to people downstream.

9.6 Emergency Planners

9.6.1 General overview

What is your / your LRF's perception of the risk posed by LRRs?

- One LRF has assessed the risk of major dam failure as 'medium' (with a low likelihood but significant impact).

- Another has assessed the risk of major dam failure as 'high' (with a low likelihood but catastrophic impact). This is in accordance with the National Risk Assessment and Local Risk Management guidance.
- The third LRF has a generic emergency plan for reservoir incidents, however at least one reservoir which has been visited and risk assessed as the consequence of failure is seen as significant.

9.6.2 Emergency response to reservoir incidents

How might the introduction of partially deregulated LRRs change how you plan for an emergency?

- One emergency plan was written in October 2016 and exercised in February 2017. Therefore, the partial deregulation of the 'not high risk' reservoirs had already started, and the plan was written accordingly.
- Another LRF has a number of site specific plans and a generic reservoir plan. The principles in the generic plan can be applied to any reservoir and currently has the maps available for all regulated LRRs. There is the perception that if maps and reservoir information was not produced for partially deregulated LRRs the LRF response to a LRR emergency would certainly be hindered (however, if a reservoir is 'not high risk' then presumably there is no one to evacuate).
- One LRF has 11 'high risk' reservoirs for which we produce a site-specific plan. All site-specific plans are developed in support of an existing multi-agency "Generic Off-site Response for Reservoir and Canal Emergencies". Should there be an emergency at a reservoir for which there isn't a site-specific plan then the response would be led by the generic plan. Generic plans will likely be implemented at a slower rate than site-specific plans whilst site-specific information is gathered.

How might the introduction of partially deregulated LRRs change how you manage an emergency?

If the emergency plan is generic then it will not be affected by risk designation.

One emergency planner commented that the management of a LRR emergency would be changed as key information about the undertaker, flood extent hazard and travel times may not be known. This could increase risks to responders and decrease response times as information would have to be acquired at the time.

9.6.3 Response to changes in legislation

What changes have occurred since the changes brought about by FWMA2010?

Following the FWMA 2010, funding was available to LRF to produce site specific off-site plans for the "top 100" high risk reservoirs. One of the LRFs interviewed produced off-site plans for their reservoirs within this top 100. They also produced a generic plan which covered the remaining reservoirs in their region. The off-site plans are much more detailed. Moving forward, there is no extra funding for reservoir planning, however as it has been identified as a high risk as part of the risk assessment process, a generic plan covering all 'high risk' reservoirs will continue to be produced using JESIP (Joint Emergency Services Interoperability Programme) principles.

Has your perception of the risk of LRRs been changed by the FWMA2010?

One emergency planner compared risk assessments from 2009 and 2016. The likelihood of a reservoir incident has remained the same but the impact has reduced from a 5 in 2009 to a 4 in 2016. It is not clear as to whether this change was influenced by the change in legislation.

The perception of risk has increased in one LRF due to the change in national guidance on risk assessments and an increase in available information on LRR incidents.

The other emergency planner stated that the biggest drivers for their planning are things that actually happen in the region (e.g. fluvial flooding) and National Resilience planning assumptions provided by the Cabinet Office in the National Risk Assessment. This drives the perception of risks in their region.

9.7 Enforcement Authority

9.7.1 Impact on the Environment Agency

Has the FWMA 2010 increased or decreased the regulatory burden on the EA?

As may be expected, the introduction of the FWMA 2010 increased the regulatory burden on the Environment Agency in the short term. The Environment Agency provided both evidence and advice for the drafting of the legislation, and developed the risk designation methodology with Consultants. A temporary 12-month full time post was created to provide the evidence and advice, and the risk methodology development took approximately two years. The risk designation process was also labour intensive for the Reservoir Safety team.

At the time of writing this report, the majority of reservoirs (1747) have received a risk designation. There are 10% less reservoirs that are now actively regulated ('not high risk'), however, as these remain legislated, there is still regulatory burden associated with them, such as periodic reviews to ensure conditions have not changed which may affect the risk designation. As there are less Section 10 inspections there should be a reduction in Matters in the Interests Of Safety (MIOS) to enforce. However, in general the partially deregulated reservoirs are Category C and D dams which tended historically to have lower incidents of MIOS to enforce, or were given lower priority than Category A and B dams, and so this does not significantly reduce regulatory burden. The introduction of recommendations of measures to be taken with regard to the maintenance of the reservoir is a further increase in regulatory burden on the Environment Agency, noting that this is difficult to enforce if there is no timeframe associated with the works. Further administration is required to receive all Section 12 and Section 10 reports and process the information within.

In the long term, it is unlikely that there will be a reduction in regulatory burden on the Environment Agency. In the opinion of the interviewees, the introduction of a 'medium risk' category, where the undertaker retains a Supervising Engineer but not an Inspecting Engineer, could have reduced the burden on the Environment Agency by transferring it to industry. With the introduction of new reservoir flood maps, there is the possibility that a number of reservoirs may require re-designation.

Are the regulations delivering the benefits to the Environment Agency as originally identified?

There have been less 'not high risk' designations than anticipated in the IA. As such, and for the reasons stated above, there had not been a discernible reduction in administrative burden.

The wording of Clause 2C of FWMA 2010, that "human life could be endangered", is open to interpretation and as such placed the responsibility of interpretation on the Environment Agency. The interpretation was given careful consideration by the Environment Agency's legal team. Within their interpretation of the wording, the Environment Agency has been cautious with partial deregulation, and this is reflected in the current risk designation methodology (noted that, if a full risk assessment process was adopted, more reservoirs could be partially deregulated).

Although there are less 'not high risk' designations than anticipated, the recent appeals have given confidence that the interpretation of Clause 2C is appropriate.

Have there been any unexpected benefits or obvious omissions to the FWMA 2010

Unexpected benefits to the changes include:

- Records and data management has improved
- Contact has been made with all LRR undertakers
- The Environment Agency has been more engaged with Supervising Engineers and the reservoir industry as a whole.
- Flood maps for LRRs have been reviewed and poor-quality maps identified
- The possibility of regulating SRRs means that evidence has been gathered for SRRs and by identifying waterbodies a number of LRRs have been identified and regulated

The introduction of a 'medium risk' designation, where Supervising Engineers are retained, would have been beneficial to the enforcement authority in reducing the administration of some reservoirs.

9.7.2 Impact on reservoir undertakers

Are there any particular groups that seem to benefit / not benefit from the new regulations?

Reservoirs in flat catchments (typically farm reservoirs and/or non-impounding reservoirs) are typically partially deregulated. Very few water company reservoirs were partially deregulated and most companies took the view that supervision and inspection would continue regardless of designation as this in an integral part of managing their assets.

Has partial deregulation decreased the burden on rural communities and small business owners?

It is believed that the majority of beneficiaries have been private, single reservoir owners (mainly farmers). These undertakers may benefit from the short-term gain of not spending money on Supervising Engineers, however, in the long term, without the regular visits from an expert reservoir engineer there is the greater possibility of the dam falling in to disrepair and requiring a capital scheme to keep the asset in operation, at a much greater expense than annual maintenance.

Are reservoir undertakers retaining a voluntary element of self-regulation?

It is understood that there are a number of undertakers that are known to be retaining Supervising Engineers. These undertakers can decide when the Supervising Engineer visits occur, so there is a cost saving here without jeopardising the asset. However, it is likely that most undertakers will dispense with the apparent burden.

9.7.3 Risk designation

How satisfied are you with the risk designation process and available guidance?

The risk designation guidance establishes the methodology: if the risk thresholds are met then the reservoir is 'high risk', if there is no evidence to the contrary then the reservoir is 'high risk'. The guidance document may have benefitted from a series of pilot studies prior to publication, and the document has not been updated since publication.

The guidance document presents the criteria for determining whether life could be endangered on the basis of the computation of LLOL; it does not present how LLOL should be calculated

and therefore allows a flexibility in determining an appropriate fatality rate. This may present a disparity between the risk thresholds and the wording of the FWMA 2010 (i.e. “endangerment to human life”). For example, a reservoir flood map may report a LLOL of less than one, however, the velocity/depth hazard may “endanger human life” (with reference to FD2321). This suggests that in principle, the philosophy of the FWMA 2010 and the subsequent interpretation by the Environment Agency is one of PAR and not LLOL.

During the risk designation process, it became apparent that in some instances the reservoir flood maps were inadequate. This led to the adoption of the precautionary principle which recognises the available data is not adequate and that a detailed review is required to make a risk designation. This leads to an apprehension in using the reservoir flood maps for partial deregulation and inherently makes the risk designation process more conservative. It was accepted that the flood following a dam breach could be very different from the flood shown on the reservoir flood map.

Including the probability component of risk is very difficult to assess for the risk designation of a population of reservoirs. The probability of a dam failing theoretically changes daily, and with the removal of regular monitoring and surveillance this probability will increase (noted that the consequence of partially deregulated reservoirs failing is negligible by implication). It is noted that by interpreting the wording of the FWMA 2010 (“in the event of an uncontrolled release of water from the reservoir”) the probability of failure could be taken as one.

How would you rate the simplicity of the entire risk designation process?

The risk designation process became simpler as the process went on and the enforcement authority became more comfortable with the precautionary principle. The representation process was simple for undertakers as the Environment Agency took on the responsibility of reviewing the provisional designation. Frustrations were felt by some undertakers during the representation process due to the time it took, however this was a resource problem at the Environment Agency who were undertaking designations and representations at the same time. The appeal process is simple for the Environment Agency as it is undertaken by an independent party (noting that the Environment Agency must first provide all evidence for the appeal). Also, simple for the undertaker as every appeal is accepted regardless of content.

Have you been surprised by the number of ‘high risk’ designations?

The outcome from the change in legislation is not what was expected by the Environment Agency, Defra or the reservoir industry. However, it has been implemented over 2,000 times and undergone independent reviews on three occasions.

9.7.4 Costs

As discussed above, the resource time for the risk designation was a 12-month temporary position for evidence and advice to Defra and a two-year period for risk designation methodology. There are also consultant fees associated with this work.

In the future, the cost and work load is likely to remain at current levels. Although designations have reduced, other admin work is still ongoing (e.g. review of reservoirs).

9.7.5 Other

It is apparent that there is a large discrepancy between what was expected in the reservoir industry and what was eventually drafted and implemented by the government. Particularly with reference to two items:

- Expectation that SRRs will be regulated

- Probability will be included in risk designation (noted that the inclusion of probability is a significant undertaking and that probability, even once established, changes over time)

All reservoirs that present a hazard to life should be considered by legislation regardless of capacity.

9.8 Conclusions

9.8.1 Membership organisations, water companies, individual undertakers and SBOs

- There is generally a good understanding of the changes implemented by the FWMA 2010 with regards to reservoirs across all interviewees. Membership organisations received very few queries from their members. The majority of individual undertakers sought advice from their Supervising Engineer during the risk designation process, and it is apparent that the Supervising Engineer is an important role. This is demonstrated by the percentage of undertakers wishing to retain their Supervising Engineer (see below).
- For water companies, it is common for 'not high risk' reservoirs to continue to have Supervising Engineer visits and monitoring and surveillance remains commonplace where the assets are still operational. Approximately 40% of individual undertakers confirmed they would retain the services of the Supervising Engineer and approximately 10% said they would retain an Inspecting Engineer. None of the undertakers have changed the frequency of monitoring and surveillance. This evidence suggests not all the benefits of the IA will be realised from changes in behaviour.
- The costs savings of partial deregulation are not reported to be significant for water companies or large farms. For SBOs and angling clubs, the cost savings are considered significant. This trend can be expected to continue for SRRs.
- During the interviews with individual undertakers, the following costs were established:
  - Typical Supervising Engineer costs - £500 to £1,200
  - Typical Inspecting Engineer costs - £2,000 to £4,000 (the same range was also discussed during interviews with water companies)
- From the interviews with SBOs, it is apparent that there is the possibility for a LRR to be 'not high risk' and not in commercial use. In this scenario, it is likely that the reservoir would fall in to disrepair without any monitoring or surveillance.
- From discussions with membership organisations it is clear that the pertinent issue for their members will be the reduction in threshold to 10,000 m^3 if implemented.

9.8.2 Emergency planners

- There are varying levels of understanding of the changes brought about by the FWMA 2010.
- LRRs are given different hazard ratings in different LRFs. The national risk assessment guidance has the risk of major dam failure as 'high' (with a low likelihood but catastrophic impact).
- Off-site emergency plans can be site specific or generic, depending on the perceived risk of the reservoirs in the region. A generic plan is not influenced by risk designation. However, the "top 100" high risk reservoirs should have site specific off-site emergency response plans, as funded by central government.

9.8.3 Enforcement Authority

- The introduction of the FWMA 2010 increased the regulatory burden on the Environment Agency in the short term, and likely in the long term also. As noted in Section 5 of this report, the cost to government was not considered in the IA (Defra; 2011).
- In general, partially deregulated reservoirs are Category C and D dams which tended historically to have lower incidents of Matters in the Interest Of Safety (MIOS) to enforce, or were given lower priority than Category A and B dams, and so this does not significantly reduce regulatory burden. This may well have been an oversight of the IA, as it was assumed that Category C and D dams would be partially deregulated and reduce regulatory burden.
- The introduction of recommendations of measures to be taken with regard to the maintenance of the reservoir is a further increase in regulatory burden on the Environment Agency.
- The introduction of a 'medium risk' category, where the undertaker retains a Supervising Engineer but not an Inspecting Engineer, could have reduced the burden on the Environment Agency by transferring it to industry. It is noted that a 'significant' hazard rating was proposed by the Environment Agency in the lead up to the FWMA 2010 (Environment Agency; 2008) but was not adopted.
- As discussed in Section 6 of this report, the wording of Clause 2C of FWMA 2010, that "human life could be endangered", is open to interpretation and as such placed the responsibility of interpretation on the Environment Agency. And although there has been less 'not high risk' designations than anticipated, the recent appeals process by an independent authority have given confidence that the interpretation of Clause 2C is appropriate.
- The risk designation guidance establishes the methodology: if the risk thresholds are met then the reservoir is 'high risk', if there is no evidence to the contrary then the reservoir is 'high risk'. This is the adoption of the precautionary principle. With low confidence in the reservoir flood maps, the primary source of hazard data, the precautionary principle was called upon perhaps more regularly than originally anticipated in the guidance document.
- It is believed that the majority of beneficiaries have been private, single reservoir owners. These undertakers may benefit from the short-term gain of not spending money on Supervising Engineers, however, in the long term there is the greater possibility of the dam falling in to disrepair and requiring a capital scheme to keep the asset in operation. It is unknown from the interview whether the suggested £5,000 in the IA is a reasonable figure to represent this.

10 Implementation Review

10.1 Anticipated Benefits (Impact Assessment)

The main financial benefits reported in the IA were:

- Savings to 1,008 'low risk' LRRs, from the total population of 1,824, due to a relaxation of supervision, record keeping, inspection and remedial works.
- Reducing costs from £6,800 per reservoir per year (baseline) to £2,680 (best estimate) per 'not high risk' reservoir per year.
- This is a 50-year Present Value net saving to undertakers of £101.7m.

10.2 Actual Benefits (Impact Assessment)

Defra and the Environment Agency have acted upon Recommendation 58 and implemented risk designation and partial deregulation. The Environment Agency has successfully implemented Phase 1 of Schedule 4 of the FWMA 2010 and designated a risk to the vast majority of LRRs in England.

However, in terms of the IA, there are a number of assumptions which have not been realised which implies the IA reported benefits have not been achieved:

- The IA assumed that 1,008 of 1,824 (55%) reservoirs would be designated as 'low risk'. The definition of a 'low risk' reservoir is one that does not put lives at risk/result in loss of life which is understood to have been assumed to be Category C and Category D dams at the time of the IA. Conversely, a 'high risk' reservoir is one that is either Category A or Category B and does put lives at risk/result in loss of life.
- However, Clause 2C of the 1975 Act, as modified by the FWMA 2010, prescribes that a reservoir should be designated 'high risk' if, "*in the event of an uncontrolled release of water from the reservoir, human life could be endangered*". The regulations did not specifically define "endangered" and it was left to the Environment Agency to interpret (Environment Agency; 2013b).
- The definition of "endangered" and subsequent risk designation process has resulted in:
  - 211 'not high risk' reservoirs in the total LRR population of 2,026 (10.4%).
  - 211 'not high risk' reservoirs of the 1,747 LRRs that have been designated (12.1%).

  As the IA assumed 55% of reservoirs would be partially deregulated, and in fact that proportion is closer to 12%, it is clear that the originally anticipated cost benefits will not be realised based purely on the number of 'not high risk' designations.
- The IA assumed Supervising Engineer and record keeping costs of £1,500 a year for 'high risk' reservoirs. From the interviews, it would seem that this cost is at the high end of the typical range, and so may overestimate potential savings. It was also assumed that 10% of undertakers will continue to employ a Supervising Engineer despite there being no legal requirements to do so. The interviews of individual undertakers suggest that this is closer to 40% and so again the potential savings may have been overestimated as Supervising Engineers continue to be an important asset for undertakers. The interviews also suggest that water companies retain their Supervising Engineers for 'not high risk' reservoirs.
- It was assumed that 10% of undertakers will continue to employ an Inspecting Engineer. This appears to have been a robust assumption.

- To determine the cost of remedial works to maintain a reservoir at the appropriate safety standards (including capital investment and expert engineers) a sum of £250,000 was assumed, that being the cost of decommissioning a reservoir. This was annualised to £5,000 a year based on an asset life of 50 years. It should be noted that this is a significant proportion (74%) of the annual savings per reservoir; far greater than the reduction in annual cost for a Supervising Engineer (£1,500) and Inspecting Engineer (£300). The assumption is somewhat contradictory, as the IA states that… *"A suitable conservative representation of the overall average position can be obtained by estimating the unavoidable costs that an owner would be willing to pay to maintain the reservoir so that it is safe and operational"* however by its very nature, the decommissioning of a reservoir will leave the asset out of operation (although it is noted that reducing the volume to below the current threshold would remove the reservoir from the 1975 Act and therefore all regulatory burden). That said, it is noted that to determine a "typical" cost of remediation is extremely difficult to ascertain without a thorough investigation into the cost of all MIOS. One SBO interview revealed that the undertaker had to pay in excess of £500k for significant spillway works to a Category A dam.
- For 'low risk' reservoirs the IA assumed that only half of undertakers will undertake remedial works where there is no legal requirement to do so. There was no evidence from the interviews to support or rebuke this.
- From the interviews, it is apparent that in some instances it has cost the undertaker more than £60 to register the reservoir and obtain the resulting final risk designation.
- Under the preferred scenario the cost of enforcement was assumed to reduce as a result of partial deregulation. However, there is no discussion surrounding the cost to government to implement the changes to reservoir safety management. The introduction of the FWMA 2010 increased the regulatory burden on the Environment Agency in the short term, and likely in the long term also.

Using the above evidence, the IA can be reassessed for 2017:

Table 11: Reassessed IA for 2017

	Baseline	Partial Deregulation			Net Savings
	All	Not high risk	High risk	Total	
ONE OFF COSTS					
Registration	£0.00	£60	£60		
ANNUAL COSTS					
Supervising Engineer and record keeping	£1,500	£600	£1,500		
Inspection by Inspecting Engineer	£300	£30	£300		
Cost of remedial works	£5,000	£2,500	£5,000		
Therefore total one off costs per reservoir	£0.00	£60	£60		
Therefore total annual costs per reservoir	£6,800	£3,130	£6,800		
No. of reservoirs[1]	2026	243	1,783		
Total one-off costs	£0.00	£14,580	£106,980	£121,560	- £121,560

[1] Total number of reservoir as per Table 5 with 12% Not high risk and 88% High risk.

	Baseline	Partial Deregulation			Net Savings
Total annual costs	£13,776,800	£760,590	£12,124,400	£12,884,990	£891,810
50-year present value total cost (one-off cost plus total annual cost with 3.5% annual discount rate applied)	£337,820,912	£18,665,007	£297,409,392	£316,074,399	£21,746,513

Note – this table is based on the following assumptions:

- 40% of undertakers retain a Supervising Engineer
- 10% of Undertakers retain an Inspecting Engineer
- 50% of reservoirs undertake remedial works (remedial works cost based on same assumptions as 2011 IA)
- 12% of the population of reservoirs are designated 'not high risk'

It can be seen that there is a 50-year PV cost saving of £21.7m compared to the 2011 IA reported saving of £101.7m. The two IAs are summarised below.

Table 12: Comparison of IAs

	2011 IA	2017 IA
Total number of LRRs	1,824	2,026
Number of 'high risk' reservoirs	816	1,783
Number of 'not high risk' / 'low risk' reservoirs	1,008	243
% of 'not high risk' / 'low risk' reservoirs	55%	12%
Baseline total annual costs (a)	£12,403,200	£13,776,800
Baseline 50-year present value total costs (b)	£304,143,430	£337,820,912
Partial deregulation one off costs	£109,440	£121,560
Partial deregulation total annual costs (c)	£8,250,240	£12,884,990
Partial deregulation 50-year present value total costs (d)	£202,416,610	£316,074,399
Reported total annual savings (a-c)	£4,152,960	£891,810
Reported 50-year present value savings (b-d)	£101,726,820	£21,746,513

10.3 Other Impacts

The following positive impacts are noted outside the scope of the IA:

- The Environment Agency has achieved the aim of designating the risk of the population of LRRs in England.
- With the three First Tier Tribunals, there has been an independent review of the Environment Agency's interpretation of the wording of the FWMA 2010. All three appeals were found in favour of the Environment Agency.
- During this process, all LRR flood maps have been reviewed, and a new production specification created so that flood maps are better suited to risk designation (amongst other requirements).

- The Environment Agency has undertaken successful consultation with the reservoir industry, including making contact with all undertakers of LRRs. Records and data management has improved. However, it is apparent that the risk designation process has been resource intense for the reservoir safety team and that, in the future, this burden is likely to continue.
- The possibility of regulating SRRs means that evidence has been gathered for SRRs and by identifying waterbodies a number of LRRs have been identified and regulated.
- With LRRs being viewed in terms of risk, funding has been made available to LRFs to produce site specific off-site emergency plans for reservoir incidents at the “top 100” (by risk) reservoirs in England. This improves the emergency services ability to respond to an incident at these sites, reducing the risk to the public. It is noted that this is 100 out of the 1,536 ‘high risk’ reservoirs in England.
- There were less consultation/queries than anticipated by reservoir owner groups following the risk designation process. It is understood that lowering the threshold of LRRs is of much greater concern to the reservoir community. This is reflected by the low number of interviews undertaken during this study.

11 Conclusions

11.1 Main Conclusions

- The most significant impact of the changes to the Reservoirs Act 1975, which were brought in by Schedule 4 of the Flood and Water Management Act 2010, has been the introduction of the risk designation process which has permitted the partial deregulation of 'not high risk' Large Raised Reservoirs. However, it is apparent that not all the Environment Agency's recommendations for changes in legislation were included in the final drafting of the FWMA 2010.
- Defra produced an Impact Assessment to determine the costs and benefits of implementing Schedule 4 of the FWMA 2010. The assessment anticipated that 1,008 reservoirs out of a population of 1,824 (55%) would be designated 'low risk' (the definition of a 'low risk' reservoir is one that does not put lives at risk/result in loss of life and was generally assumed to be Category C and Category D dams). The designation as 'low risk' was assumed to generate a cost reduction from £6,800 per reservoir per year (baseline) to £2,680 per reservoir per year (best estimate). Allowing for 1,008 reservoirs this represented a 50-year Present Value saving of £101.7m.
- The adopted risk designation methodology has (to date) resulted in 211 LRRs being designated 'not high risk' out of the total LRR population of 2,026 (10.4%). The process is still on going with 279 designations outstanding. Out of the population of LRRs that have been designated to date (1747), the percentage of reservoirs have been designated 'not high risk' is 12.1%.
- For reservoirs with an attributed dam category and risk designation, the following is reported:
  - 1 of 668 (0.15%) Category A dams are 'not high risk'
  - 6 of 273 (2.2%) Category B dams are 'not high risk'
  - 65 of 376 (17.3%) Category C dams are 'not high risk'
  - 108 of 205 (52.7%) Category D dams are 'not high risk'

  Noting that there are a number of 'not applicable', 'not known' and 'blanks' in the Environment Agency data set which typically relate to non-impounding and service reservoirs.
- The number of reservoirs which have been partially deregulated is less than anticipated in the Impact Assessment. It is understood that for the purposes of costing the benefits in the IA, 'high risk' was assumed to be categories A and B and 'low risk' was assumed to be categories C and D. However, the definition of dam categories C and D does not wholly concur with the definition of 'low risk' from the IA or the subsequent risk designation process. This is apparent when reviewing the number of Category C and D dams which are designated as 'high risk' (83% of Category C dams and 48% of Category D dams).
- Analysis of Risk Designation Decision forms has revealed that the majority of 'high risk' designations for Category C and D reservoirs can be attributed to the potential impact of residential properties or inundation of other receptors which could merit a Category B classification.
- The disparity with Category C reservoirs appears to be largely due to the procedural differences between the categorisation of reservoirs by Inspecting Engineers and the risk designation process. In categorising a reservoir, the Inspecting Engineer has flexibility in the interpretation the meaning of "negligible" (in the context of risk to life) and is able to form an

opinion based on a visit to the dam. By contrast the risk designation process is informed without a site visit, and assumes a 'high risk' designation unless there is clear evidence that life is not endangered. It would therefore appear quite reasonable that some Category C reservoirs would be designated 'high risk'.

- The situation with Category D reservoirs is less clear. In this case is can only be surmised that either the Inspecting Engineer failed to correctly assess the impact of a breach or that the inundation maps were conservative. It is not possible to provide an opinion on which is more likely.
- The 50-year Present Value saving generated by the partial deregulation of 'not high risk' reservoirs is now estimated as £21.7m which is £80.0m less than the value of £101.7m presented in the Defra Impact Assessment.
- A significant part of the cost of regulation assumed in the Impact Assessment was associated with remedial works which themselves were based on an estimated decommissioning cost. The general impression gained from the interviews with undertakers was that partial deregulation will not significantly reduce the cost of remedial works as they are likely to be required to maintain the serviceability of the reservoir irrespective of whether or not it is regulated. It is noted that attempting to put a cost on hypothetical remedial works is challenging and always open to scrutiny, however in this instance the cost savings may have been over estimated due to this assumption.
- The approach adopted by the Environment Agency in making risk designations has been successfully implemented across the portfolio of LRRs in England and supported by the findings of three independent tribunals. It should be noted that the resulting definition of 'not high risk' was not made in isolation by the Environment Agency; in 2013 they consulted with industry and considered the responses.
- The introduction of the FWMA 2010 increased the regulatory burden on the Environment Agency in the short term and probably long term too. The suggested introduction of a 'medium risk' category, where the undertaker retains a Supervising Engineer but not an Inspecting Engineer, could have reduced the burden on the Environment Agency by transferring it to industry. It is noted that the cost to government (including the Environment Agency) was not considered in the IA.
- The general perception among undertakers is that the implementation of the FWMA 2010 has failed to deliver its anticipated outcome because fewer reservoirs than expected have been partially deregulated.
- Membership organisations have not received a significant number of queries from their members regarding LRRs. The pertinent issue for their members will be the reduction in threshold to 10,000 m^3 if implemented. The benefits from the changes vary. For Angling Clubs that save money through not requiring a Panel Engineer with their 'not high risk' designation, the cost can be significant. However, in the farming community, LRRs tend to be on large farms and therefore the costs are considered less significant in the wider economics of the farm.
- Generally, water companies (who are the larger undertaker group) do not have a significant number of 'not high risk' partially deregulated reservoirs and therefore receive minimal benefits. It is common for 'not high risk' reservoirs to continue to have Supervising Engineer visits and monitoring and surveillance remains commonplace where the assets are still operational. Therefore, the only savings will come from the cost of a Section 10 inspection, which is typically £2k to £4k over a ten-year period, which is not substantial to the business.
- The majority of individual undertakers sought advice from their Supervising Engineer during the risk designation process. Appreciating the expertise of their Supervising Engineer was a common theme throughout the interviews. 40% have decided to retain the services of the

Supervising Engineer whereas 12% would retain an Inspecting Engineer. A small fraction of undertakers have changed the frequency of monitoring and surveillance.

11.2 Research Questions

Responses to the research questions are tabulated below.

Table 13: Responses to research questions

Research Question	Response	Principle Reference
1. To collect and refine evidence on the number of LRRs that have been fully regulated and the impact of the changes to reservoir legislation implemented under Phase 1 of the FWMA 2010, in particular:		
a. The number of LRRs that have been registered and designated as 'high risk'	This study has identified 2,026 registered LRRs in England. 1,747 have been assigned a risk designation to date; 211 'not high risk' and 1,536 'high risk'	Section 7
b. Are the regulations delivering the benefits originally identified, referring back to the Impact Assessment	The regulations have delivered the benefit of correcting the perceived regularity failure of the 1975 Act, that current regulation does not properly account for the risk associated with different reservoirs and as a result forces an over-allocation of resources devoted to safety of LRRs	Section 10
c. Costs and benefits to reservoir undertakers and regulatory authorities	The costs anticipated in the Impact Assessment have not been realised as there remains a significant number of fully regulated reservoirs	Section 10
2. Evaluate the effectiveness of the current regulation in relation to the risk methodology and 'high risk' designation processes in England	A robust risk designation methodology will soon be applied to all LRRs in England. Although it has not produced the numbers of partially deregulated reservoirs as anticipated, the approach has been independently verified through three First Tier Tribunals.	Section 6

Glossary of Terms

Consequence	In relation to risk assessment, the outcome or result of a risk being realised
Enforcement Authority	The Environment Agency in England
Hazard	A physical event, phenomenon or human activity with the potential to result in harm
Inspecting Engineer	A Qualified Civil Engineer appointed under Clause 10 of the Reservoirs Act 1975
Large Raised Reservoir (LLR)	Reservoirs of more than 25,000 m^3 storage capacity above natural ground
Likely Loss Of Life (LLOL)	The product of the population at risk and likely fatality rate for each of the receptors considered in the risk assessment
Local Resilience Form (LRF)	Forum of emergency responders and specific supporting agencies
Population At Risk (PAR)	Individuals within the flood inundation area
Probability	A measure of the degree of confidence in a prediction, as dictated by the evidence, concerning the nature of an uncertain quantity or the occurrence of an uncertain future event. This measure has a value between zero impossibility) and 1.0 (certainty)
Qualified Civil Engineer	An Engineer appointed by Defra in consultation with the Institution of Civil Engineers (ICE)
Risk	The combination of the chance of a particular event with the impact that the event would cause if it occurred
Supervising Engineer	A Qualified Civil Engineer appointed under Clause 12 of the Reservoirs Act 1975
Undertaker	The owners or the operators of the reservoir

Bibliography

A summary of the key documents used throughout this study is provided below and referenced in the main body of the report.

Table 14: Document summary

Year Published	Document Title; Publisher	Document Summary
1988	Downstream Hazard Classification Guideline; USBR	The document has a number of figures which provide an estimate of hazard for varying downstream receptors, such as: • flood danger level relationship for houses built on foundations • flood danger level relationship for mobile homes • flood danger level relationship for passenger vehicles • flood danger level relationship for adults • flood danger level relationship for children It is understood that the figures may have been consulted for receptors that are less well-defined in UK guidance, such as passenger vehicles.
2004	Interim Guide to Quantitative Risk Assessment for UK Reservoirs; ICE	Methodology for calculating likely loss of life (LLOL) in risk designation and flood maps.
2007	Biennial report on reservoir safety 1 April 2005 - 31 March 2007; Environment Agency	First biennial report from the Environment Agency on reservoir safety. Includes recommendations for legislative change.
2008	Reservoirs Act 1975 – Environment Agency Proposals to Defra for Legislative Change; Environment Agency	The document summarises the Environment Agency's recommendations to Defra regarding legislation for reservoir safety.
2008	Pitt Review 'Learning lessons from the 2007 floods'; Cabinet Office	This review was the catalyst for significant changes to flood and water management in the UK.
2008	Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose; Defra	This document contains a succinct table which defines hazard thresholds to people from flooding (velocity and depth with an allowance for debris); Table 4 – Hazard to People Classification using Hazard Rating. It is understood that this document has been used during the risk designation process.
2009	Biennial report on reservoir safety 1 April 2007 - 31 March 2009; Environment Agency	Second biennial report from the Environment Agency on reservoir safety. Includes recommendations for legislative change.
2009	Reservoir Inundation Mapping Specification; Environment Agency	Reservoir Inundation Maps (Maximum Hazard, Depth and Velocity) were used for the risk designation process. This document provides the specification to produce the maps.
2010	Flood and Water Management Act (2010); HMSO	Brought in amendments to the 1975 Act
2011	Flood and Water Management Act 2010: Commencing Schedule 4 on reservoir safety – Impact Assessment; Defra	Discussed further in Section 4 below. This is Defra's assessment on the impact on the changes to reservoir safety management brought about by the FWMA 2010.
2013	Reservoir Risk – Establishing the Likely Loss of Life (briefing paper); Mott MacDonald	Further discussions on the algorithms used to calculate LLOL and the methodology for loss of life on roads and footpaths.
2013	Our Responses to the Consultation on 'High Risk' Reservoirs; Environment Agency	The document confirms the amendments to the risk designation process following public consultation.
2013	Reservoir Risk Designation Guidance; Environment Agency	The document is the published guidance for the risk designation process.

Year Published	Document Title; Publisher	Document Summary
2013	Reservoir Safety in England and Wales, Report of the Consultation on the Implementation of Amendments to the Reservoirs Act 1975: the policy to be implemented in England; Defra	This document offers Defra's explanation of the amendments to the Reservoirs Act 1975 following public consultation.
2013	Reservoir Safety in England and Wales, Summary of Responses to the Consultation on the Implementation of Amendments to the Reservoirs Act 1975; Defra	This report documents the questions posed to the public during the consultation, and summarises the responses.
2013	Guide to risk assessment for reservoir safety management. Volume 2: Methodology and supporting information; Defra	This document supersedes the 2004 Interim Guide to Qualitative Risk Assessment for UK Reservoirs. It provides a methodology for calculating LLOL in risk designation and flood maps
2014	A New Guide to the Reservoirs Act 1975 (paper); ICE	This paper summarises the amendments made for the 2nd Edition of A Guide to the Reservoirs Act 1975 ICE publication
2014	A Guide to Reservoirs Act 1975 2nd Edition (ICE)	This document provides a guide to the implementation of the Reservoirs Act 1975. The 2nd edition also provides guidance for the implementation of the amendments brought about by the FWMA 2010.
2014	Changes to the Reservoirs Act 1975 – the enforcement authority's perspective in England	Changes to legal requirements following FWMA 2010 and how they are being enforced in England
2015	Floods and Reservoir Safety 4th Edition (ICE)	Industry guidance for reservoir safety, with particular reference to Chapter 2 and dam categories.
2015	Amendments to the Reservoirs Act 1975 (paper); ICE	Paper to summarise the changes brought about by the FWMA 2010
2015	Reservoir Safety; Defra	Note from Defra to summarise the aims of the amendments to the Reservoirs Act 1975 and the decision not to regulate Small Raised Reservoir at this time.
2015	Legislative changes for supervising engineers - England (paper); ICE	Paper to summarise the changes to Supervising Engineers duties under the amended Reservoirs Act 1975
2015	The Reservoirs Act 1975 and reservoir risk designations (paper); ICE	Paper to summarise the reservoir risk designation process.
2015	An update on reservoir safety legislation in Wales (paper); ICE	Paper to provide a summary on how the FWMA 2010 is implemented in Wales
2016	Updating the English Reservoir Flood Maps (paper); ICE	The 2009 specification for reservoir flood maps is being updated to take account of changing circumstances and technical advances. Will be adopted for future risk designations.
2016	Reservoir Flood Map Guide Version 5, Environment Agency	Explanatory Note on Reservoir Flood Maps for Local Resilience Forums.
2017	Regulation of Dam Safety: An Overview of Current Practice World Wide; ICOLD	Offers a succinct summary of dam safety practice in the UK, as part of an overview of worldwide practice.
2017	Reservoirs Act 1975 – Supervising Engineer Statements; Environment Agency	Clarification on the new requirements for Supervising Engineer's statements under FWMA 2010

References

The following documents have been referenced throughout this study:

- 1988; USBR; Downstream Hazard Classification Guideline
- 2004; ICE; Interim Guide to Qualitative Risk Assessment for UK Reservoirs
- 2007; Environment Agency; Biennial report on reservoir safety 1 April 2005 - 31 March 2007; Environment Agency
- 2008; Environment Agency; Reservoirs Act 1975 – Environment Agency Proposals to Defra for Legislative Change
- 2008; Cabinet Office; Pitt Review 'Learning lessons from the 2007 floods'
- 2008; Defra; Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose
- 2009a; Environment Agency; Biennial report on reservoir safety 1 April 2007 - 31 March 2009
- 2009b; Environment Agency; Reservoir Inundation Mapping Specification
- 2010; HMSO; Flood and Water Management Act (2010)
- 2011; Defra; Flood and Water Management Act 2010: Commencing Schedule 4 on reservoir safety – Impact Assessment
- 2013; Mott MacDonald; Reservoir Risk – Establishing the Likely Loss of Life (briefing paper)
- 2013a; Environment Agency; Our Responses to the Consultation on 'High Risk' Reservoirs
- 2013b; Environment Agency; Reservoir Risk Designation Guidance
- 2013a; Defra; Reservoir Safety in England and Wales, Report of the Consultation on the Implementation of Amendments to the Reservoirs Act 1975: the policy to be implemented in England
- 2013b; Defra; Reservoir Safety in England and Wales, Summary of Responses to the Consultation on the Implementation of Amendments to the Reservoirs Act 1975
- 2013c; Defra; Guide to risk assessment for reservoir safety management. Volume 2: Methodology and supporting information; Defra
- 2014a; ICE; A New Guide to the Reservoirs Act 1975 (paper)
- 2014b; ICE; A Guide to Reservoirs Act 1975 2nd Edition
- 2014c; ICE; Changes to the Reservoirs Act 1975 – the enforcement authority's perspective in England (paper)
- 2015a; ICE; Floods and Reservoir Safety 4th Edition
- 2015b; ICE; Amendments to the Reservoirs Act 1975 (paper)
- 2015c; ICE; Legislative changes for supervising engineers - England (paper)
- 2015d; ICE; The Reservoirs Act 1975 and reservoir risk designations (paper)
- 2015e; Unpublished data provided by Natural Resources Wales
- 2015; Defra; Reservoir Safety
- 2016; ICE; Updating the English Reservoir Flood Maps (paper)
- 2016; Environment Agency; Reservoir Flood Map Guide Version 5
- 2017; ICOLD; Regulation of Dam Safety: An Overview of Current Practice World Wide

- 2017; Environment Agency; Reservoirs Act 1975 – Supervising Engineer Statements

Appendices

A. Environment Agency LRR Database

Environment Agency

Reservoirs In Full

Official Sensitive

Report Date: 09/06/2017

Reservoir Count: 2026

Registered Name	Undertaker Type
Abberton Central & Western Arm	Water companies
(Field) Aston Pool (ID 34)	Private landowners and trusts
Abberton	Water companies
Abbey Farm Irrigation Reservoir	Farms
Abbey Farm Wetland	Registered charities
Abbeystead Reservoir	Industrial and commercial
Adlington	Water companies
Adventurers Fen	Environment Agency
Adwick Washland	Environment Agency
Agden	Water companies
Airy Holm	Water companies
Albert	Water companies
Aldborough Ings	Environment Agency
Aldenham	Other/unknown
Aldermaston Court Lake	Private landowners and trusts
Alderney No 8	Water companies
Aldington	Environment Agency
Alexandra	Other/unknown
Alkborough Flats Reedbed Reservoir	Local Authority
Aller Moor Reservoir	Environment Agency
Allerton Newton Fairburn	Environment Agency
Allestree Park Lake	Local Authority
Alston No.1	Water companies
Alston No.2	Water companies
Alton Water	Water companies
Ambergate No1	Water companies
Ambergate Proposed No2	Water companies
Ampthill Reservoir	Water companies
Angerton Lake	Private landowners and trusts
Anglers Lake	Local Authority
Anglezarke	Water companies
Angram	Water companies
Apley Pool	Local Authority
Apleyhead	Farms
Appleton	Water companies
Arden Hall Lake	Private landowners and trusts
Ardingly	Water companies
Ardleigh	Other government agencies and departments
Ardley FSR (Ardley Energy From Waste Facility)	Industrial and commercial
Ardsley	Water companies
Argal	Water companies
Arkley 3-4	Water companies
Arley	Water companies
Arlington	Water companies
Arlington Court Lake	National Trust
Arnfield Reservoir	Water companies
Ash Lagoons 4 & 5 Cottam Power Station	Industrial and commercial

Ashbourne FSR	Environment Agency
Ashburnham Lakes - Broadwater	Registered charities
Ashburnham Lakes - Frontwater	Registered charities
Ashburnham Lakes - Reservoir Pond	Registered charities
Ashford	Water companies
Ashing Lagoons 1A	Industrial and commercial
Ashing Lagoons 1B	Industrial and commercial
Ashing Lagoons 2A	Industrial and commercial
Ashing Lagoons 2B	Industrial and commercial
Ashworth Moor	Water companies
Aspull Open Reservoir - Balancing Tank	Water companies
Aston Valley FSA	Environment Agency
Atherton Lake FSR	Environment Agency
Auberies Farm	Farms
Audenshaw No. 3	Water companies
Audenshaw No.1	Water companies
Audenshaw No.2	Water companies
Audley	Private landowners and trusts
Aughton	Water companies
Avon	Water companies
Awbridge Lake	Private landowners and trusts
Babraham	Farms
Back of Hall Reservoir	Farms
Badcocks Farm	Farms
Baddiley Mere Reservoir ID268	Private landowners and trusts
Badlingham Farm (Badlington)	Farms
Badlingham Farm Reservoir	Farms
Baitings	Water companies
Bakethin	Water companies
Balancing Pond C	Industrial and commercial
Balcombe Lake	Private landowners and trusts
Balderhead	Water companies
Banbury	Water companies
Banbury FAS	Environment Agency
Barcombe	Water companies
Barden Lower	Water companies
Barden Upper	Water companies
Barleylands Farm	Farms
Barmby Raw Water (aka Loftsome Bridge)	Water companies
Barnacre North	Water companies
Barnacre South	Water companies
Barningham Lake (ID 4)	Private landowners and trusts
Barnsfold	Private landowners and trusts
Barnwell	Environment Agency
Barr Beacon No.1	Water companies
Barr Beacon No.2	Water companies
Barracks Farm Reservoir	Farms
Barrow Compensation	Water companies
Barrow Hill Service Reservoir	Water companies
Barrow No. 3	Water companies
Barrow No.1	Water companies
Barrow No.2	Water companies
Barrowford	Canal and River Trust
Bartley	Water companies
Barton Place Farm Reservoir	Farms
Barwell Court Lake	Private landowners and trusts

Basin Pond	Private landowners and trusts
Baskeybay Farm Reservoir	Private landowners and trusts
Bathpool Park Lake	Local Authority
Battles East	Farms
Bay Pond	Registered charities
Bayham Lake	Private landowners and trusts
Beacon Hill	Water companies
Beaminster Flood Retention Reservoir	Environment Agency
Bear Brook FSR	Environment Agency
Bearwood Lake	Other/unknown
Beaumont Hill	Water companies
Beckerings Park Farm	Private landowners and trusts
Beckingham FSA	Environment Agency
Beckingham Hall	Farms
Bedgebury Park Great Lake	Registered charities
Beeston Hall	Farms
Belfry	Private landowners and trusts
Belgrave Farm (ID195)	Farms
Belmont	Water companies
Belvide	Canal and River Trust
Belvoir Lower Lake	Private landowners and trusts
Belvoir Upper Lake	Private landowners and trusts
Bentley Priory	Environment Agency
Berners Hall Farm	Other/unknown
Berrington Pool	National Trust
Bescot	Environment Agency
Bewdley Bank	Water companies
Bewl Bridge	Water companies
Bicton College Lake	Farms
Biddlesden Park Upper Lake	Private landowners and trusts
Big Hayes Lake (ID378)	Farms
Big Waters, Fawsley	Private landowners and trusts
Biggin Fish Pond	Farms
Bilberry	Water companies
Billets Flood Storage Reservoir	Water companies
Billets FSR	Water companies
Bilsham Farm Reservoir	Farms
Birch Vale Lodge	Private landowners and trusts
Birds Farm	Farms
Birkacre	Local Authority
Birkby Nab Flood Storage Reservoir	Environment Agency
Birkwood Hall No. 2 (ID364)	Farms
Birkwood Hall No.3 (ID379)	Farms
Birkwood Washland	Environment Agency
Birney Hill	Water companies
Birtle Upper	Industrial and commercial
Bishops Wood Reservoir	Water companies
Bishopthorpe Lagoon	Water companies
Bitham Lake	Private landowners and trusts
Bittell Lower	Canal and River Trust
Bittell Upper	Canal and River Trust
Black Dick's Lake	Private landowners and trusts
Black Lake, Knowle Wall Farm	Private landowners and trusts
Black Moss	Canal and River Trust
Black Park Lake	Local Authority
Black Swan Lake Dinton Pastures	Local Authority

Blackbrook	Water companies
Blackleach Reservoir South	Other government agencies and departments
Blackmoorfoot	Water companies
Blackmoss Lower	Water companies
Blackmoss Upper	Water companies
Blackroot Pool	Local Authority
Blackstone Edge	Water companies
Blackton	Water companies
Bladon Lake	Other government agencies and departments
Blagdon	Water companies
Blakely	Water companies
Blashford Lake	Water companies
Blatherwycke Lake	Farms
Blea Tarn	Water companies
Bleawater	Water companies
Blencarn (ID 64)	Private landowners and trusts
Blenheim Lake	Private landowners and trusts
Blickling Lake	National Trust
Blithfield	Water companies
Blunsdon C	Water companies
Boat House Pond	National Trust
Bockingham Hall	Private landowners and trusts
Boddington	Canal and River Trust
Bodicote (ID304)	Farms
Bolam Lake	Local Authority
Bolder Mere	Registered charities
Bollinhurst	Water companies
Bolton Ings (Dales)	Environment Agency
Bolton Ings (River Dearn-Ridings)	Environment Agency
Bolton Lower Reservoir	Private landowners and trusts
Bomb Pond	Private landowners and trusts
Bonnington's Lake	Private landowners and trusts
Booth Dean Lower	Water companies
Booth Dean Upper	Water companies
Bootham Lane SRC Lagoons	Industrial and commercial
Boothwood	Water companies
Borrans	Water companies
Boscathnoe No 2	Water companies
Boshaw Whams	Water companies
Bosley	Canal and River Trust
Bosworth Marina Nr 2	Industrial and commercial
Bosworth Water Trust Amenity Lake	Private landowners and trusts
Botany Marshes Reservoir	Registered charities
Bottoms (Longdendale)	Water companies
Bottoms (Macclesfield)	Water companies
Bough Beech	Water companies
Boughton Treatment Works - East	Water companies
Boughton Treatment Works - North & Mid	Water companies
Boughton Treatment Works - South	Water companies
Bourley Military No. 5	Other government agencies and departments
Bourley Military No.2	Other government agencies and departments
Bourne Ditch	Environment Agency
Bowers Marsh Reservoir	Registered charities
Bowers Marsh Wetlands North West Area	Registered charities
Bowers Marsh Wetlands South East Area	Registered charities
Bowmans Green Lake	Private landowners and trusts

Bowood Lake	Private landowners and trusts
Bracebridge Pool	Local Authority
Bracebridge Reservoir	Water companies
Bradshaw Reservoir	Water companies
Bradwell Lake	Water companies
Bramshill House Pond	Industrial and commercial
Bran Sands Aeration Tanks	Water companies
Bransholme Stormwater Lagoon	Water companies
Branston Island	Environment Agency
Braunstone Park Storage Reservoir	Environment Agency
Braydon Pond	Private landowners and trusts
Brayton Barff	Water companies
Breaston FSR	Environment Agency
Breck Farm Reservoir (ID008)	Farms
Brent (aka Welsh Harp Reservoir)	Canal and River Trust
Brentingby Flood Storage Reservoir	Environment Agency
Bretton Park Lakes Lower	Local Authority
Bretton Park Lakes Upper	Local Authority
Brick Kiln Lake	Water companies
Brick Kiln Reservoir (ID162)	Private landowners and trusts
Brickhill Copse Reservoir	Water companies
Brickyard Reservoir	Farms
Bridge Farm (ID208)	Farms
Bridge Farm Reservoir	Farms
Bridge Farm Reservoir (Wickham Market)	Farms
Bridgeham Reservoir	Farms
Brightwell Farm Reservoir	Other/unknown
Brindley Ford Flood Storage Reservoir	Industrial and commercial
Brine Reservoir, Wilton No.3	Industrial and commercial
Brine Reservoir,Wilton No.1	Industrial and commercial
Brine Reservoir,Wilton No.2	Industrial and commercial
Brine Reservoir,Wilton No.4	Industrial and commercial
Brine Reservoir,Wilton No.5	Industrial and commercial
Brinklow Marina	Private landowners and trusts
Bristol Wastewater 1-1-2	Water companies
Bristol Wastewater 1-3-4	Water companies
Bristol Wastewater 2-1-2	Water companies
Bristol Wastewater 2-3-4	Water companies
Bristol Wastewater 3-1-2	Water companies
British Camp	Water companies
Broadstone	Water companies
Broadwater Lake	Local Authority
Broadwater, Packington	Private landowners and trusts
Brocket Hall Lake	Private landowners and trusts
Broken Scar	Water companies
Bromfield Middle Pool	Private landowners and trusts
Bromfield Upper Pool	Private landowners and trusts
Bromhey Farm Reservoir No. 2 (Northward Hill) (ID335)	Registered charities
Bromley Mill Pool	Private landowners and trusts
Brook End Irrigation Reservoir	Farms
Brook Farm ID278	Farms
Brooklands Meadows (Linear Park Flood Attenuation Ponds)	Private landowners and trusts
Brookleys Lake	Industrial and commercial
Broomfleet Washland Reservoir	Environment Agency
Broomhead	Water companies
Brotherton Little Marsh to Birkin Holme Washland Reservoir	Environment Agency

Brown Edge No.3	Water companies
Brownhill	Water companies
Brunclough	Canal and River Trust
Brushes (Stalybridge)	Water companies
Bruton Dam Flood Storage Reservoir	Environment Agency
Buckenham Tofts Upper	Other government agencies and departments
Buckhurst Park Lake	Private landowners and trusts
Buckshole	Local Authority
Buckton Vale	Local Authority
Burghley House Lake	Registered charities
Burley Fishponds Lagoon (Rutland Water Lagoon A)	Water companies
Burnhope	Water companies
Burrator	Water companies
Burringham Pumping Station Drain	Other government agencies and departments
Burton Mill Pond	Local Authority
Bury Farm FSA	Environment Agency
Buscot Park Lake	National Trust
Buscot Reservoir	National Trust
Bushey Heath No. 5	Water companies
Bussow	Water companies
Butchers Hill Winter Storage Reservoir	Farms
Butley Farm Reservoir	Private landowners and trusts
Butterley	Water companies
Butterley.	Canal and River Trust
Cadney Carrs	Water companies
Caen Hill Marina	Industrial and commercial
Caistor No 1	Farms
Caistor No.2	Farms
Caldecote Farm	Farms
Caldecott Lake	Water companies
Calf Heath	Canal and River Trust
Calf Hey	Water companies
Cam and Wicksters Brook FSA	Environment Agency
Camois Farm	Farms
Canada Farm	Farms
Candlet Farm Reservoir	Other/unknown
Canklow Washland Reservoirs	Environment Agency
Cant Clough	Water companies
Canwell Estate Reservoir	Farms
Capesthorne Middle Lake	Private landowners and trusts
Captains Pool	Private landowners and trusts
Carburton	Private landowners and trusts
Carburton Forge	Private landowners and trusts
Cargenwen No.1	Water companies
Cargenwen No.2 & No.3	Water companies
Carr Farm Reservoir	Farms
Carr Lane Reservoir	Local Authority
Carr Mill	Canal and River Trust
Carsington	Water companies
Carter's Bridge Farm	Farms
Cartgate FSR	Other government agencies and departments
Castle Ashby - Engine Pond	Private landowners and trusts
Castle Ashby - Menagerie	Private landowners and trusts
Castle Ashby - Park Pond	Private landowners and trusts
Castle Carrock	Water companies
Castle Howard Great Lake	Private landowners and trusts

Castle Irwell	Environment Agency
Castleshaw Lower	Water companies
Castleshaw Upper	Water companies
Catcleugh	Water companies
Catterall Flood Storage	Environment Agency
Catterick Flood Storage Reservoir	Environment Agency
Cavendish Dock	Industrial and commercial
Cawood Ings Wistow Lordship	Environment Agency
Central East Area Balancing Pond	Industrial and commercial
Centre Vale Park FSA	Environment Agency
Cerne Abbas Flood Regulation	Environment Agency
Chalk Breck	Farms
Challacombe	Water companies
Chapel House	Water companies
Chard	Local Authority
Charville Lane FSA	Environment Agency
Chasewater (Cannock Chase)	Local Authority
Chatwell Park Farm Reservoir ID207	Farms
Cheddar	Water companies
Chelburn Upper	Water companies
Chelker	Water companies
Chellow Heights East	Water companies
Chellow Heights West	Water companies
Chelmarsh	Water companies
Cheltenham Racecourse	Industrial and commercial
Cherrington Moor (ID218)	Private landowners and trusts
Cherry Orchard (Poplars Reservoir)	Farms
Cherry Top Reservoir	Private landowners and trusts
Chertsey Settling	Water companies
Cheshunt North FSA	Environment Agency
Cheveney Farm Upper Lake (No. 1)	Private landowners and trusts
Chew	Water companies
Chew Magna	Water companies
Chew Valley Lake (Chew Stoke)	Water companies
Chigborough Fishing Lakes	Private landowners and trusts
Chignal Hall Farm	Farms
Chigwell No. 2	Water companies
Chigwell Raw Water	Water companies
Chigwell Washwater Lagoon	Water companies
Chillington Pool	Private landowners and trusts
Chingford Pond	Private landowners and trusts
Church Farm	Farms
Church Farm Booton	Farms
Church Reservoir (Childerditch Hall Lower)	Private landowners and trusts
Church Wilne	Water companies
Churchdown No.5	Water companies
Churches Reservoir	Farms
Churn Clough	Water companies
Cirencester Park - The Mansion Lake	Private landowners and trusts
Clandon Park	Private landowners and trusts
Clarkes Hill	Water companies
Clattercote	Canal and River Trust
Clatworthy	Water companies
Claydon Park Lower Lake	Private landowners and trusts
Clays Lake Reservoir	Environment Agency
Clayton Brook	Registered charities

Clements Creek FSR	Environment Agency
Cley Breck North	Farms
Clifton Brook Tributary	Other/unknown
Clifton Ings Washlands	Environment Agency
Clifton Moor	Water companies
Cloughbottom	Water companies
Cloverley Pool	Private landowners and trusts
Clowbridge	Water companies
Clumber Lake	National Trust
Coate Water	Local Authority
Coatenhill Reservoir ID230	Private landowners and trusts
Cobbins Brook FAS	Environment Agency
Cockfosters	Water companies
Cod Beck	Water companies
Codnor Park	Canal and River Trust
Cofton	Canal and River Trust
Cogra Moss	Water companies
Cold Hiendley	Farms
Coldwell Upper	Water companies
College No.4	Water companies
Colliford Lake	Water companies
Colt Crag	Water companies
Colton No. 2	Farms
Combs	Canal and River Trust
Compton Castle Lake	Private landowners and trusts
Coningsby (ID173)	Farms
Coniston Hall Lake	Private landowners and trusts
Connaught Water	Local Authority
Cononley Washland	Environment Agency
Cooks Pond	Private landowners and trusts
Coombe Bank Lake	Other/unknown
Coombe Pool	Local Authority
Coopers Green	Water companies
Copgrove Reservoir	Private landowners and trusts
Corsham Lake	Private landowners and trusts
Cottam Power Station Cooling Towers Ponds	Industrial and commercial
Cottam South Coal Stock Ash Lagoon	Industrial and commercial
Coult Stream Dam	Environment Agency
Cove Brook FSR	Environment Agency
Covenham	Water companies
Cow Green	Water companies
Cowhill Belt Pond	Private landowners and trusts
Cowm	Water companies
Cowpe	Water companies
Coxe's Mill Pond	National Trust
Cox's Meadow	Environment Agency
Cransley Waters	Private landowners and trusts
Cribbs Causeway (aka Lysander Road)	Environment Agency
Crichel Lake	Private landowners and trusts
Crookfoot	Private landowners and trusts
Crookgate	Water companies
Croome River	National Trust
Cropston	Water companies
Crosshill 1	Water companies
Crosshill 2	Water companies
Croston Flood Storage Basin,	Environment Agency

Crouch Hill	Water companies
Crowdy	Water companies
Crowlands Cowbit Washes	Environment Agency
Crownhill	Water companies
Crowshaw Lodge	Private landowners and trusts
Crowthorne Reservoir (Cells 3 & 4)	Water companies
Croxton Park Reservoir	Farms
Crummock Water	Water companies
Cudworth Washland	Environment Agency
Culford Park Lake	Private landowners and trusts
Culnell's Fishing Lake	Farms
Culverthorpe Lower Lake	Private landowners and trusts
Cumwhinton Reservoir	Water companies
Curry Moor Flood Storage Area	Environment Agency
Dairy House Farm (ID117)	Farms
Dakyn Road FSR	Environment Agency
Dale Dyke	Water companies
Dallington Brook	Environment Agency
Damas Ghyll	Water companies
Damflask	Water companies
Dammerwick Farm (Old)	Farms
Dammerwick New	Farms
Damonts Farm	Farms
Danson Park Lake	Local Authority
Darracott	Water companies
Dartmouth Boating Lake	Local Authority
Dartridge (at Childerditch Hall)	Private landowners and trusts
Darwell	Water companies
Daventry	Canal and River Trust
Dean Clough Lower	Water companies
Dean Clough Upper	Water companies
Dean Head Lower	Water companies
Dean Head Upper	Water companies
Deanhead	Water companies
Dearne Mouth Washland	Environment Agency
Debdon	Private landowners and trusts
Decoy Farm Reservoir	Private landowners and trusts
Decoy Pond	Industrial and commercial
Deene Lake	Private landowners and trusts
Deerhill	Water companies
Delph	Water companies
Denaby Ings (washland)	Environment Agency
Dene Lake	Private landowners and trusts
Denton	Canal and River Trust
Denton No.1	Water companies
Denton No.2	Water companies
Denver Black Bank FSR	Environment Agency
Denver Middle Drove	Environment Agency
Denver Silt Fen	Environment Agency
Derwent	Water companies
Derwent Reservoir	Water companies
Devil's Bridge Pond	Private landowners and trusts
Devil's Dingle	Industrial and commercial
Diddington Service Reservoir	Water companies
Didsbury FSR	Environment Agency
Digestate Reservoir No. 1	Industrial and commercial

Diggle	Canal and River Trust
Digley	Water companies
Dilworth Upper	Water companies
Dimmingsdale	Canal and River Trust
Dimmocks Cote	Farms
Dingle	Water companies
Ditchingham Lake	Farms
Ditchley Park Lake	Private landowners and trusts
Docking Reservoir	Farms
Dodds 2 Reservoir	Industrial and commercial
Doe Hey Lower	Private landowners and trusts
Doe Hey Upper	Private landowners and trusts
Doe Park	Water companies
Doffcocker Lodge	Local Authority
Dogmersfield Park Lake	Private landowners and trusts
Dollis Hill	Water companies
Dollymans Farm	Farms
Dolphin Farm Reservoir	Farms
Douster Pond	Local Authority
Dovestone	Water companies
Dowdeswell	Environment Agency
Dowry	Water companies
Doxford Lake	Private landowners and trusts
Drax North Cooling Pond	Industrial and commercial
Drax South Cooling Pond	Industrial and commercial
Draycote Water	Water companies
Drayton	Canal and River Trust
Drayton Pool	Private landowners and trusts
Dreamfields (ID370)	Farms
Drift	Water companies
Dronfield Dam (Jack Goodhand Reservoir)	Environment Agency
Drum Hill Reservoir	Water companies
Dubbs	Water companies
Dudmaston Big Pool	National Trust
Dunchurch Pools Marina (AKA Barby Pools Marina)	Private landowners and trusts
Dunham Park	Water companies
Dunorlan Park Lake	Local Authority
Durham Warping Drain Lagoon	Other government agencies and departments
Durleigh	Water companies
Durranhill Flood Storage	Environment Agency
Duston Mill Flood Storage Area	Local Authority
Eagle Pond	Other government agencies and departments
Ealing Reservoir	Water companies
Earlswood Common Boating Lake	Local Authority
Earlswood Common New Pond	Local Authority
Earlswood Lakes - Engine Pool	Canal and River Trust
Earlswood Lakes - Terry's Pool	Canal and River Trust
Earlswood Lakes - Windmill Pool	Canal and River Trust
Earnsdale	Water companies
East Fen Farm	Farms
East Hall Farm	Farms
East Ings and Wood Holmes Washland Reservoir	Environment Agency
East View Reservoir	Water companies
East Warwick	Water companies
Eastnor Lake	Private landowners and trusts
Eastwell Lake	Private landowners and trusts

Eavestone Lake	Private landowners and trusts
Ecclesbourne	Private landowners and trusts
Eccleston Mere	Private landowners and trusts
Eccup	Water companies
Edgar Farm Reservoir	Farms
Edgbaston Pool	Private landowners and trusts
Edstone Lake	Private landowners and trusts
Eggborough Cooling Tower Ponds	Industrial and commercial
Eldon Cottages	Farms
Eldwick	Water companies
Eller Beck Flood Storage Reservoir	Environment Agency
Elleron Lake	Industrial and commercial
Ellingham Intake	Water companies
Elmerdale Farm Reservoir	Farms
Elsecar	Local Authority
Elsham Reservoir	Water companies
Elslack	Water companies
Elton	Canal and River Trust
Elton Vale Lower	Private landowners and trusts
Elveden Forest Lake	Private landowners and trusts
Elvington	Water companies
EMA Gimbro Ponds (Winter and Summer)	Industrial and commercial
Embsay	Water companies
Emerson Green Pond C3	Private landowners and trusts
Emperor Lake	Other government agencies and departments
Enfield Golf Course	Environment Agency
Ennerdale Water	Water companies
Enton Lower Lake	Private landowners and trusts
Enton Upper Lake	Private landowners and trusts
Entwistle	Water companies
Epsom Common Great Pond	Local Authority
Ercall	Private landowners and trusts
Erdington	Water companies
Erpingham Lodge Reservoir	Farms
Errwood	Water companies
Etherow Country Park	Local Authority
Euston Reservoir	Private landowners and trusts
Ewhurst Park Lake	Private landowners and trusts
Ewshot	Water companies
Eyebrook	Industrial and commercial
Eythrope Park Lake	Private landowners and trusts
Fairlands Lake	Private landowners and trusts
Far Lake	Other/unknown
Faringdon House Estate Lake	Other government agencies and departments
Farlington No. 8	Water companies
Farlington No. 9	Water companies
Farlington No.6	Water companies
Farlington No.7	Water companies
Farmoor No. 1	Water companies
Farmoor No. 2	Water companies
Farningham Hill No.2	Water companies
Farnley Balancing	Water companies
Fawley	Industrial and commercial
Feeringbury Farm	Farms
Felbrigg Lake	National Trust
Feltwell Anchor Reservoir	Private landowners and trusts

Fen Drayton Lakes	Registered charities
Fen Place Mill Lakes	Private landowners and trusts
Fenham Reservoir	Water companies
Fens Pools - Lower Pool	Canal and River Trust
Fens Pools - Middle Pool	Canal and River Trust
Fens Pools - Upper Pool	Canal and River Trust
Fenton	Environment Agency
Fernilee	Water companies
Fernworthy	Water companies
Ferrybridge Cooling Tower Pond	Industrial and commercial
Fewston	Water companies
Fiddler's Ferry P.S. Ash Lagoon A	Industrial and commercial
Fiddler's Ferry P.S. Ash Lagoon B	Industrial and commercial
Fiddler's Ferry P.S. Ash Lagoon C	Industrial and commercial
Fiddler's Ferry P.S. Ash Lagoon D	Industrial and commercial
Fiddler's Ferry P.S. Cooling Tower Pond - North	Industrial and commercial
Fiddler's Ferry P.S. Cooling Tower Pond - South	Industrial and commercial
Fillingham Lake	Private landowners and trusts
Finchett's Gutter	Environment Agency
Fish Pond - Ascot Place	Private landowners and trusts
Fish Pond (Battlesden Park Lake)	Private landowners and trusts
Fish Pond (Lake View)	Private landowners and trusts
Fisher Tarn	Water companies
Fishers Pond	Other government agencies and departments
Fishmoor	Water companies
Fleakingley Beck Reservoir	Private landowners and trusts
Fleet Pond	Local Authority
Flintham Lake	Private landowners and trusts
Flintsham	Private landowners and trusts
Folkington	Water companies
Folly Farm Reservoir	Farms
Folly Lake	Private landowners and trusts
Fontburn	Water companies
Fonthill Bishop Reservoir	Farms
Forcett Hall Lake	Private landowners and trusts
Foremark	Water companies
Forest Farm	Farms
Fortis Green	Water companies
Foscott	Water companies
Foston Reservoir	Environment Agency
Fourteen Acre Field	Farms
Fowlers Field Reservoir	Farms
Foxburrow Plantation Reservoir	Farms
Foxcote	Water companies
Foxenfield	Farms
Framfield Upper (Newplace Estate) (ID95)	Farms
Frampton Marsh Reedbed Reservoir	Registered charities
Frankley Balancing Reservoir	Environment Agency
Frankley Pure Water	Water companies
Frankley Raw Water	Water companies
Frensham Great Pond	Local Authority
Frensham Little Pond	National Trust
Freshwater Reservoir	Industrial and commercial
Frisby Lake	Environment Agency
Frog Farm Reservoir	Farms
Frogmore Farm Reservoir	Private landowners and trusts

Fullingbridge Lake ID273	Private landowners and trusts
Fulmer Wood Lake	Private landowners and trusts
Furnace Pond	Private landowners and trusts
Furnace Pond (Horsmonden)	Private landowners and trusts
Furnace Pond, Slaugham	Local Authority
Further Fen Farm Reservoir	Farms
Furzton Balancing Lake	Water companies
Gaddings West	Other/unknown
Gailey Lower Pool	Canal and River Trust
Gailey Upper Pool	Canal and River Trust
Gang Wall	Environment Agency
Gap Pool, Ranton	Private landowners and trusts
Garden Lake	National Trust
Garstang Flood Storage	Environment Agency
Gasper New Lake	Private landowners and trusts
Gatcombe Water	Private landowners and trusts
Gatehouse Tarn (Eskdale Green)	Registered charities
Gately Moor No.1	Water companies
Gately Moor No.2	Water companies
Gatton Park Lake	Private landowners and trusts
Gatwick Airport Flood Alleviation Pond	Industrial and commercial
Gatwick Airport Long Term Storage Lagoon	Industrial and commercial
Gatwick Airport Longterm Storage Lagoon Nr 2	Industrial and commercial
Geary's, Packington	Private landowners and trusts
Gedgrave New Reservoir (ID401)	Farms
George V FSA	Environment Agency
Ghyll Head	Water companies
Gifford's Hall	Farms
Gilling Lower Fish Pond	Other government agencies and departments
Gilstead Raw Water	Water companies
Gipping Flood Reservoir	Environment Agency
Gleadthorpe	Farms
Glebe Farm (ID222)	Private landowners and trusts
Glentworth Reservoir (ID383)	Farms
Godley	Water companies
Godley Open	Water companies
Golder Hill	Farms
Gooseum Rhyne	Environment Agency
Gorple Lower	Water companies
Gorple Upper	Water companies
Gorpley	Water companies
Gorton Lower	Water companies
Gorton Upper	Water companies
Gosfield Lake	Private landowners and trusts
Goulds Tarn - Warcop Fell (ID251)	Other government agencies and departments
Gouldsmeadow Lake	Private landowners and trusts
Gouthwaite	Water companies
Gowdall Ings	Environment Agency
Grafham Stage 2	Water companies
Grafham Water	Water companies
Graincliffe	Water companies
Grange Farm	Environment Agency
Grange Farm Reservoir	Farms
Grantham CAL	Industrial and commercial
Grassholme	Water companies
Graysmoor Winter Storage Reservoir	Farms

Great Barford Flood Alleviation - East	Other government agencies and departments
Great Barford Flood Alleviation - West	Other government agencies and departments
Great Barr Lower Lake (ID 44)	Private landowners and trusts
Great Island Pond	Other/unknown
Great Lake	Private landowners and trusts
Great Meadow Pond	Other government agencies and departments
Great Pond at Stubbing Court	Private landowners and trusts
Great Pond, Sunninghill	Other government agencies and departments
Great Pool, Packington	Private landowners and trusts
Great Sir Hugh's (ID144)	Private landowners and trusts
Great Water and Saw Mill Pond	Private landowners and trusts
Greatmarsh Farm Reservoir	Other/unknown
Green Lane Reservoir	Private landowners and trusts
Green Mile Farm	Farms
Green Withens	Water companies
Greenbooth	Water companies
Greenfield	Water companies
Grendon Quarter Pond	Private landowners and trusts
Grimsbury	Water companies
Grimsby Reservoir	Water companies
Grimsthorpe Lake	Registered charities
Grimwith	Water companies
Grizedale	Water companies
Grizedale Lea	Water companies
Groby Pool	Industrial and commercial
Grovelands Park Lake	Local Authority
Guide	Water companies
Gurnal Dubs	Industrial and commercial
Hackthorn Manor Reservoir	Farms
Hadfield	Water companies
Hadleigh	Other government agencies and departments
Hadler's Hole, Croxton Hall Farm Reservoir	Farms
Hagbourne Hill Service Reservoir	Water companies
Haigh Cote	Industrial and commercial
Hainault Forest Lake	Local Authority
Hales Hall Pool	Local Authority
Half Mile Pond	Private landowners and trusts
Half Moon Reservoir	Farms
Hall Farm No 1 Reservoir, Herringswell	Farms
Hall Farm No.2 Reservoir, Herringswell	Farms
Hall Farm Reservoir	Farms
Hall Farm Reservoir Illington	Farms
Hall Farm Reservoir No 1	Farms
Hall Farm, Little Bentley	Farms
Hall Farm, Marlesford	Farms
Hall Place FRR	Environment Agency
Hall Pool, Packington	Private landowners and trusts
Hall Raw Water Reservoir	Water companies
Halleypike Lough	Private landowners and trusts
Hallgates No.4	Water companies
Hallington East	Water companies
Hallington West	Water companies
Halstead Flood Alleviation Reservoir	Environment Agency
Hammer Pond	Private landowners and trusts
Hampstead Pond No.1	Local Authority
Hampton - Distributing	Water companies

Hampton - Grand Junction	Water companies
Hampton - Stain Hill	Water companies
Hampton - Sunnyside	Water companies
Hamrow Farm	Farms
Hamrow Farm Reservoir No 2	Farms
Handley Barns Farm	Farms
Hanging Lees	Water companies
Hanningfield	Water companies
Hanningfield	Water companies
Harden	Water companies
Hardham Reservoir	Water companies
Hardwick Hall - Great Pond	National Trust
Hardwick Hall - Millers Pond	National Trust
Hardwick Hall Lake	Local Authority
Harefield No.3	Water companies
Harewood Park Lake	Registered charities
Harlesthorpe	Private landowners and trusts
Harlestone Lake	Private landowners and trusts
Harlington Washland	Environment Agency
Harlock	Water companies
Harlock's Farm	Farms
Harnham (ID236)	Private landowners and trusts
Harold Park	Local Authority
Harringworth Lodge Pond	Private landowners and trusts
Harrow Reservoir	Water companies
Hart Lower	Private landowners and trusts
Hart Reservoir	Water companies
Hart Upper	Private landowners and trusts
Harthill	Canal and River Trust
Hartlebury Castle Moat and Charlton Pool	Registered charities
Hartleton Lake (Lower) (Drummonds Dub)	Industrial and commercial
Hartsbourne FSA	Environment Agency
Hartshead	Water companies
Hartsholme Lake	Local Authority
Haseley Farm	Farms
Haslar Ocean Basin	Other government agencies and departments
Hasse Farm	Farms
Hatchet Pond	Other government agencies and departments
Hatfield Forest Lake	National Trust
Hatters	Water companies
Haveringland Lake	Private landowners and trusts
Haweswater	Water companies
Hawk Lake	Private landowners and trusts
Hawkins Pond	Private landowners and trusts
Hawkridge	Water companies
Hawley Lake	Other government agencies and departments
Haymill Balancing Pond	Environment Agency
Hazlewood	Farms
Headingley Reservoir	Water companies
Heapey No.1	Private landowners and trusts
Heapey No.2	Private landowners and trusts
Heapey No.3	Private landowners and trusts
Heaton Grange Reservoir 2	Water companies
Heaton Park	Water companies
Heaton Park Boating Lake	Local Authority
Heaton Park Open	Water companies

Heck Ings Reservoirs	Environment Agency
Hedgecourt Lake	Private landowners and trusts
Heigham Large Deposit Reservoir	Water companies
Hemlington Lake	Local Authority
Heron Bay Lagoon (was Lagoon D1)	Water companies
Herongate Reservoir 2	Water companies
Heronry Pond, Wanstead Park	Local Authority
Heronsgate No. 3 Reservoir	Water companies
Hessle Western Drain Flood Alleviation Scheme	Environment Agency
Heveningham Hall Lower Lake	Private landowners and trusts
Heveningham Hall Upper Lake	Private landowners and trusts
Hever Castle Lake	Private landowners and trusts
Hewell Grange	Other government agencies and departments
Hewenden	Water companies
Hewletts No.3	Water companies
Hexthorpe Washland	Environment Agency
High Bullough	Water companies
High Dam	Other government agencies and departments
High Fish Pond	Private landowners and trusts
High Maynard	Water companies
High Newton No.1	Water companies
High Park Lake	Other government agencies and departments
High Pond at Raby	Private landowners and trusts
High Rid	Water companies
High Warren No. 2	Water companies
High Wood	Water companies
Highams Park Lake	Local Authority
Highgate Park FSR	Environment Agency
Highgate Pond No.2	Local Authority
Highgate Pond No.3	Local Authority
Highlands Farm	Farms
Highmoor Drove	Farms
Hilfield Park	Water companies
Hilgay Wetland	Registered charities
Hill Cliffe	Water companies
Hill Farm 2 Tuddenham	Farms
Hill Farm Reservoir (Easton Estates)	Farms
Hill Farm Reservoir 2	Farms
Hill Farm, Tuddenham 1	Farms
Himley Hall Pool	Local Authority
Hirst Courtney and West Marsh Washland Reservoir	Environment Agency
Hisehope	Water companies
Hoads Hill No. 3	Water companies
Hockley Farm Reservoir	Farms
Hoddlesden	Water companies
Hodsock Priory Farm	Farms
Hogsbrook	Private landowners and trusts
Holbeam Wood	Environment Agency
Holbrook Fishponds	Private landowners and trusts
Holburn Lake	Farms
Holden Wood	Water companies
Holkham Estate Lake (Hall)	Private landowners and trusts
Holland Wood	Farms
Hollingworth Lake	Water companies
Hollow Road	Industrial and commercial
Hollowell	Water companies

Holly Bush Lake	Private landowners and trusts
Holly Heath Farm Reservoir	Farms
Holly Lodge Farm Reservoir	Farms
Holmer Farm Balancing Lake	Water companies
Holmestyes	Water companies
Holywell	Water companies
Home Farm (Longstanton)	Private landowners and trusts
Home Farm Irrigation Reservoir	Farms
Honey Pots (Field 6)	Farms
Honor Oak	Water companies
Hoober Reservoir	Water companies
Horbury Sailing Lake	Environment Agency
Horncastle reservoir	Environment Agency
Hornsey	Water companies
Horsbere Brook FAS	Environment Agency
Horse Coppice	Water companies
Horsehay Pool	Local Authority
Horsemoor Reservoir	Private landowners and trusts
Hothfield	Environment Agency
Houghton Regis Quarry (ID297)	Industrial and commercial
Houghton Washland Reservoir	Environment Agency
Howard's Farm Irrigation Reservoir (aka Bawtry Farm)	Farms
Howden	Water companies
Hoyle Mill	Private landowners and trusts
Hullgate Farm	Farms
Hundred Pool (ID40)	Private landowners and trusts
Hunston Reservoir	Farms
Hunstrete Lake	Other government agencies and departments
Hurcott Pool	Local Authority
Hurcott Upper Reservoir	Local Authority
Hurleston	Canal and River Trust
Hurst Drove	Other government agencies and departments
Hurstwood	Water companies
Hurworth Burn	Private landowners and trusts
Hury	Water companies
Hury Subsidiary	Water companies
Hutton Wandesley	Farms
Idless	Environment Agency
Ifield Mill Pond	Local Authority
Iken Reservoir	Farms
Ingbirchworth	Water companies
Ingham Place Farm Reservoir	Farms
Ingleborough Lake	Other government agencies and departments
Ingon Manor Reservoir (Snitterfield)(ID 29)	Farms
Intercommon Heath	Farms
Intermediate Pond	Industrial and commercial
Island Barn	Water companies
Ivy Lake	Water companies
Jennetts	Water companies
John O'Gaunts	Water companies
Johnson's Lake	Farms
Johnson's Pond	Other government agencies and departments
Jumbles	Water companies
Kedleston Park Lake No.1	National Trust
Kedleston Park Lake No.2	National Trust
Keens Farm Reservoir	Farms

Keighley Moor	Water companies
Keldgate No. 1	Water companies
Keldgate No. 2	Water companies
Kellington Ings Reservoir (aka Hensall Ings)	Environment Agency
Kemsley Mill Lagoon 1	Other government agencies and departments
Kennel Field Reservoir	Farms
Kennel Pond, Woodchester	National Trust
Kennick	Water companies
Kensington No.3	Water companies
Kentford Lakes No.1 (Upper)	Private landowners and trusts
Kentford Lakes No.2 (Lower)	Private landowners and trusts
Kentmere Head	Industrial and commercial
Kenwith	Environment Agency
Ketley Sands	Water companies
Ketsby Mill	Private landowners and trusts
Kidderminster Flood Storage Reservoir	Environment Agency
Kielder	Water companies
Killamarsh Washland	Environment Agency
Killington	Canal and River Trust
Killington	Other/unknown
Kiln Close Reservoir	Farms
Kiln Farm Flood Storage Reservoir	Private landowners and trusts
Kilnclough (Bottom Lodge)	Private landowners and trusts
Kilnclough (Top Lodge)	Private landowners and trusts
Kinder	Water companies
King George V	Water companies
King George VI	Water companies
Kings Farm Reservoir	Private landowners and trusts
King's Mill	Local Authority
Kingston Park Pond	Farms
Kingstons Reservoir (ID394)	Farms
Kirk Hall Farm	Farms
Kirkby-Great-Little Ings	Environment Agency
Kirkleatham	Water companies
Kirton Lodge Farm	Farms
Kitcliffe	Water companies
Knapp Mill	Water companies
Kneppmill Pond	Private landowners and trusts
Knighton	Canal and River Trust
Knighton Park FSR	Environment Agency
Knight's Farm Reservoir	Farms
Knipton	Canal and River Trust
Knockholt No. 2	Water companies
Knoll's Bridge	Environment Agency
Knottalow Tarn	Other government agencies and departments
Knypersley	Canal and River Trust
Kyre Pool	Private landowners and trusts
Ladderedge	Water companies
Ladies Pool	Private landowners and trusts
Ladybower	Water companies
Lady's Pond	Private landowners and trusts
Ladyseat Reservoir	Farms
Lagoon No. 4, Hope Works	Industrial and commercial
Lagoon No.3, Hope Works	Industrial and commercial
Lagoons 1 & 2 Hope Works	Industrial and commercial
Laindon Barnes	Environment Agency

Lake Hart	Private landowners and trusts
Lake Superior	Private landowners and trusts
Lakenheath	Registered charities
Lamaload	Water companies
Lamorbey Park FRR	Environment Agency
Lancaster Lake	Private landowners and trusts
Laneshaw	Water companies
Langford Raw Water	Water companies
Langham Raw Water	Water companies
Langley Dam	Private landowners and trusts
Langold Lake	Local Authority
Langsett	Water companies
Langsett	Water companies
Langthwaite	Water companies
Langworth Reservoir (Barlings) (ID175)	Farms
Lark Hill Reservoir	Farms
Larkshall Farm Reservoir	Farms
Latimer Lakes (Great Water)	Private landowners and trusts
Lavender (Leigh's Lower) Reservoir	Farms
Lawton Hall Lake	Private landowners and trusts
Lechmere Water	Private landowners and trusts
Lee Green Reservoir	Water companies
Leeds Castle Moat	Other government agencies and departments
Leeming	Water companies
Leeshaw	Water companies
Leg of Mutton (ID300)	Local Authority
Leigh	Water companies
Leigh Barrier (Medway) FSR	Environment Agency
Leigh Place Pond	Private landowners and trusts
Leighton	Water companies
Levers Water	Water companies
Leylandii Norton	Private landowners and trusts
Lifford Reservoir	Local Authority
Lightshaw Open Reservoir	Water companies
Lily Mere	Other/unknown
Linacre Lower	Water companies
Linacre Middle	Water companies
Linacre Upper	Water companies
Linden Lake	Private landowners and trusts
Lindley Wood	Water companies
Linnheads	Private landowners and trusts
Linton Ings	Environment Agency
Little Aston Pool	Private landowners and trusts
Little Borwick Fold Reservoir (ID66)	Private landowners and trusts
Little Braxted 1 (ID129)	Farms
Little Braxted No3 (ID321)	Farms
Little Cheyne Court (ID293)	Farms
Little Easton Reservoir	Private landowners and trusts
Little London Reservoir	Farms
Little Swinburne	Water companies
Little Testwood Lake	Water companies
Littleton Road FSR	Environment Agency
Livermere	Farms
Llanforda	Water companies
Lochinvar	Environment Agency
Locko Park Lake	Private landowners and trusts

Lockwood	Water companies
Lockwood Beck	Water companies
Lodge (Leigh's Upper) Reservoir	Farms
Lodge Farm	Local Authority
Lodge Farm (Penseroso Reservoir, Chicksands)	Farms
Lodge Farm Reservoir	Farms
Lodge Lake	Water companies
Lodge Pool	Water companies
Lodgerail Pool	Private landowners and trusts
Londesborough Park Lake	Private landowners and trusts
Long Meadow Reservoir	Farms
Long Newton New	Water companies
Long Newton Old	Water companies
Longham No. 2 Reservoir	Water companies
Longham Raw Water Storage Reservoir 1	Water companies
Longleat Forest Sports Lake	Private landowners and trusts
Longmoor Lake	Local Authority
Longmoor Pool	Local Authority
Longwood Compensation	Water companies
Longwood Lower	Water companies
Longwood Upper	Water companies
Lords Ground Farm Reservoir	Farms
Loscoe	Farms
Lostock 1	Water companies
Lostock No. 2 Reservoir	Water companies
Loughton Lake	Water companies
Louth Northern Reservoir	Environment Agency
Louth Southern Reservoir	Environment Agency
Low Santon Farm (ID169)	Farms
Lowcocks	Water companies
Lower Busbridge Lake	Farms
Lower Cannop Pond	Other government agencies and departments
Lower Chellow	Local Authority
Lower Coldwell	Water companies
Lower Compton Verney	Private landowners and trusts
Lower Drakeloe Pond	Private landowners and trusts
Lower East End Farm	Farms
Lower Fish Pond (Allerton Park Estate)	Private landowners and trusts
Lower Foulridge	Canal and River Trust
Lower Gammaton	Water companies
Lower Grounds	Farms
Lower Kilnhurst Washland	Environment Agency
Lower Laithe	Water companies
Lower Litton	Water companies
Lower Ormsgill	Local Authority
Lower Ripley Lake	Private landowners and trusts
Lower Slade	Water companies
Lower Swineshaw (Glossop)	Water companies
Lower Tamar	Water companies
Lower Woman's Way Pond	National Trust
Lowercroft Lower	Other/unknown
Lowercroft Middle	Other/unknown
Lowercroft Upper	Other/unknown
Lowther A (washland)	Environment Agency
Lowther B (washland)	Environment Agency
Lucerne Lake	Private landowners and trusts

Lulworth Lake	Other government agencies and departments
Lumley Moor	Water companies
Lunt Meadows	Environment Agency
Luton Hoo Lake Lower	Private landowners and trusts
Luton Hoo Lake Upper	Private landowners and trusts
Luxhay	Water companies
Lymm Dam	Local Authority
Lynemouth Power Station Ash Lagoon No. 4	Other government agencies and departments
Lyng Farm Reservoir (Thornham)	Farms
Lyng Quarry (Farm) (ID107)	Farms
Magpie Farm	Farms
Maiden Erlegh Lake (No.1)	Local Authority
Maiden Lane	Water companies
Main Lake, Eridge Park	Farms
Makin Fisheries Lake 1	Private landowners and trusts
Malham Tarn	National Trust
Mallards Mere	Private landowners and trusts
Mallory Park Large Lake	Private landowners and trusts
Maltby Grange	Water companies
Manley Mere	Private landowners and trusts
Manners Balancing Pond	Local Authority
Manns Walk Farm Reservoir	Farms
Manor Farm Reservoir	Farms
Manor Farm Reservoir (Bury St Edmunds)	Farms
Manor Farm Reservoir (West Bilney)	Farms
Manor Farm Reservoir, Middleton	Farms
Manor Pool (ID355)	Private landowners and trusts
Manton Bay Lagoon (was Lagoon D2)	Water companies
Manton Lane No 1 Reservoir	Farms
Manton Lane No. 2 Reservoir	Water companies
Mapperley	Local Authority
March Ghyll	Water companies
March Haigh	Canal and River Trust
Margaretting Hall	Other/unknown
Markeaton Reservoir (Mill Pond)	Local Authority
Markyate FSA	Environment Agency
Marlbrook Quarry Landfill	Private landowners and trusts
Marsh Farm Bund (Ross-on-Wye FSR)	Local Authority
Marsh Leys Farm - Pond D2	Local Authority
Marshland Farm Reservoir	Farms
Marske (ID223)	Private landowners and trusts
Marston Pond	Farms
Marsworth	Canal and River Trust
Martin Moor - East Reservoir	Private landowners and trusts
Marton Mere	Local Authority
Mashbury Hall Farm	Farms
Meadowgate & Nethermoor Lakes	Environment Agency
Medbourne Flood Storage Reservoir	Environment Agency
Melbourne Pool	Other government agencies and departments
Melbury	Water companies
Melbury Lake	Private landowners and trusts
Meldham Washland	Environment Agency
Meldon	Water companies
Mells Park Lower Lake	Private landowners and trusts
Mells Park Upper Lake	Private landowners and trusts
Meltham Mills	Private landowners and trusts

Melton Constable Lake	Farms
Merevale Park Estate	Private landowners and trusts
Meriden No. 1	Water companies
Meriden No.2	Water companies
Meriden No.3	Water companies
Methwold Wetland	Registered charities
Mickletown Washland	Environment Agency
Middle Farm Winter Storage	Farms
Middle Pond, Woodchester	National Trust
Middle Pool	Water companies
Middle Water - Ugbrooke Park	Private landowners and trusts
Middlethorpe Ings	Environment Agency
Middleton Hall Lake	Private landowners and trusts
Midhope	Water companies
Milford Lake	Private landowners and trusts
Milford-on-Sea	Environment Agency
Mill Beck Balancing Pond (ID 316)	Environment Agency
Mill Dam Beaulieu	Other government agencies and departments
Mill Lakes	Local Authority
Mill Leese Flood Storage Reservoir	Environment Agency
Mill Lodge Reservoir	Other/unknown
Mill Pond Balancing Res.	Water companies
Mill Pond, Lurgashall	Private landowners and trusts
Mill Pool	Private landowners and trusts
Mill Shrub Pool	Canal and River Trust
Mirelake Reservoir 1	Private landowners and trusts
Mirelake Reservoir 2	Private landowners and trusts
Misson East FSA	Environment Agency
Misson West FSA	Environment Agency
Mitcheldean	Water companies
Mitchells House No.1	Water companies
Mitchells House No.2	Water companies
Mitford Flood Storage Reservoir (Morpeth FSR)	Environment Agency
Mixenden	Water companies
Mizzy Dam	Other government agencies and departments
Molands, Packington	Private landowners and trusts
Monk Bretton	Water companies
Monk Lake 2 (aka Riverfield)	Farms
Monkswood	Water companies
Montagu Recreation Ground	Environment Agency
Montrey Reservoir	Water companies
Moorgreen	Canal and River Trust
Moorland Stud Farm Reservoir	Farms
Morehall	Water companies
Morghew Farm Reservoirs	Private landowners and trusts
Mortfield	Local Authority
Morton Grange	Farms
Moseley's Farm Reservoir	Farms
Moss Eccles Tarn	National Trust
Mote Park Lake (ID398)	Local Authority
Mullens Farm (ID277)	Farms
Mytchett Lake	Local Authority
Nacton Home Farm Reservoir (ID138)	Farms
Naden Higher	Water companies
Naden Middle	Water companies
Nanpantan	Water companies

Napton	Canal and River Trust
Narford Lake	Private landowners and trusts
Naseby	Canal and River Trust
Nelly's Moss North	National Trust
Nelly's Moss South	National Trust
New Barn Reservoir	Farms
New Cut Washland	Environment Agency
New Mill	Environment Agency
New Pond (Battle Abbey)	Other government agencies and departments
New Pool, Badger Hall	Private landowners and trusts
New Pool, Shrawley	Private landowners and trusts
New Waters, Warwick Castle	Private landowners and trusts
New Years Bridge	Water companies
Newdale Brook Flood Detention Pond	Other government agencies and departments
Newington Reservoir	Industrial and commercial
Newmillerdam	Local Authority
Newstead Abbey Upper Lake	Local Authority
Newton Park Upper Lake	Other government agencies and departments
Nieuport House Lake	Private landowners and trusts
No.1 & 2 Lagoons (Hillhouse)	Private landowners and trusts
Norman Hill	Water companies
North Hykeham Sailing Lake	Industrial and commercial
North Ings Washland	Environment Agency
North Lake Cantley	Industrial and commercial
Northampton Washlands	Environment Agency
Northfield	Water companies
Northumberland Heath Reservoir	Water companies
Northwood Lagoon	Private landowners and trusts
Norton Fitzwarren Dam	Private landowners and trusts
Norton Mere	Other government agencies and departments
Norwood	Water companies
Nostell Priory Lower Lake	National Trust
Nostell Priory Middle Lake	National Trust
Nostell Priory Upper Lake	Private landowners and trusts
Nunhead Lower	Water companies
Nunhead Upper	Water companies
Nutscale	Water companies
Oakleigh (ID289)	Farms
Obelisk Pond	Other government agencies and departments
Ogden	Water companies
Ogden (Milnrow)	Water companies
Ogden Haslingden	Water companies
Ogden Lower	Water companies
Ogden Upper	Water companies
Ogston	Water companies
Oil Well Reservoir (ID180)	Farms
Old Alresford Pond	Private landowners and trusts
Old Bury Hill Lake	Farms
Old Denaby Washland	Environment Agency
Old Mill	Water companies
Old Moor Washland	Environment Agency
Old Warden Park	Farms
Oldbury No.1	Water companies
Oldbury No.2	Water companies
Oldbury Power Station	Industrial and commercial
Olton	Canal and River Trust

Orchardleigh	Private landowners and trusts
Ormesby Reservoir (Wharton Farms)	Farms
Ormesby Subsidence	Water companies
Ornamental Water, Wanstead Park	Local Authority
Osborne's Pond	Local Authority
Osmaston Farm Lake	Private landowners and trusts
Osmaston Manor Lake	Private landowners and trusts
Osterley Lower Lake (ID 309)	Private landowners and trusts
Osterley Middle Lake	National Trust
Otby Farm	Private landowners and trusts
Otmoor Phase 1	Registered charities
Otmoor Phase 2	Registered charities
Oulston	Local Authority
Ouse Washes FSA	Environment Agency
Overstone Lower (Pike Pond)	Industrial and commercial
Overstone Park Lake	Industrial and commercial
Overstone Upper Pond	Industrial and commercial
Overwater	Water companies
Overwater Marina	Private landowners and trusts
Oxhey Woods Reservoir	Water companies
Pagham Reservoir	Farms
Painshill Park Lake	Private landowners and trusts
Palmer's Dam (Harbertonford FSA)	Environment Agency
Panorama	Water companies
Park Dam	Local Authority
Park Farm Reservoir	Farms
Park Farm, Stoneleigh	Farms
Park Lake - Gamlingay (ID388)	Private landowners and trusts
Park Lane 1 (ID122)	Farms
Park Meadow, Packington	Private landowners and trusts
Park Mill Pond	Private landowners and trusts
Park Pool, Weston Park	Other government agencies and departments
Park Reservoir	Farms
Parkmill Pond, Woodchester	National Trust
Parkwood Farm Reservoir	Other government agencies and departments
Parsonage	Water companies
Patshull Church Pool	Private landowners and trusts
Patshull Great Pool	Private landowners and trusts
Peatmoor Reservoir	Local Authority
Pebley	Canal and River Trust
Pembury	Water companies
Pen Pond Lower Lake, Richmond	Other government agencies and departments
Pen Pond Upper Lake	Other government agencies and departments
Pendigo Lake	Private landowners and trusts
Pennington	Water companies
Penns Hall Lake	Private landowners and trusts
Penwortham Mill Lodge (ID 63)	Private landowners and trusts
Perch Pond, Wanstead Park	Local Authority
Perry Barr	Water companies
Perry Hall Playing Fields Flood Detention Reservoir	Environment Agency
Perry Pool	Local Authority
Perrymoor Reservoir	Environment Agency
Petworth Lower Pond	National Trust
Petworth Upper Pond	National Trust
Pex Hill No.2	Water companies
Pex Hill No.3	Water companies

Pickering Flood Storage Reservoir	Environment Agency
Pickup Bank	Water companies
Piethorne	Water companies
Piggeries Field, Ikburgh	Farms
Pilsworth Reservoir	Private landowners and trusts
Pinkworthy Pond	Other government agencies and departments
Pioneer and Severalls Farm Reservoir	Farms
Pipps Hill Washland (Festival Leisure Park)	Private landowners and trusts
Pirton Pool	Private landowners and trusts
Pitsea Leachate Lagoon	Industrial and commercial
Pitsford	Water companies
Pitt Dene	Farms
Plashett Park, Upper Lake	Other government agencies and departments
Plenty Brook	Water companies
Plumpton Rocks Reservoir	Private landowners and trusts
Poaka Beck	Water companies
Podmore Pool (Broadwater)	Private landowners and trusts
Pond Lye	Private landowners and trusts
Pond M (Gatwick Airport)	Industrial and commercial
Ponden	Water companies
Pondersbridge	Farms
Ponsonby Tarn	Industrial and commercial
Pool Hall	Farms
Poolmead Reservoir	Environment Agency
Pool's Farm (ID212)	Private landowners and trusts
Poolsbrook Country Park Lake (Ireland Colliery)	Local Authority
Poolsbrook Washland Reservoirs	Environment Agency
Porth	Water companies
Possingworth Park Lake	Farms
Potter Heigham Reedbed Reservoir	Registered charities
Powdermill	Water companies
Powells Pool	Local Authority
Powers Hall	Farms
Poynton Pool	Local Authority
Prescot No. 5	Water companies
Prescot No.3	Water companies
Prescot No.4	Water companies
Press No.3 (Upper)	Private landowners and trusts
Preston Storm Tank	Industrial and commercial
Preston's Lake	Private landowners and trusts
Prince Edward Playing Fields FSA	Environment Agency
Priorslee Balancing Lake	Water companies
Priorslee Flash	Local Authority
Pucklechurch	Water companies
Pugneys Washland	Environment Agency
Purbrook Regulating Reservoir	Water companies
Purton No 1	Water companies
Purton No 2	Water companies
Putney Hill Farm No. 1 (ID361)	Farms
Putney Hill Farm No. 2	Farms
Putney Reservoir (Cells A & B)	Water companies
Putney Reservoir (Cells C & D)	Water companies
Quadring Reservoir (ID177)	Farms
Quarlton Vale	Private landowners and trusts
Quebec Farm	Private landowners and trusts
Queen Elizabeth II	Water companies

Queen Mary	Water companies
Queen Mother	Water companies
Queensmere	Private landowners and trusts
R G Abrey Millenium Reservoir	Private landowners and trusts
Rackers Meadow	Farms
Radlett Brook FSA	Environment Agency
Radnor Mere	Industrial and commercial
Raft Pond Bardney	Industrial and commercial
Ragdale	Water companies
Ragley Hall Lake	Private landowners and trusts
Rakebrook	Water companies
Ramsbury Manor Lake	Private landowners and trusts
Ramsden	Water companies
Ramsden Clough (Ramsden Wood)	Water companies
Ramsden Wood	Water companies
Ramsgreave	Water companies
Randymere	Water companies
Ratcliffe on Soar Ash Lagoons	Industrial and commercial
Rattlesden Flood Reservoir	Environment Agency
Ravensthorpe	Water companies
Rawcliffe Ings Washland Reservoir	Environment Agency
Rawdales Reservoir	Local Authority
Rayburn Lake	Private landowners and trusts
Raywell Reservoir	Water companies
Reaches Farm	Farms
Readycon Dean	Water companies
Redbourn Road Reservoir	Water companies
Redbrook	Canal and River Trust
Reddish Vale (ID266)	Local Authority
Redesmere	Private landowners and trusts
Redgrave Park	Private landowners and trusts
Redgrave Pinsent Rowing Lake	Registered charities
Redmere	Farms
Redmere No.2	Farms
Redmires Lower	Water companies
Redmires Middle	Water companies
Redmires Upper	Water companies
Redwalls Lower (ID283)	Farms
Redwalls Upper (ID369)	Farms
Reeders Resevoir	Farms
Reservoir At Isleham (Willow Farm)	Farms
Reva	Water companies
Revesby	Farms
Rhodes Lodge - Big Pond (ID256)	Local Authority
Rhodeswood	Water companies
Ridgegate	Water companies
Ridgehanger	Private landowners and trusts
Riding Wood	Water companies
Ridings Brook, Cannock (Mill Green)	Environment Agency
Ridlins Wood FSA	Environment Agency
Ringstone	Water companies
Ringwood Lake	Local Authority
Riseholme Lake (ID17)	Other government agencies and departments
Rishton	Canal and River Trust
Rivelin	Water companies
Rivelin Depositing Pond	Water companies

Rivelin Lower	Water companies
Rivelin Upper	Water companies
River Farm Reservoir	Farms
River Nar Flood Storage Area	Environment Agency
River Park Pond	Private landowners and trusts
River Rase North Branch	Environment Agency
River Rase South Branch	Environment Agency
River Till Washlands	Environment Agency
River Wang Marshes	Registered charities
River Wid Flood Storage Area	Environment Agency
River Witham Flood Washlands	Environment Agency
Rivington Lower	Water companies
Rivington Upper	Water companies
Road Lake	Other/unknown
Roadford	Water companies
Robson's Cottage Reservoir	Local Authority
Roddlesworth Lower	Water companies
Roddlesworth Upper	Water companies
Rode Pool	Private landowners and trusts
Rolleston Lake	Private landowners and trusts
Roman Bridge	Private landowners and trusts
Rooden	Water companies
Rooktree Farm (Summerfields)	Farms
Roosthole Pond	Private landowners and trusts
Rosedene Reservoir No 1	Farms
Rosedene Reservoir No. 2	Farms
Rosehill Lake	Private landowners and trusts
Rother Valley Country Park, Main Lake	Local Authority
Rotherdale Farm	Farms
Rothley East Lake	Private landowners and trusts
Rothley Lake South	National Trust
Rotton Park	Canal and River Trust
Roundhill	Water companies
Rowe's Flashe Lake - Winkworth Arboretum	National Trust
Rowley Lake	Local Authority
Royd Moor	Water companies
Rudyard	Canal and River Trust
Rufford Lake	Local Authority
Rugeley Amenity Lake	Industrial and commercial
Rugeley Ash Lagoon 4LH	Industrial and commercial
Rugeley Ash Lagoon 4RH	Industrial and commercial
Rugeley Cooling Tower Ponds 6-9	Industrial and commercial
Rugeley Hagley Park FSR	Environment Agency
Ruislip Lido	Local Authority
Rumworth	Water companies
Rushbrook Farm	Farms
Rushbrooke Farm Reservoir	Private landowners and trusts
Rushmere Farm Reservoir	Farms
Russell Hill	Water companies
Rutland Lagoon No. 5 (Lagoon C1)	Water companies
Rutland Lagoon No. 7 was Rutland Water Mitigation Lagoon C2	Water companies
Rutland Lagoon No. 8 (Lagoon C3)	Water companies
Rutland Lagoon No.4 - was Rutland Water Mitigation Lagoon B	Water companies
Rutland Water, Empingham	Water companies
Rutlands Farm Winter Storage Reservoir	Farms
Ryburn	Water companies

Rycote Park Lake	Private landowners and trusts
Rye Hill No.2	Water companies
Rye Meads Lagoons 10, 12, 14 & 16	Water companies
Rye Meads Lagoons 11, 13, 15 & 17	Water companies
Sacrewell	Other government agencies and departments
Sacrewell	Other government agencies and departments
Saddington	Canal and River Trust
Saintbridge Balancing Pond 1	Environment Agency
Saintbridge Balancing Pond 2	Environment Agency
Sale Ees FSR	Environment Agency
Salford Reservoir	Local Authority
Saltholme No.1 Brine Reservoir	Industrial and commercial
Saltholme No.2 Brine Reservoir	Industrial and commercial
Saltholme No.3 Brine Reservoir	Industrial and commercial
Sandbeck Park (Lower Lake)	Private landowners and trusts
Sandbeck Park (Upper Lake)	Private landowners and trusts
Sandhill	Local Authority
Sandhurst Lower Lake	Other government agencies and departments
Sandhurst Upper Lake	Other government agencies and departments
Sandwell Valley Storage Lake	Environment Agency
Sarsden Lake	Private landowners and trusts
Scalford Brook Reservoir	Environment Agency
Scaling	Water companies
Scammonden	Water companies
Scar House	Water companies
Scargill	Water companies
Scotland Pond (Castle Ashby)	Private landowners and trusts
Scott's House Lake	Private landowners and trusts
Scout Dyke	Water companies
Scout Moor	Water companies
Searle's Lake	Private landowners and trusts
Searsons Farm Reservoir.	Other/unknown
Seathwaite Tarn	Water companies
Seaton Reservoir	Water companies
Sedgley Beacon Northern	Water companies
Sedgley Beacon Southern	Water companies
Seeswood Pool	Local Authority
Sefton Park Lake	Local Authority
Selset	Water companies
Serpentine	Other government agencies and departments
Serpentine Lake	Private landowners and trusts
Serpentine.	Local Authority
Settling Ponds Queen Adelaide	Farms
Seven Acre Lake	Private landowners and trusts
Sewardstone Green	Water companies
Shadwell Park Lake	Farms
Shadwell Pool	Private landowners and trusts
Shakerley Mere	Local Authority
Shardeloes	Private landowners and trusts
Shavers End No.2	Water companies
Shearwater Lake	Private landowners and trusts
Sheeplands Farm	Private landowners and trusts
Sheepwash Country Park	Environment Agency
Sheerland Farm Dam	Farms
Shelve Pool	Farms
Sherborne Lake	Private landowners and trusts

Sherwood Forest Lake	Private landowners and trusts
Shifnal Reservoir (ID216)	Farms
Shipley Lake	Local Authority
Shobrooke Park Lake	Private landowners and trusts
Shore Top	Private landowners and trusts
Shornden	Local Authority
Shoulder of Mutton Pond	Private landowners and trusts
Shrub Farm	Farms
Shrubbery Lake	Private landowners and trusts
Shrubbs Farm Reservoir (ID395)	Farms
Shustoke Lower	Water companies
Shustoke Upper	Water companies
Siblyback	Water companies
Silsden	Water companies
Simmonds Hill	Water companies
Simpson Balancing Reservoir	Water companies
Simpson Ground	Water companies
Sir Edward's Lake	Private landowners and trusts
Siward's How	Water companies
Sixty Million Gallon Reservoir	Private landowners and trusts
Sizewell Walks	Farms
Skeckling Drain Floodbank	Environment Agency
Skelton Grange Washland	Environment Agency
Skipton Washland	Environment Agency
Slade Brook Balancing Reservoir	Local Authority
Slade Upper	Water companies
Slaithwaite	Canal and River Trust
Slaugham Mill Pond	Private landowners and trusts
Sleapford (Eyton) (ID211)	Private landowners and trusts
Slipper Hill	Canal and River Trust
Smallburgh Reservoir	Farms
Smiddy Shaw	Water companies
Snailsden	Water companies
Snaith Ings	Environment Agency
Snarehill Farm Reservoir	Farms
Sneyd Reservoir ID220	Local Authority
Soigne Reservoir	Industrial and commercial
Sotterley Farm Reservoir	Farms
South Benfleet FSR	Environment Agency
South Farm No. 2	Farms
South Farm Reservoir No1	Private landowners and trusts
South Hill	Water companies
South Lackenby	Water companies
South Lake Cantley	Industrial and commercial
South Lake Reservoir	Environment Agency
South Norwood	Local Authority
South Perrott Reservoir	Environment Agency
South Pickenham	Farms
Southend Farm No. 2	Farms
Southend Farm Reservoir No. 3 (ID386)	Farms
Southfield	Canal and River Trust
Southill Park Lake	Private landowners and trusts
Southlake	Local Authority
Southwick Park Lake	Industrial and commercial
Sowley Pond	Farms
Spade Mill No.1	Water companies

Spade Mill No.2	Water companies
Sparth	Canal and River Trust
Spout Lane Lagoon	Industrial and commercial
Spring Farm	Farms
Spring Gardens (Spring Mill Wildlife Dam)	Environment Agency
Spring Lodge Methwold	Farms
Spring Mill	Water companies
Springs	Water companies
Springslade Pool	Private landowners and trusts
Sprotborough A (washland)	Environment Agency
Sprotborough B (washland)	Environment Agency
Squabmoor	Water companies
St Aidan's (was Swillington)	Environment Agency
St Blazey	Environment Agency
Stackpool	Local Authority
Stafford Moor No 1 Winkleigh	Private landowners and trusts
Stafford Moor No 2 Winkleigh	Private landowners and trusts
Staincliffe	Water companies
Staines North	Water companies
Staines South	Water companies
Stamford Park Lake	Local Authority
Standalone Farm Flood Reservoir	Other government agencies and departments
Stanford	Water companies
Stanford Water	Other government agencies and departments
Stanley	Canal and River Trust
Stannetts Creek Lagoon	Water companies
Stanton Park Lake	Local Authority
Stanton's Farm	Farms
Stapleford Lake	Private landowners and trusts
Staples Road FSR	Environment Agency
Starmount Lodge	Local Authority
Starnhill Farm	Farms
Startop's End	Canal and River Trust
Staunton Harold	Water companies
Stewartby Lake	Other government agencies and departments
Sticking Hill Reservoir	Farms
Stickle Tarn	Other government agencies and departments
Stithians	Water companies
Stocklake Flood Storage	Environment Agency
Stocks	Water companies
Stoke Newington (East)	Water companies
Stoke Newington (West)	Local Authority
Stoke Park - Eastern	Water companies
Stoke Park - Thunderbridge	Water companies
Stoke Park Lower Lake	Local Authority
Stoke Park Upper Lake	Other government agencies and departments
Stokewood	Water companies
Stoneham Park Pond	Private landowners and trusts
Stoney Wood FSA	Environment Agency
Stony Hills	Farms
Stover Park Lake	Local Authority
Stow Bardolph No. 1 (ID106)	Other/unknown
Stowbridge Farm Reservoir	Farms
Stowe Landscape Gardens, Octagon Lake	National Trust
Stowe Park Eleven Acre	National Trust
Stowe Pool	Local Authority

Stowlangtoft Waters	Farms
Stradsett Lake	Private landowners and trusts
Strelley	Water companies
Strines	Water companies
Stubden	Water companies
Studley Royal Lake	National Trust
Style Place Farm	Farms
Styperson Pool	Private landowners and trusts
Sudbury Lake	Private landowners and trusts
Sugarbrook	Water companies
Sulby	Canal and River Trust
Sun Paper Mill	Other/unknown
Sunderton Pool	Private landowners and trusts
Sundon Reservoir	Water companies
Sunnydale	Water companies
Surrenden Lower Lakes (Bethersden)	Private landowners and trusts
Surrey Hill	Water companies
Sutcliffe Park Flood Detention Area	Environment Agency
Sutton	Canal and River Trust
Sutton Bingham	Water companies
Sutton Hall	Water companies
Sutton Heath	Farms
Sutton Hoo New	Farms
Sutton Lawn Dam	Local Authority
Sutton Mill	Local Authority
Sutton Place Lake	Private landowners and trusts
Swan Pool.	Local Authority
Swanage No.1 Flood Detention Reservoir	Environment Agency
Swanage No.2 Flood Detention Reservoir	Environment Agency
Swanbourne Lake	Private landowners and trusts
Swangey Farm Reservoir	Farms
Swanley Bridge Marina	Private landowners and trusts
Swanshurst Pool	Local Authority
Sweethope Lough (Great)	Private landowners and trusts
Sweethope Lough (Little)	Private landowners and trusts
Swellands	Canal and River Trust
Swinden No.1	Water companies
Swinden No.2	Water companies
Swineshaw Higher	Water companies
Swineshaw Lower (Stalybridge)	Water companies
Swinfen Lake	Private landowners and trusts
Swinsty	Water companies
Swiss Lake	Other government agencies and departments
Swithland	Water companies
Sydmonton Court Lake	Private landowners and trusts
Symonds Farm	Farms
Syston Park Lake	Farms
Sywell	Local Authority
Tabley Mere	Other government agencies and departments
Tadcaster, Hackenby, North Ings and Cock Beck	Environment Agency
Tardebigge	Canal and River Trust
Tarn Hows	National Trust
Tatton Park Mere	Local Authority
Taylor Park Big Dam	Local Authority
Teggsnose	Water companies
Temple Lake	Private landowners and trusts

Temple Lake.	Private landowners and trusts
Ten Acres	Water companies
Tewkes Creek	Environment Agency
Thacka Beck FSR	Environment Agency
Thame Park Lake	Private landowners and trusts
Thanet Earth No. 2	Private landowners and trusts
Thanet Earth No. 3	Farms
Thanet Earth No. 5	Farms
Thanet Earth No. 6	Farms
Thanet Earth No. 7	Farms
The Avenue Flood Storge Reservoir	Environment Agency
The Basin, Wanstead	Private landowners and trusts
The Big Pool (Shavington)	Private landowners and trusts
The Broadwater	Private landowners and trusts
The Lake Abbey Wood	Private landowners and trusts
The Lake at Fountain Court, Bramshaw	Private landowners and trusts
The Large Lake, The Vyne	National Trust
The Mere	Private landowners and trusts
The Monks Pond	Private landowners and trusts
The Old Wood (Betley Hall)	Private landowners and trusts
The Ringles	Farms
The Tarn	Private landowners and trusts
The Warrells	Private landowners and trusts
Thirlmere	Water companies
Thoresby Lake (Upper)	Private landowners and trusts
Thorington Street	Other government agencies and departments
Thornage (ID154)	Farms
Thorncliffe Road	Water companies
Thornton	Water companies
Thornton Moor	Water companies
Thornton Steward	Water companies
Thorpe and Asgarby Estate Reservoir	Farms
Thorpe Malsor	Private landowners and trusts
Thorpe Marsh Reservoir	Environment Agency
Thorpe Marsh Silt Settling	Private landowners and trusts
Thrum Hall Victoria	Water companies
Thruscross	Water companies
Thrybergh	Local Authority
Thursley Lake	Private landowners and trusts
Thurstonfield Lough.	Farms
Tidal Hill Farm Reservoir	Farms
Tilbury Flood Storage	Environment Agency
Tilgate Lake	Local Authority
Timsbury Lake	Private landowners and trusts
Tithe Farm Reservoir	Farms
Titley Pool	Registered charities
Tittesworth	Water companies
Tixall Park Pool	Private landowners and trusts
Tockenham	Other/unknown
Toddbrook	Canal and River Trust
Toft Newton	Environment Agency
Tongwell Lake	Water companies
Top Barn Activity Lake (Windsurfing Lake)	Other/unknown
Top Lodge (Barrow)	Farms
Top Strong Land	Farms
Tophill Low No. 1	Water companies

Tophill Low No. 2	Water companies
Torr Works Balancing Reservoir	Industrial and commercial
Torside	Water companies
Tortworth Lake	Private landowners and trusts
Tottiford	Water companies
Towcester Flood Storage Reservoir	Environment Agency
Toyota Wet and Flood Balancing Lake	Industrial and commercial
Treesmill Stream	Environment Agency
Treeton	Environment Agency
Trench Pool	Canal and River Trust
Trenchford	Water companies
Trent Park Lake	Local Authority
Trentabank	Water companies
Trentham Gardens Lake	Private landowners and trusts
Trimley Marshes	Registered charities
Trimpley	Water companies
Trimpley Sludge Lagoon	Water companies
Tringford	Canal and River Trust
Trinity Hall Farm Reservoir	Farms
Trittiford Mill Pool	Local Authority
Tubbs Bottom Washland	Environment Agency
Tuesley Farm Reservoir	Private landowners and trusts
Tull Way Flood Alleviation Bund	Local Authority
Tumbleton Lake	National Trust
Tundry Pond	Private landowners and trusts
Tunnel End	Canal and River Trust
Tunstall	Water companies
Turners Paddock Lake	National Trust
Tusmore Park Lake	Farms
Twenty Acre Pond	Industrial and commercial
Tye Farm Reservoir	Farms
Ulley	Local Authority
Ulverston Canal	Private landowners and trusts
Underbank	Water companies
Upcott Pool	Local Authority
Updown Farm	Private landowners and trusts
Upper Chellow	Local Authority
Upper Compton Verney	Registered charities
Upper Foulridge	Canal and River Trust
Upper Gammaton	Water companies
Upper Green Hows Tarn	Private landowners and trusts
Upper Hartleton Farm Reservoir	Private landowners and trusts
Upper Kilnhurst Washland	Environment Agency
Upper Lake (Witley Park)	Private landowners and trusts
Upper Litton	Water companies
Upper North Pond	Farms
Upper Ripley Lake	Private landowners and trusts
Upper Tamar	Water companies
Upper Woman's Way Pond	National Trust
Upton Farm	Farms
Upton Farm Reservoir	Farms
Upton North (Phase 1 & 2)	Other government agencies and departments
Upton South (Phase 3)	Other government agencies and departments
Vachery Pond	Private landowners and trusts
Valehouse	Water companies
Valentines Park Lake	Local Authority

Valley Farm Boyton	Farms
Vann Lake	Registered charities
Venford	Water companies
Ventnor Marina - Sunrise Basin	Other/unknown
Vicarage Farm	Private landowners and trusts
Victoria	Water companies
Village Farm Reservoir	Private landowners and trusts
Virginia Water	Other government agencies and departments
Wadhurst Park Lake	Other government agencies and departments
Wadsley	Water companies
Wakefield Lodge	Private landowners and trusts
Walcot Pool	Private landowners and trusts
Walkerwood	Water companies
Wall End	Industrial and commercial
Waller Hill Flood Storage Reservoir	Environment Agency
Walshaw Dean Lower	Water companies
Walshaw Dean Middle	Water companies
Walshaw Dean Upper	Water companies
Walthamstow No.4	Water companies
Walthamstow No.5	Water companies
Walton - Bessborough	Water companies
Walton - Knight	Water companies
Walton Dam	Private landowners and trusts
Walton Hall	Private landowners and trusts
Walton Hall Lake	Private landowners and trusts
Walton No.1	Water companies
Walton No.2	Water companies
Walverden	Water companies
Walves	Other/unknown
Warbreck	Water companies
Ward's (Blue Lagoon)	Private landowners and trusts
Warford Pool	Private landowners and trusts
Warland	Water companies
Warley Moor	Water companies
Warnham Mill Pond	Environment Agency
Warren Chase Water	Farms
Warren Farm Beachamwell	Farms
Warren Gun Breck	Farms
Warren Lodge Farm	Farms
Washing Pool (ID41)	Private landowners and trusts
Washlands FSA	Environment Agency
Washpits Reservoir	Private landowners and trusts
Waskerley	Water companies
Water Heyes (River Douglas) Flood Alleviation Basin	Environment Agency
Water Sheddles	Water companies
Waterden Reservoir	Farms
Watergrove	Water companies
Waterloo Lake	Local Authority
Waverley Flood Detention Reservoir	Private landowners and trusts
Wayoh	Water companies
Weecher	Water companies
Weedon Flood Storage Reservoir	Environment Agency
Weeton	Water companies
Weigall Road Flood Storage Area	Environment Agency
Weirton Hill	Private landowners and trusts
Weirwood	Water companies

Weldon Flood Storage Reservoir	Environment Agency
Welford	Canal and River Trust
Wellington Country Park Lake	Private landowners and trusts
Welton Cliff East	Farms
Welton Cliff West	Farms
Wentworth Park - Dog Kennel Pond	Other government agencies and departments
Wentworth Park - Mill Dam	Other government agencies and departments
Wentworth Park - Morley Pond	Other government agencies and departments
Wessenden Head	Water companies
Wessenden Old	Water companies
West Canvey Marsh Reservoir	Registered charities
West Cherwell Flood Storage Area	Water companies
West Country Water Park	Other government agencies and departments
West Moor Reservoir	Environment Agency
West Park and Harrington Drain FSR	Environment Agency
West Riding Quarry	Environment Agency
West Warwick	Water companies
West Wycombe Lake	National Trust
Westbeck Lake	Farms
Westby	Water companies
Westford Flood Storage Reservoir	Environment Agency
Weston Hills	Water companies
Weston Turville	Canal and River Trust
Weston-Super-Mare Strategic Flood Storage Superpond	Other government agencies and departments
Westwood	Local Authority
Westwood Great Pool	Private landowners and trusts
Wet Moor Reservoir	Environment Agency
Wet Sleddale	Water companies
Wharford Farm Balancing Lake	Local Authority
Wharncliffe	Private landowners and trusts
Wheal Jewell (aka Mary Tavy)	Water companies
Whinfell Forest	Private landowners and trusts
Whinny Gill	Water companies
Whins Pond (ID70)	Private landowners and trusts
Whitacre	Water companies
White Man's Dam	Other government agencies and departments
White Water	Registered charities
Whitebridge Farm Reservoir	Farms
Whitehill Flood Storage Area	Water companies
Whiteholme	Water companies
Whiteknights Lake	Private landowners and trusts
Whitemoor	Canal and River Trust
Whitevane Pond	Private landowners and trusts
Whitewater Lagoon	Private landowners and trusts
Whitley	Water companies
Whittle Dene Lower	Water companies
Whittle Dene Northern	Water companies
Whittle Dene Western	Water companies
Whittle Dene, Great Northern	Water companies
Whittle Dene, Great Southern	Water companies
Whittlesey (Nene) Washes Flood Storage Area Reservoir	Environment Agency
Whittlesey Covered Anaerobic Lagoon	Industrial and commercial
Whitwood Washland	Environment Agency
Whorley Reservoir	Water companies
Wick Lane Reservoir	Other government agencies and departments
Wicksteed Park Lake	Private landowners and trusts

Widdop	Water companies
Wilderness Lake	Private landowners and trusts
Wildlife Pond	Environment Agency
Willen Lake	Water companies
Willes Meadow	Water companies
Willesley Lake	Private landowners and trusts
Willey Park - Lower Pool	Private landowners and trusts
Willey Park - Middle Pool	Private landowners and trusts
Willey Park - Upper Pool	Private landowners and trusts
William Girling	Water companies
Williamthorpe Lagoon	Local Authority
Willington	Local Authority
Willow Park Lake	Local Authority
Wilstone	Canal and River Trust
Wimbleball	Water companies
Wimbledon Park Lake	Local Authority
Wimpole Hall Estate	National Trust
Windleden Lower	Water companies
Windleden Upper	Water companies
Windmill Pool	Private landowners and trusts
Wingerworth Lido	Local Authority
Winscar	Water companies
Winterburn	Canal and River Trust
Wintersett	Farms
Wiremill Lake	Private landowners and trusts
Wishing Tree	Water companies
Wissington No.1 (Duck) Pond	Industrial and commercial
Wissington No.2 Pond (Storage Lagoon)	Industrial and commercial
Wissington No.3 (Wildes Pond)	Industrial and commercial
Wistlandpound	Water companies
Witcombe No.1	Water companies
Witcombe No.2	Water companies
Witcombe No.3	Water companies
Withens Clough	Water companies
Withins	Other/unknown
Withnell	Private landowners and trusts
Withy Pool Reservoir	Local Authority
Witley Court Reservoir	Other government agencies and departments
Witton Lake	Local Authority
Woburn Forest Reservoir	Private landowners and trusts
Woburn Road Wetlands - Pond E	Local Authority
Wollaton Park Lake	Local Authority
Wolsey Creek Marshes	Registered charities
Wolterton Lake	Private landowners and trusts
Wombwell Ings (washland)	Environment Agency
Wood Lane Reservoir	Farms
Woodford Forest Reservoir	Water companies
Woodgate Hill 1	Water companies
Woodgate Hill 2	Water companies
Woodhead	Water companies
Woodhouse Mill Washland	Environment Agency
Wootton Pool	Private landowners and trusts
Wormleighton	Canal and River Trust
Wormstalks	Farms
Worsbrough	Local Authority
Worth Farm FSR	Environment Agency

Worthington	Water companies
Wotton Park Lake	Private landowners and trusts
Wraysbury	Water companies
Wrenthorpe Park Reservoir	Environment Agency
Wrightington New Pond	Private landowners and trusts
Wychall	Environment Agency
Wychdell FSA	Environment Agency
Wyken Hall Reservoir	Private landowners and trusts
Wyldes Quarry (or Stevenshill) Reservoir ID209	Private landowners and trusts
Wylds Lake	Private landowners and trusts
Wyndhammere	Private landowners and trusts
Wyndley Pool	Local Authority
Wynyard Lake	Private landowners and trusts
Wyresdale Park	Private landowners and trusts
Yarrow	Water companies
Yateholme	Water companies
Yeadon Tarn	Local Authority
Yeoman Hey	Water companies
Zen Reservoir (Courtauld Road)	Private landowners and trusts

B. Interview Documents

MOTT MACDONALD

Questionnaire

Project title 380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs

Subject Interview with representative bodies (CLA)

Interview reference

Attendees

Name	Company/organisation	Initials
	CLA	

Date and time of meeting Returned in email

Question	Response
Introduction	
Section 1 – Effect on the organisation	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes
b) From your understanding, what were the intended / expected benefits of the regulation changes?	
c) In your view, are the regulations delivering these benefits?	The CLA supported the criteria presented for establishing loss of life but were keen to see a fair appeals process. The CLA in the first instance preferred a self assessment approach with help from the EA to assess whether a reservoir was high risk and then if there was a further need for professional support/advice this could be engaged. The volumetric threshold should be increased back to 25,000 cubic metres.
d) Have many members sought advice on the changes? What was the timing of this advice?	The majority of enquiries the CLA receive regarding reservoirs are landowners and farmers who want to build new or additional water storage. Encouraging a sympathetic planning and permitting system to build more reservoirs on farms would help ensure farmers and land managers get a fair allocation of water.
e) Has additional advice from the regulatory authority (Environment Agency) been sought by the interviewee?	
f) Were you involved in distributing information to your members? If yes, was this pre-emptive or at request?	Yes – we try to inform members of all new regulations.
g) Did you have any other involvement with the FWMA2010 changes that have not been discussed?	
h) Overall how has the change in legislation been received by your organisation? Discuss	
Section 2 – Effect on reservoir undertakers	
a) Overall how has the change in legislation been	

received by your members?	
b) For partially deregulated reservoirs, are you aware if your members have changed their reservoir management behaviours?	
c) Have you recommended any changes to your members management?	
d) For partially deregulated reservoirs, have members / are members likely to retain a Supervising Engineer? From your discussions, what approximate percentage?	
e) For partially deregulated reservoirs, have members / are members likely to retain an Inspecting Engineer? From your discussions, what approximate percentage?	
f) For partially deregulated reservoirs, to your knowledge have your members changed their frequency of monitoring and surveillance since deregulation? Please provide some details	
g) Are reservoir undertakers planning on keeping and maintaining the PFR?	
Section 3 - Costs	
a) Did you incur costs as part of the reservoir risk designation process / implementation of the FWMA2010? Please provide some information	
b) Are you aware of the typical costs incurred by your members? Before and after…	
c) Do you think the changes will bring about significant cost savings to your members and their businesses?	
Section 4 - Risk designation process	
a) How has the risk designation process been received by your members?	
b) How would you rate the simplicity of the risk designation process? What is the reason for your score?	
c) Have you been involved or offered advice to those seeking to challenge designations?	
d) Typically, how has ‘not High Risk’ been interpreted?	

Section 5 - Other	
a) In the opinion of the interviewee, are reservoir undertakers of partially deregulated reservoirs still aware of their responsibilities?	
b) Are there any notable disadvantages of the change in regulations?	Whilst the CLA welcomes the deregulation of reservoirs over 25,000 cubic metres on the basis of risk we are opposed to the proposal to change the threshold and the introduction of a bureaucratic process of registration for reservoirs over 10,000 cubic metres - this adds cost.
c) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	
Section 6 – Small Raised Reservoirs	
a) Do you or your members keep a database of SRRs (undertaker, dam type, location, reservoir type, etc.)?	
b) Do your members use the principles of the Reservoirs Act 1975 on SRRs?	
c) Do your members undertake surveillance and maintenance on SRRs?	
d) Do your members have reservoirs in cascades, and are these treated in the same way as above?	
e) Would you be happy to participate in further discussions surrounding the regulation of SRRs at a later date?	
f) Do you have anything to add now regarding the regulation and management of SRRs?	

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interview with representative bodies (NFU)

Attendees

Name	Company/organisation	Initials
	Mott MacDonald	
	NFU	

Date and time of meeting	28/07/17 at 10am

Question	Response
Introduction	
Section 1 – Effect on the organisation	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	· Yes
b) From your understanding, what were the intended / expected benefits of the regulation changes?	· To apply principles of risk management to reservoir safety, not simply hazard based
c) In your view, are the regulations delivering these benefits?	· The NFU is a representative body for farmers and growers, with a broad oversee of the industry. It is not an expert in risk assessment for reservoirs. However, it does respond to farmer's concerns on all regulations, particularly if there are negative impacts. · There has been very little reaction to the changes brought about by the FWMA 2010 therefore one can assume it has been well received.
d) Have many members sought advice on the changes? What was the timing of this advice?	· Articles in magazine and newsletters · The Environment Agency's briefing note was made available to members. · It is more likely that members ask for information rather than advice. · LRRs tend to be on large sophisticated farms and they have a better understanding of relevant legislation.
e) Has additional advice from the regulatory authority (Environment Agency) been sought by the interviewee?	· The briefing note from the EA was satisfactory. · The issue for farmers is likely to be the threshold for registration and SRRs.
f) Were you involved in distributing information to your members? If yes, was this pre-emptive or at request?	
g) Did you have any other involvement with the FWMA2010 changes that have not been discussed?	
h) Overall how has the change in legislation been received by your organisation? Discuss	· SRRs are on the NFU agenda but LRRs and the current changes from the FWMA 2010 are not.
Section 2 – Effect on reservoir undertakers	
a) Overall how has the change in legislation been received by your members?	*0 – Poorly 1 2 3* ***4*** *5 – Well*

b) For partially deregulated reservoirs, are you aware if your members have changed their reservoir management behaviours?	· Not aware of any changes of behaviour. · In similar circumstances, the NFU may contact targeted members for consultation by NFU are aware that this forms part of MML scope for Objective 1
c) Have you recommended any changes to your members management?	
d) For partially deregulated reservoirs, have members / are members likely to retain a Supervising Engineer? From your discussions, what approximate percentage?	
e) For partially deregulated reservoirs, have members / are members likely to retain an Inspecting Engineer? From your discussions, what approximate percentage?	
f) For partially deregulated reservoirs, to your knowledge have your members changed their frequency of monitoring and surveillance since deregulation? Please provide some details	
g) Are reservoir undertakers planning on keeping and maintaining the PFR?	
Section 3 - Costs	
a) Did you incur costs as part of the reservoir risk designation process / implementation of the FWMA2010? Please provide some information	· No increase in costs as it formed part of the day job of the advisory team
b) Are you aware of the typical costs incurred by your members? Before and after…	
c) Do you think the changes will bring about significant cost savings to your members and their businesses?	· Some farmers can feel like Inspecting Engineers and S10 inspections are costly, so hopefully it has had the benefits of reductions in cost. But no evidence gathered to support
Section 4 - Risk designation process	
a) How has the risk designation process been received by your members?	· Assumption is that members are happy as there are no queries
b) How would you rate the simplicity of the risk designation process? What is the reason for your score?	
c) Have you been involved or offered advice to those seeking to challenge designations?	
d) Typically, how has ‘not High Risk’ been interpreted?	· As farming is a “broad church” it is likely that different farmers view responsibilities in different ways!

Section 5 - Other	
a) In the opinion of the interviewee, are reservoir undertakers of partially deregulated reservoirs still aware of their responsibilities?	· Speculation, but farms with LRRs tend to be larger farms who more likely rely on professional advice for legal matters, so likely to still be aware / have advisors that can assist.
b) Are there any notable disadvantages of the change in regulations?	· Not aware of any
c) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	
Section 6 – Small Raised Reservoirs	
a) Do you or your members keep a database of SRRs (undertaker, dam type, location, reservoir type, etc.)?	· No · There should be an EA data base of farmer's winter abstractions for reservoirs as it is a different licence / cost
b) Do your members use the principles of the Reservoirs Act 1975 on SRRs?	· Noted that modest sized reservoirs are likely in flat, remote, isolated locations (East Anglia for example) therefore risk to people is minimal. Not in steep valleys where flooding consequence is significant.
c) Do your members undertake surveillance and maintenance on SRRs?	
d) Do your members have reservoirs in cascades, and are these treated in the same way as above?	
e) Would you be happy to participate in further discussions surrounding the regulation of SRRs at a later date?	· Yes
f) Do you have anything to add now regarding the regulation and management of SRRs?	· Reduction of the threshold (and to what number) is of greater concern than current changes to FWMA 2010. NFU has an article on website to inform members. Maybe one query a week on this.

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interview with representative bodies (Angling Trust)

Attendees

Name	Company/organisation	Initials
	Mott MacDonald	
	Mott MacDonald	
	Angling Trust	

Date and time of meeting	27/07/17 at 2pm

Question	Response
Introduction	
Section 1 – Effect on the organisation	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	· Yes – sat on an Advisory Group for implementation of FWMA 2010
b) From your understanding, what were the intended / expected benefits of the regulation changes?	· To move away from a fixed structure towards a more risk based, flexible structure. · A realisation that time and cost to regulate all 25,000m³ reservoirs was onerous
c) In your view, are the regulations delivering these benefits?	· Yes · However, on the Advisory Group which recommended that the owner of the reservoir should be the undertaker, not the user. But this wasn't adopted.
d) Have many members sought advice on the changes? What was the timing of this advice?	· Since implementation there have been no queries · There has been an angling club which still need to pay for a Supervising Engineer as it is in their lease, despite the reservoir being designated as 'not high risk'. · Noted that members could also contact their Supervising Engineer and/or Fish Legal. · Didn't anticipate many queries as it is generally accepted that angling clubs are intelligent undertakers. · Anticipate more queries if phase 2 is implemented.
e) Has additional advice from the regulatory authority (Environment Agency) been sought by the interviewee?	
f) Were you involved in distributing information to your members? If yes, was this pre-emptive or at request?	· Yes, and there were numerous consultations with angling groups.
g) Did you have any other involvement with the FWMA2010 changes that have not been discussed?	
h) Overall how has the change in legislation been received by your organisation? Discuss	*0 – Poorly 1 2 3 4 5 – Well* · *4*

Section 2 – Effect on reservoir undertakers	
a) Overall how has the change in legislation been received by your members?	*0 – Poorly 1 2 3 4 5 – Well* · 4
b) For partially deregulated reservoirs, are you aware if your members have changed their reservoir management behaviours?	· Unknown, but general opinion is that less than 10% would maintain Supervising Engineers and Inspecting Engineers for 'not high risk' reservoirs
c) Have you recommended any changes to your members management?	
d) For partially deregulated reservoirs, have members / are members likely to retain a Supervising Engineer? From your discussions, what approximate percentage?	
e) For partially deregulated reservoirs, have members / are members likely to retain an Inspecting Engineer? From your discussions, what approximate percentage?	
f) For partially deregulated reservoirs, to your knowledge have your members changed their frequency of monitoring and surveillance since deregulation? Please provide some details	· Guess is that undertakers will continue to monitor and surveillance as there is no associated cost and it makes good sense/practice
g) Are reservoir undertakers planning on keeping and maintaining the PFR?	· Unlikely
Section 3 - Costs	
a) Did you incur costs as part of the reservoir risk designation process / implementation of the FWMA2010? Please provide some information	· Mainly staff time and expenses. Over two, say, years likely to have cost in the region of £10k
b) Are you aware of the typical costs incurred by your members? Before and after…	· Typical costs for S12 and S10 reports
c) Do you think the changes will bring about significant cost savings to your members and their businesses?	· For angling clubs that save money it is very significant, and clubs can go bankrupt if they have such ongoing costs · In some instances the angling club can lease the reservoir but still be classed as the undertaker and there pay the costs of RA75 · Many clubs will be renting/leasing the reservoir from Water Companies and so will not be paying for RA75 responsibilities. Same situation with Canal & Rivers Trust. · There will be more cost burden for SRRs
Section 4 - Risk designation process	
a) How has the risk designation process been received by your members?	
b) How would you rate the simplicity of the risk designation process?	

What is the reason for your score?	
c) Have you been involved or offered advice to those seeking to challenge designations?	
d) Typically, how has 'not High Risk' been interpreted?	
Section 5 - Other	
a) In the opinion of the interviewee, are reservoir undertakers of partially deregulated reservoirs still aware of their responsibilities?	· Very much dependent on the capabilities of the club/fishery.
b) Are there any notable disadvantages of the change in regulations?	· Disappointed that there wasn't a change in undertaker definition
c) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	· No – it has appeared smooth
Section 6 – Small Raised Reservoirs	
a) Do you or your members keep a database of SRRs (undertaker, dam type, location, reservoir type, etc.)?	· No – but there has been a piece of work undertaken by the Angling Trust on the subject of SRRs
b) Do your members use the principles of the Reservoirs Act 1975 on SRRs?	· Unlikely. · RSPB would be a good stakeholder to contact regarding SRRs
c) Do your members undertake surveillance and maintenance on SRRs?	
d) Do your members have reservoirs in cascades, and are these treated in the same way as above?	· Clubs has expressed concerns regarding cascades, particularly if the regulatory definition of a cascade is combined volumes of greater than 25,000m³ or lower. · Noted that Angling Trust puts public safety above lobbying for angling.
e) Would you be happy to participate in further discussions surrounding the regulation of SRRs at a later date?	· Yes – SRRs is a bigger issue for angling clubs that LRRs
f) Do you have anything to add now regarding the regulation and management of SRRs?	

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interview with Water Utility companies (Thames Water)

Attendees

Name	Company/organisation	Initials

Date and time of meeting 24/07/17 at 10am

Question	Response
Introduction	
Section 1 – Confirmation of baseline data	
a) Number of partially deregulated (not high risk) reservoirs?	· 57 LRRs in the portfolio (approx. as there are some under construction). · 6 representations were made for a 'high risk' reservoir to be 'not high risk'. · 4 representations were successful, leading to 4 LRRs 'not high risk' in the portfolio · There were no appeals
b) Number of reservoirs designated 'high risk'?	
c) Number of representations made?	
d) Number of appeals that are underway?	
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	· Yes – interviewee is Reservoir Safety Manager of Thames Water
b) From your understanding, what were the intended / expected benefits of the regulation changes?	· General expectation was that 'not high risk' LRRs would be deregulated and 'high risk' SRRs would be regulated and that the regulatory burden would remain the same
c) In your view, are the regulations delivering these benefits?	· The regulations appear to be more conservative than anticipated and it was expected that more reservoirs would be deregulated. · That said, did not expect more 'not high risk' reservoirs as their portfolio are typically large reservoirs in London or service reservoirs near housing (i.e. typically Category As). · Typically, the designation and representation process was smooth. One example took longer than anticipated to successfully downgrade to 'not High Risk'. · Also, not anticipating significant cost reductions as the saving is only the cost of a Section 10 Inspection over the 10-year period (typically £2k to £4k). This is not significant for a water company (but could be for a small private owner).
Section 2 – Reservoir management of deregulated reservoirs / changes in behaviour	
a) Will you maintain the same method of reservoir management for regulated and partially deregulated reservoirs?	· Supervising Engineer visits are now every 12 months for 'not High Risk' reservoirs where usually it is every 6 months for 'High Risk' reservoirs. Noted that Supervising Engineers are in-house staff. · There will no longer be Inspecting Engineer visits.

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b) How many of your partially deregulated reservoirs have you retained a Supervising Engineer for?	· All
b) How many of your partially deregulated reservoirs have you retained an Inspecting Engineer for?	· None (unless a problem develops).
c) Is there any change of frequency of monitoring and surveillance by in-house teams? Please provide some details	· No change as typically staff are on site as part of operations.
d) Will you keep and maintain the PFR?	· Not for 'not High Risk' reservoirs.
Section 3 - Costs	
a) Did you incur costs as part of the reservoir risk designation process / implementation of the FWMA2010? Please provide some information	· Nothing significant as existing staff used for any data collection etc.
b) What are the costs per reservoir of the following aspects before and after deregulation?	· Any maintenance activities that were carried out before the FWMA2010 are still being done (e.g. grass cutting) as the reservoir is still a company asset regardless of risk designation under Reservoirs Act 1975.
c) Will the overall cost change be significant in terms of the costs to the business?	· No. But noted that not recording water levels for the PFR on some sites is a cost saving as instrumentation etc. may have been required. · If there was a cost to register each reservoir under the Act then that could have been a significant cost.
Section 4 - Risk designation process	
a) How has the change been perceived in your organisation?	· There has been no significant change. · It may become more difficult to get maintenance activities done (e..g. testing valves) or increasing surveillance now there are no recommendations from Inspecting Engineers on 'not High Risk' reservoirs.
b) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4 5 – Very simple* · 3 · It has differed per site depending on the information required. Noted that (almost) all of the 'not High Risk' reservoirs required a representation to get deregulated. · Likely due to inaccurate flood maps predicted worse consequences. This is somewhat rectified by the representation visits and the consequences are better understood.
c) Are you surprised by any of the designations?	· No
Section 5 - Other	
a) Have there been any notable disadvantages to the changes brought about by the FWMA2010?	· Not yet. The impacts of recommendations for maintenance work remains to be seen.
b) Do you have any further comments on reservoir risk management?	· No – typically reservoirs are As or very low risk, therefore risk designations were anticipated.

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Section 6 – Small Raised Reservoirs	
a) Do you keep a register of SRRs (undertaker, dam type, location, reservoir type, etc.)	· Looked at their portfolio of service reservoirs/balancing reservoirs (waste water) that would be in the Act if the threshold was reduced to 10,000m³. There would be an additional (approx.) 40 assets. Risk designation not considered in the study. · Of the 40 assets, typically 30 are service reservoirs and 10 are balancing reservoirs (waste water).
b) Do you use the principles of the Reservoirs Act 1975 on SRRs?	· All reservoirs get an annual inspection, but SRRs not strictly inspected by a Qualified Civil Engineer under the Reservoirs Act 1975 (noted that the inspections are carried out by expert civil engineers). · Thames Water undertake risk assessments of reservoirs that can hold 1m depth of water above ground level.
c) Do you undertake surveillance and maintenance on SRRs?	· Assets undergo surveillance and maintenance but not necessarily from a reservoir safety perspective. For example, screens may be unblocked. · Service reservoirs are also risk assessed for water quality etc.
d) Do you have reservoirs in cascades, and are these treated in the same way as above?	· Any reservoirs in cascade (e.g. in North London) are already Category A 'High Risk' · No SRRs in cascade
e) Would you be prepared to participate in further discussions surrounding the regulation of SRRs at a later date?	· Yes
f) Do you have anything to add now regarding the regulation and management of SRRs?	· If the legislation includes SRR service reservoirs then this could increase the burden on Thames Water reservoir safety management. · Noted that the risk associated with modern reinforced concrete service reservoirs is low, but oldest service reservoir (1832) is brick. May be difficult to distinguish the risk in legislation. · Old service reservoirs are unlikely to have adequate spillway capacity. If the reservoir is far from the nearest watercourse then it is not feasible to install kilometres of pipe through London. Therefore, specific overflow prevention techniques are adopted such as telemetry, alarms, pump trips). · With service reservoirs below 25,000m³ threshold, there is a risk that inflows capacity > outflow capacity. There would be a big cost to the company to rectify this if there is a change in threshold. · Noted that some newer overflow systems have come from recommendations from Section 10 inspections.

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MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interview with Water Utility companies (Wessex Water)

Attendees

Name	Company/organisation	Initials

Date and time of meeting 25/07/17 at 4pm

Question	Response
Introduction	
Section 1 – Confirmation of baseline data	
a) Number of partially deregulated (not high risk) reservoirs?	· 17 no. reservoirs; 3 no. are 'not High Risk' · 1 no. representation was made · No appeals
b) Number of reservoirs designated 'high risk'?	
c) Number of representations made?	
d) Number of appeals that are underway?	
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	· Yes –Reservoir Safety Manager and a Supervising Engineer
b) From your understanding, what were the intended / expected benefits of the regulation changes?	· Understanding that the Pitt Review, following the 2007 floods, suggested that there are some reservoirs below the threshold of 25,000m³ that posed a risk to the public, and some reservoirs above the threshold didn't. So, the amendments are to address the balance of risk to the public. To date this hasn't happened. · The risk designation method and the application of the precautionary approach means that there are fewer 'not high risk' designations than anticipated. · Overall, the problem has not been addressed.
c) In your view, are the regulations delivering these benefits?	
Section 2 – Reservoir management of deregulated reservoirs / changes in behaviour	
a) Will you maintain the same method of reservoir management for regulated and partially deregulated reservoirs?	· All reservoirs are subjected to surveillance as they are operational assets, however visits to 'not high risk' reservoirs are less formal. · Two 'not high risk' reservoirs are gravel pits of WTW which is not currently in operation, so these reservoirs will receive less surveillance.
b) How many of your partially deregulated reservoirs have you retained a Supervising Engineer for?	· Noted that interviewee is in-house Supervising Engineer

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b) How many of your partially deregulated reservoirs have you retained an Inspecting Engineer for?	· There will be no Section 10 inspections for 'not high risk' reservoirs.
c) Is there any change of frequency of monitoring and surveillance by in-house teams? Please provide some details	· All sites have an operational presence so if there is a problem with a reservoir the reservoir safety team will be notified
d) Will you keep and maintain the PFR?	· PFR is retained but no new information is added to 'not high risk' reservoirs
Section 3 - Costs	
a) Did you incur costs as part of the reservoir risk designation process / implementation of the FWMA2010? Please provide some information	· Yes – making representations cost the company money · Reasonable amount of staff time · Topographic survey was required to challenge a flood inundation map which was incorrect.
b) What are the costs per reservoir of the following aspects before and after deregulation?	· 'not high risk' reservoirs will be visited annually and not every six months, so that is in the region of £1k a year. · No Sections 10s is a saving of a few £k's every ten years. · If the 'not high risk' reservoirs are used for operational purposes then maintenance will be undertaken regardless of designation. If the reservoirs are not operational and significant work is required then likely the reservoir will be decommissioned.
c) Will the overall cost change be significant in terms of the costs to the business?	· No
Section 4 - Risk designation process	
a) How has the change been perceived in your organisation?	· No perceived change within Wessex Water.
b) How would you rate the simplicity of the risk designation process? What is the reason for your score?	· Score of 2 · The designation is not technically complicated, but the procedure was haphazard for 'not high risk' reservoirs. · Undertakers have three months to make a representation following a provisional designation, but there is no timescale to resolve the representation. In this case it went on for a while (provisional designation on 20th March 2014, representation made within the three months, resolved 'not high risk' designation on 13th May 2016).
c) Are you surprised by any of the designations?	· Anticipated the three 'not high risk' reservoirs so was surprised to require a representation for one of them (noting that all three are on the same site so anticipated the same preliminary designation)
Section 5 - Other	
a) Have there been any notable disadvantages to the changes brought about by the FWMA2010?	· Maintenance requirements have not been enforced on reservoirs (wouldn't expect it with in-house Supervising Engineers). · Have been issued by Inspecting Engineer following S10 inspection. Doesn't make too much difference now that it is a statutory requirement.
b) Do you have any further comments on reservoir risk management?	· Acknowledged that the Environment Agency had a difficult job and appeared under resourced. In some instances, the process appeared random will ill-defined programme/sequencing and poor communication. · Noted that the inundation maps were developed for a different purpose than risk designation. With a new map specification in progress, hope is

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	that the reservoirs do not need re-designation. Noted that the new map specification appears to be less precautionary.
Section 6 – Small Raised Reservoirs	
a) Do you keep a register of SRRs (undertaker, dam type, location, reservoir type, etc.)	· Yes there is a register for impounding SRRs · No register for service reservoirs which will likely need registering
b) Do you use the principles of the Reservoirs Act 1975 on SRRs?	· On impounding SRRs the same principles apply. There are S10 inspections but more leeway regarding MIOS
c) Do you undertake surveillance and maintenance on SRRs?	· As above
d) Do you have reservoirs in cascades, and are these treated in the same way as above?	· Two cascades · One reservoir is discontinued beneath the 25,000m³ threshold
e) Would you be prepared to participate in further discussions surrounding the regulation of SRRs at a later date?	· *Yes*
f) Do you have anything to add now regarding the regulation and management of SRRs?	· It is the right idea to deregulate low risk LRRs and regulate high risk SRRs. However, the concept is largely irrelevant for water companies as they manage their assets in order to provide a service to the customer. · Any reservoir that poses a risk to the public should be regulated however it is noted there a threshold is needed otherwise it'll include everything down to small ponds. · If there is a change in threshold then private undertakers will need help (e.g. many farm reservoirs are built at 24,000m³ to avoid the Act) as it will be unfair to impose the changes on these undertakers. · Noted that is has been ten tears since the 2007 flood and Pitt Review and not much has changed with no end in sight for SRRs.

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MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interview with Water Utility companies (Yorkshire Water)

Attendees

Name	Company/organisation	Initials

Date and time of meeting 4th August 2017 (returned in email)

Question	Response
Introduction	
Section 1 – Confirmation of baseline data	
a) Number of partially deregulated (not high risk) reservoirs?	· 4
b) Number of reservoirs designated 'high risk'?	· 129
c) Number of representations made?	· 0
d) Number of appeals that are underway?	· No – generally agree with designations. We have taken the view that the 'not high risk' designation is potentially redundant as we still have a duty of care to operate/maintain any reservoir given this designation.
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	· Yes – and have implemented required changes (PFR, SE statement issue etc,)
b) From your understanding, what were the intended / expected benefits of the regulation changes?	· It was always stated that the legislation was to move to a 'risk based' approach and to consider smaller assets outside the ambit of the Act which could still pose a risk to life.
c) In your view, are the regulations delivering these benefits?	· Not necessarily – the new regulations are consequence based and the volume threshold has yet to be reduced.
Section 2 – Reservoir management of deregulated reservoirs / changes in behaviour	
a) Will you maintain the same method of reservoir management for regulated and partially deregulated reservoirs?	· We continue to manage all 'high risk' reservoirs in accordance with the relevant legislation. · We have continued to appoint a Supervising Engineer to 'supervise' the 'Not high risk' reservoirs. In some cases we have had a 'periodic inspection' by an ARPE – the option to call for this inspection is given to the 'SE' if they feel the safety of the structure is compromised. · We understand that these appointments are not required now that the reservoir has been partially deregulated. · YW still has a duty of care to maintain these large civil assets, they continue to be used for our core wholesale business and the reputational impacts of failure of these assets still remains.
b) How many of your partially deregulated reservoirs have you retained a Supervising Engineer for?	· All (4)

b) How many of your partially deregulated reservoirs have you retained an Inspecting Engineer for?	· 2, with the option should safety be compromised
c) Is there any change of frequency of monitoring and surveillance by in-house teams? Please provide some details	· The proactive policy has remained the same
d) Will you keep and maintain the PFR?	· We have continued with the PFR and the monitoring requirements detailed in the last Section 10 report
Section 3 - Costs	
a) Did you incur costs as part of the reservoir risk designation process / implementation of the FWMA2010? Please provide some information	· There was a manpower cost associated with assessing potential assets for inclusion should phase 2 be implemented – this was undertaken by the existing Reservoir Safety team
b) What are the costs per reservoir of the following aspects before and after deregulation?	· Supervising engineer & record keeping - unchanged · Inspection by an inspecting engineer – unchanged should an inspection be required · Maintenance - unchanged · Cost of remedial works – unchanged
c) Will the overall cost change be significant in terms of the costs to the business?	· The finances have remained the same; however, we are in the process of compiling the periodic review submission for the next asset management period – it may be more difficult to secure funding to maintain reservoirs as we now have no requirement to undertake work to comply with legislation
Section 4 - Risk designation process	
a) How has the change been perceived in your organisation?	· The designation is consequence based – we already have detailed risk assessments for the reservoirs which compare probability and consequence. This portfolio risk assessment (to RARS) is used to prioritise and manage risk. · This methodology is applied to the 4 partially deregulated reservoirs. · It has not been a major impact as the we always considered the 134 reservoirs under the act to be a high strategic risk to the business and managed them accordingly.
b) How would you rate the simplicity of the risk designation process? What is the reason for your score?	· YW was not involved in the designation process.
c) Are you surprised by any of the designations?	· Generally, no. Most appear to be correct.
Section 5 - Other	
a) Have there been any notable disadvantages to the changes brought about by the FWMA2010?	· The partial deregulation has made it difficult to secure internal funding should work be required – no legal driver, no H&S driver (does not affect life).
b) Do you have any further comments on reservoir risk management?	· There is no risk management standard that has been accepted and adopted by all undertakers – this would inevitably lead to issues should it ever be tested following a serious incident

Section 6 – Small Raised Reservoirs	
a) Do you keep a register of SRRs (undertaker, dam type, location, reservoir type, etc.)	· Yes – we have started to compile a list of assets between 10,000m^3 and 25,000m^3. Additionally, all assets which store water are included in our asset inventory.
b) Do you use the principles of the Reservoirs Act 1975 on SRRs?	· We have 'appointed' Supervising Engineers to small number of SRRs that are thought to be higher risk i.e. small earth embankments. Typically, we have not for service reservoirs as the probability of failure is deemed to be lower due to method of construction
c) Do you undertake surveillance and maintenance on SRRs?	· Yes, surveillance and monitoring is undertaken. This is at a lesser frequency on the service reservoirs for the reason detailed above
d) Do you have reservoirs in cascades, and are these treated in the same way as above?	· We have a number of reservoirs in cascade (this is my interpretation of cascade – the legal one may be different…..). These are typically chains of LRRs and, therefore, assed individually. · I await a further legal clarification of cascade.
e) Would you be prepared to participate in further discussions surrounding the regulation of SRRs at a later date?	· Yes
f) Do you have anything to add now regarding the regulation and management of SRRs?	· Key issues are – quantifying 'risk' and what will the volume threshold be?

MOTT MACDONALD

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Angling Club

Attendees

Name	Company/organisation	Initials
James Penman	Mott MacDonald	JP
Carrie Eller	Mott MacDonald	CE
Undertaker		

Date and time of meeting 27/07/2017 15:15

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Downgraded to 'low risk' following an appeal [assuming meaning a representation]. 'Appeal' was made as not believed to be high risk based on actual storage volume and situation downstream.
b) Reservoir capacity / dam height / dam type	Approximately 8m high. 400,000m^3 is incorrect [see answer 2b]
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	*Has there ever been a dispute regarding ownership?* No dispute – there are two owners; the top section is owned by a separate person, but they work together as one reservoir. Angling club is the undertaker of the dam; any relevant information is relayed to the joint undertaker, good communication.
d) Are you the undertaker for any other reservoirs?	No
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	[High risk/not high risk understood – as per the subsequent questions] Stated that generally some parts of the Act are confusing. Any queries are asked in the yearly inspection.
b) From your understanding, what were the intended / expected benefits of the regulation changes?	[Response to why was the reservoir downgraded] The volume was incorrect; originally the local county council worked out volume by dam height and multiplied by the surface area. But depth of lake is only 1m generally. SA is 20-30 acres.
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	No risk to anybody; based on the nature of where it is and volume of water. There was an incident in 1968 where bank burst and the extent of flood did not reach the farm in the field behind it [understanding of the risk element to the regulation]
Section 3 - Risk designation process	

a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex* ***1*** *2 3 4 5 – Very simple* 1; very complicated, stated that there must be a simpler way of doing it.
c) Was the risk designation result anticipated and why?	Was provisionally designated as high; representation submitted as expected to be not high risk. Through talking to other undertakers, the general view is that they are provisionally made high risk by the EA, and then have to make a representation to get it downgraded.
d) Was a representation made?	Yes – Mott MacDonald. Mr Airey
If Y, was the representation successful?	Yes
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	[Previously answered that the supervising engineer was the person to go to with queries]
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	Yes (Mott MacDonald)
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As a fishing club, 90% of time/staff is voluntary. And things might be missed, hence asking for advice. Easier for insurance purposes to have someone coming in. Public liability on reservoir not simple to obtain. Planned frequency is every 2 years for brief update
b) Have you retained an Inspecting Engineer?	Assuming that might do in future. Confusion about whether the S10 are required – did not know that they are not required now partially deregulated.
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	If S10 not required, likely won't to do the 10 year as covered by the 2 years.
c) Have you changed your frequency of monitoring and surveillance?	No
d) How often do you visit the reservoir? What are the associated costs?	Undertaker personally visits once a fortnight. Drive up and check for e.g. animal damage. (Sometimes anglers in the club need reminding that reservoir/dam safety is important to maintain the fishing)
e) Will you keep and maintain the Prescribed Form of Record?	Yes, still are maintaining it at present. Currently treating the lake with chalk for PH level; this and the level of the lake is being added into the PFR.
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	Undertaker wrote out everything and passed on details to MA. The EA paid for the process, hence didn't cost them anything. MA had just done the S10 inspection so assuming the costs were covered then
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* Invoiced to the two undertakers (60:40% split). As now the annual visits will be every 2 years, the cost after will be half *Inspection by an inspecting engineer*

	Cost not known off top of head. The lake a relatively simple/quick site, estimated at perhaps around £2k *Maintenance* Varies year by year. Some of the larger costs are having the trees trimmed or removed. This is not expected to change post deregulation *Cost of remedial works (including Measures in the Interest of Safety)* As above *Other* N/A
c) Will the overall change in cost be significant in terms of operating your business?	No difference to finances as long-term maintenance is to rise every year anyway based on the nature of the site, which is expected to be a larger sum than the savings.
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	Had to analyse and increase the overflow capacity for 200-year flood, resulting in the outlet requiring widening. Costs less than £10k In addition some bank repairs were undertaken ***<£10k,*** *< 10-100, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	Similar works anticipated
Section 6 – Legislation	
a) What does not "High Risk"' mean to you? What are the main differences to a 'High Risk' reservoir?	If designated high risk – would have asked for further evidence/proof; because from research done into HRR, there 'was no way they were in category', based on volume and corresponding flood extents. If there was housing close by and roads etc would assume would be high risk
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	Have to look after it in the same way over the years as that is the sensible approach. Aware of duty of care and law of negligence if causes any harm. Might have insurance to cover it, but if was aware of a fault and didn't act, then they would be negligent and will go to court.
c) Are there any notable disadvantages of the change in regulations?	Hard to say as day to day procedures not being changed. Nothing notably positive or negative. They can see the reason of the regulations, but also aware that this reservoir is low risk. Need to keep the reservoir there as the fish stock very costly so worth more than the damage.
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	Regarding all the regulations (including other flood regulations with the EA), a feeling that there is too much reliance on computer models and 'fancy words', need site visits to understand the on ground conditions

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Farm

Attendees

Name	Company/organisation	Initials
Peter Brinded Undertaker	Mott MacDonald	PB

Date and time of meeting	27/07/17 at 12pm

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	Undertaker believed the reservoir volume to be 50,000m³ whereas EA database states 70,000m³
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes, been on the farm for 25 years
d) Are you the undertaker for any other reservoirs?	
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes – the NFU provided very useful information
b) From your understanding, what were the intended / expected benefits of the regulation changes?	Understood to be an increase in red tape – to bring in more legislation to reservoirs
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	Believed that their farm reservoir was not high risk – and (eventually) accepted by the Environment Agency (had to work hard to get the designation)
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	The process was relatively simple [assumed a score of 4]
c) Was the risk designation result anticipated and why?	No – expected the reservoir to be low risk, as it is believed the reservoir in the event of a breach would only flood farm fields
d) Was a representation made?	Yes, initially 'high risk' Representation took two years

	Required a visit from an Engineer (understood to be MML), to confirm that the breach would not endanger pubic as the reach would flood fields and be retained by a road embankment Noted that the process wasn't as bad as expected
If Y, was the representation successful?	Yes
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	NFU provided good information
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No; for cost savings and the feeling that the reservoir is well built . Noted that the reservoir is more of a liability than an asset – original purpose was irrigation but the soil (clay) doesn't take well to irrigated crops
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As above
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As above
c) Have you changed your frequency of monitoring and surveillance?	Reservoir is visited fortnightly. Water levels are recorded monthly. Record book kept
d) How often do you visit the reservoir? What are the associated costs?	
e) Will you keep and maintain the Prescribed Form of Record?	As above. PFR (water levels) kept ongoing despite no requirements
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	Around £1000, farm time and consultant's time. Noted that money was spent on the reservoir and now the reservoir isn't in use
b) What are the costs of the following aspects before and after partial deregulation?	Savings for Supervising Engineer (annual) and Inspecting Engineer (ten years) around £2,500
c) Will the overall change in cost be significant in terms of operating your business?	Yes this is significant in terms of the business
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	

Section 6 – Legislation	
a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	Doesn’t put property or life at risk But management of the dam is not different
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	Yes – especially when water is considered in tonnage and not m^3
c) Are there any notable disadvantages of the change in regulations?	None. Noted that if there is an issue at the reservoir, they can contact their previous Supervising Engineer, now it is at their requirement and not simply annually. NFU has been proactive and have a department farmers can consult
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	No

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Farm

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting 01/08/2017 Around 14:30

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	18million gallons. 3m high at highest point above ground level
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes – since constructed in 1989
d) Are you the undertaker for any other reservoirs?	No
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes
b) From your understanding, what were the intended / expected benefits of the regulation changes?	To target those sites that do pose risk.
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	Flooding; dam breach would be catastrophic flood but very unlikely. Most of the water in this site is below existing ground level (was a cut and fill process where the excavated soil was used to make the dam) which limits risk
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4* ***5*** *– Very simple* Straightforward
c) Was the risk designation result anticipated and why?	Yes - always questioned the bureaucracy of regulating this site as seems low risk
d) Was a representation made?	No
If Y, was the representation successful?	N/A

e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	No as PE was aware of the process and was assisting. Would have spoken to PE first if assistance required
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Deemed not necessary now it is not mandatory in the regulations
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As above
c) Have you changed your frequency of monitoring and surveillance?	No – same processes including cutting grass and maintain water levels. .
d) How often do you visit the reservoir? What are the associated costs?	Passing by the reservoir weekly or more.
e) Will you keep and maintain the Prescribed Form of Record?	Yes (including logging water level information)
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	No cost
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* Roughly £2000, now will be £0 Unsure re S10 Maintenance is done in house and costs the same after designation
c) Will the overall change in cost be significant in terms of operating your business?	No, saving is relatively minimal.
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	Relining a proportion of the basin a few years ago *<£10k,* ***< 10-100****, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	Yes, remedial works as required

Section 6 – Legislation	
a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	Negligible risk of harm by flooding.
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	Covered for public liability [Undertaker initially answered no but was aware of public liability]
c) Are there any notable disadvantages of the change in regulations?	No
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	*LRRs* No, the impacts have been fine.

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Industrial and commercial

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting	01/08/2017

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	Unsure, panel engineer conducted the calculation
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes sole undertaker– has been with the landlord for ~30 years
d) Are you the undertaker for any other reservoirs?	No
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes
b) From your understanding, what were the intended / expected benefits of the regulation changes?	Unsure, nothing has changed. Don't think of the site as reservoir/dam; the length of the bank is only 20 yards and is very robust ('would take a bomb to remove'). 95% is not a dam. The reservoir is fed by a small spring, and there is a pipe that runs the flow to the other part of the quarry.
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	This site is not a huge risk as it runs into the larger quarry area with no houses between. No risk to life.
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3* ***4*** *5 – Very simple* Not a problem, 4, as hired a panel engineer. Impact was only in cost.
c) Was the risk designation result anticipated and why?	Not worried – assumed it would be not high risk as PE advised this right at start of the process
d) Was a representation made?	No
If Y, was the representation successful?	N/A

e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	No, the panel engineer sorted everything
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Will stop – won't pay for anyone else. Not in legislation so avoiding the cost of inspections
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As above
c) Have you changed your frequency of monitoring and surveillance?	No, will remain to be on the water daily, walk over the dam specifically daily for fishing purposes.
d) How often do you visit the reservoir? What are the associated costs?	As above, daily
e) Will you keep and maintain the Prescribed Form of Record?	No won't fill in now
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	Panel engineer overseeing the process - ~£400 to £500
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *£0* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* [Confusion regarding PE visits] Apparently only attended a few times to do a survey, generally in touch over the phone. Within a year of the first survey the designation was given [unsure if referring to yearly visits or inspection regarding designation only]. Re maintenance - don't touch the dam as nothing to do. Hence costs to be the same
c) Will the overall change in cost be significant in terms of operating your business?	No
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	No costs/works – only procedures are monitoring that the pipe is flowing every day (6 inch diameter). Checks that it hasn't blocked and use long rods to clear out if so. *<£10k, < 10-100, £100- 500, £500k – 2M, > £2M*

e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	No
Section 6 – Legislation	
a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	As above [nothing downstream]
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	Aware of risk downstream if broke. However the reservoir would spill into the next quarry that goes out about for ~1 mile. Nothing down there to be damaged
c) Are there any notable disadvantages of the change in regulations?	No other changes
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	The process/results are fine, no problems with the reservoir and never have. Only actions on the undertaker is to make the pipe clear. The reservoir is 15ft to 18ft on average, and the bottom of the lower quarry is a lot deeper and a lot lower [hence containing the outflow]

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Farm

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting	01/08/2017 Around 15:00 (45 mins)

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes (It was originally designated as High Risk – hence there was an appeal process [assuming referring to the representation process] Representation process was aided by Jon Scriven from the Richard Jackson Partnership who represented a number of people in the area [the undertaker stated that JS wasn't a panel engineer but the records suggest he is])
b) Reservoir capacity / dam height / dam type	Capacity appears too large [later discussed that this could be down to the difference between above natural ground and not] Around 2.5m dam height. Earth embankment
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes sole undertaker– have been for around 6 years
d) Are you the undertaker for any other reservoirs?	Yes under the Waldersy Farms organisation– 5 reservoirs on different sites. 2 at Puyney. 2 are too small, 3 are under the regulations
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes ('very much')
b) From your understanding, what were the intended / expected benefits of the regulation changes?	To simplify regulation and to remove an overly bureaucratic system. To make the oversight of reservoir legislation more relevant to the risks associated with a physical breach.
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	Perceive that there is a risk downstream – yes. Always a risk associated with dams. But much of the risk is to do with location; i.e. if the breach is close to densely populated areas. In very different scenario with these reservoirs as in the middle of nowhere. Another reservoir at Manor Farm which if breached could cause problem, but it is also very doubtful that it would happen.
Section 3 - Risk designation process	

a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4 5 – Very simple* Been to appeal on 3 reservoirs. Jon Scriven who has dealt with the reservoirs since built in 1998 and since the others have been bought 6 years ago. He said that they should never have been High risk. The process was very badly dealt with. Appeal process took a long time. EA team based in Exeter communicated poorly, Jon Scriven had to help a lot with correspondence. 'If rating competency not simplicity then it would be a 0'. The undertaker had the view that the EA are not in favour of the process. View that because EA are unhappy with the concept of risk designation, they wanted to make them high risk What should have happened is that the engineers on site should have guided the designation. I.e. the inspecting engineers. Risk that they would not be independent, but as the engineers have a duty to be correct this shouldn't happen and the designations should be fair. CE stated that site visits may have helped but resourcing is challenging for a national scheme. RL said it could have coincided with annual inspection. No-one in a better position than the IE and should have used their opinion.
c) Was the risk designation result anticipated and why?	Assumed that should be designated low risk (as did the PE who said the change in regulations were made for cases like these and was very shocked when preliminary designated High Risk)
d) Was a representation made?	Yes [assuming this was meant by appeal]
If Y, was the representation successful?	Yes
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	As above, felt that the EA wouldn't respond/engage (felt was stuck in pile of paperwork from other undertaker representations). PE helped considerably
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	Yes – (sadly Jon retired but someone taking over) Would have been better to have further guidance about expectation regarding keeping inspectors or not. Not properly communicated.
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Every year, yet to see what the report will now consist of (used to be a handwritten report, now more digital) For the specific expertise including aspects such as dynamic earth analysis and wave action
b) Have you retained an Inspecting Engineer?	Unknown - will take advice from panel engineer doing annual inspection.
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As above. For the larger reservoir might keep one. Also from an insurance point of view (including satisfying the county council)
c) Have you changed your frequency of monitoring and surveillance?	Personally the daily actions are the same. Don't believe that anything has changed on the farm, such as monitoring the banks, checking the overflows etc
d) How often do you visit the reservoir? What are the associated costs?	Fortnightly

e) Will you keep and maintain the Prescribed Form of Record?	Intended to be a manual book, not set up digitally yet but this might change in the future
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	Inspecting engineer was employed to assist. Costs unknown
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* SE/IE costs not know not off top of head. No big changes to maintenance
c) Will the overall change in cost be significant in terms of operating your business?	The reservoir has not and is not viewed as overly expensive for compliance, however requirement for compliance is viewed as over the top. Hassle and time used in dealing with compliance at a time of year when there are other things to do. In the long run not doing anything different as still incurring costs (maintenance etc) but will not be forced to do anything [viewed as] unnecessary.
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	Required to deal with wave erosion- various schemes including establishing better reed shelf. Have imported clay for earthworks. Putney reservoir at the beginning had no overflow so this was required. EA insisted installed overflows; not happy about this These reservoirs were bought, hadn't been built with any eye for regulation, and now the undertaker had to comply following them being registered. The volume was larger than they were told in the purchasing process. £40k *<£10k, < **10-100**, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	Yes – works as required. Namely wave erosion expected as this in an ongoing issue
Section 6 – Legislation	
a) What does not "High Risk"' mean to you? What are the main differences to a 'High Risk' reservoir?	As discussed above in 1c
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	*We need a briefing sheet in case we need to explain what the changes are* Yes
c) Are there any notable disadvantages of the change in regulations?	JS said he would retire as soon as these reservoirs have become deregulated. Hard to continue now that this site specific expertise (PE) has left.

	Too soon to analyse this at present as all happened recently. Generally reservoir safety responsibilities are taken very seriously. The burden has not lessened.
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	First reservoir built in 1997- senior and informed group of people involved in this process dealing with reservoir issues. EA entered into this important issue [of risk designation] but ignored this PE expertise Took a significant time frame; around 18 months between not high risk and high risk. [Generally it was discussed in depth how the interview was unhappy with how the preliminary designations were carried out (not based on the correct information or with PE expertise), the lack of communication with the EA and the extensive time it has taken to get a result]

MOTT MACDONALD

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Small business – leisure

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting 01/08/2017 14:00

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	Specifics unknow - mile long earth embankment
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes (the estate) Since roughly mid 1990s (~20 years)
d) Are you the undertaker for any other reservoirs?	Yes, a small square reservoir used to feed water to the house. ~200m^2. Very old.
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes – had some paperwork. Online form completed by Ben 13/01/2017 to fill in missing data.
b) From your understanding, what were the intended / expected benefits of the regulation changes?	There isn't any benefit to the changes in regulations; the management will continue the same as it's a public open estate. This includes still checking the piezo points, ensuring there are no trees, mowing the grass every 2 weeks, checking the sluice gates etc. Has been part of management regime for 15/20 years and no real changes anticipated to it
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	The reservoir flows into the River Trent. There is a town further down but unsure if would be affected. Lake is not that deep; 60 acres of water, max depth 9ft and on average is 4.5ft. A view that as long as carry on as they are, not likely to be an issue. Not huge resource required to do the works
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4 5 – Very simple* Unknown - G wasn't too involved in the process hence hard to score.
c) Was the risk designation result anticipated and why?	Unknown (as above, not too involved)

d) Was a representation made?	No (the lake is an old browning lake, 25 years ago mining subsistence called one end of the lake to drop. Dam wall built to maintained the level)
If Y, was the representation successful?	N/A
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	Used to have an engineer [assuming Inspecting Engineer] every year that advised. Now every 2 years to get the expertise check [see 4a]
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	Yes
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Every 2 years likely, they will see what the PE suggests including what the survey should cover.
b) Have you retained an Inspecting Engineer?	Unsure, will be guided by panel engineer view (have had the same PE for 15 years)
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Guidance of PE and their expertise check
c) Have you changed your frequency of monitoring and surveillance?	No change. Every 6months piezo results send to PE, take photos of sluice gates etc [more information provided in answer 2b]
d) How often do you visit the reservoir? What are the associated costs?	The team are based on site throughout the year
e) Will you keep and maintain the Prescribed Form of Record?	Unknown - will send records across to PE, depends on their advice.
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	No cost – just received a letter.
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* Roughly £1000 a visit (half a day visit and report). Now will be £500 if split the cost over 2 years S10 unknown Same costs of maintenance before and after – minimal as keep on top of it.
c) Will the overall change in cost be significant in terms of operating your business?	No
d) What major works have occurred in the last 30 years?	3 or 4 years ago we had to replace the sluice gates as they were weeping.

Please provide the nature of the works and indicative cost	***<£10k***, *< 10-100, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	Yes similar works; e.g. sluice blocks still going to happen (and they are important as they are used to manage the water levels on site). Might cost in the £10k to 20k region.
Section 6 – Legislation	
a) What does not "High Risk"' mean to you? What are the main differences to a 'High Risk' reservoir?	No difference to the undertaker as still managed the same.
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	*We need a briefing sheet in case we need to explain what the changes are* Yes, if anyone got injured on site, including the public as the site is a public site
c) Are there any notable disadvantages of the change in regulations?	No
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	No (hard to comment as new in this particular role)

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Private landowner and trusts

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting 02/08/2017 10:15

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	[Not completed]
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	PL and sister are the undertakers Approximately 20 years (following his mother's death)
d) Are you the undertaker for any other reservoirs?	No
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes
b) From your understanding, what were the intended / expected benefits of the regulation changes?	Unsure – no risk to life from his dam as there is no housing downstream
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	In this case zero risk (as above, because there is no housing downstream)
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2* ***3*** *4 5 – Very simple* Relatively straightforward
c) Was the risk designation result anticipated and why?	Yes
d) Was a representation made?	No
If Y, was the representation successful?	N/A
e) Was an appeal made?	No

If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	No as assistance was not required. Was originally a medium risk dam [assuming referring to e.g. dam category B/C], had engineers on site to assist [assuming reference to panel engineers]
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As no longer in the legislation. Monitoring will be done in house
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As above
c) Have you changed your frequency of monitoring and surveillance?	No, monitoring and surveillance will stay the same
d) How often do you visit the reservoir? What are the associated costs?	In the summer every day, in the winter twice a week. The public in village frequent the site so needs to check all OK
e) Will you keep and maintain the Prescribed Form of Record?	No not maintain the PFR; records will now be kept elsewhere
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	No, no expenditure during the process
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* £1000 £0 *Inspection by an inspecting engineer* £2500 £0 *Maintenance* Maintenance costs will stay the same. *Cost of remedial works (including Measures in the Interest of Safety)* As below *Other*
c) Will the overall change in cost be significant in terms of operating your business?	Not a significant cost
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	A few years ago the sluices into the Dart were replaced with more efficient and safer gates. They were inspected by relevant parties (inc. Mr Gough [PE]) The cost was approximately £20k *<£10k, < **10-100**, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	No
Section 6 – Legislation	

a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	As above [no properties downstream]
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	Yes, aware of public liability
c) Are there any notable disadvantages of the change in regulations?	No
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	No

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Private landowners and trusts

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting 07/08/2017

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes – designation letter received in 2016
b) Reservoir capacity / dam height / dam type	Yes – 4m high and ~550,000m^3 capacity is correct. (It was used as a reservoir up to 2003/2004 (for effluent solid separation). It is discontinued now (no input flows from natural sources); has grassed-over in the basin)
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes - owned since 2003 (bought from ICI). No disputes. The areas where the lagoons sit is going to be 'public owned' in the future as part of a restoration project. Either NPL estates or Local Authority will likely become the undertaker. This will likely happen in around 5 years.
d) Are you the undertaker for any other reservoirs?	No not as NPL (they are ownership of a canal, which a MM PE manages [unknown])
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes- a key change was that before the changes they had the annual inspections. Following the changes we will now save around £1200 a year [see cost section]
b) From your understanding, what were the intended / expected benefits of the regulation changes?	As above, the main benefit is the cost savings. The reservoir will still be checked on monthly basis, as still 'consented to discharge' with the EA so the site still requires checking. Now it will just be without the PE check. (The site is 4m deep which now has grass and trees growing. Solids are in there from historical process. There is no impounding, reservoir only gets rainwater which sinks into the ground. The basin never overflows. Picked up from the letter from the EA that if ever the outflow channel gets altered then engineering expertise/QCE approval will be required. Currently the basin has a huge capacity and discontinuance will bring it to under 25m^3.)

c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	Zero as even if did fill up – not that it would in its current state, this would only happen if operational – the reservoir is right next to an estuary so any breach water would go straight in there. There are no houses or farmland. There was a concern of environmental impact of discharge impact back when the site was operational, but this no longer applies.
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3* ***4*** *5 – Very simple* Relatively simple, got a letter from the EA. The phrasing of the letter meant it required re-reading a few times, but generally phrasing of communication from the EA is improving
c) Was the risk designation result anticipated and why?	Yes
d) Was a representation made?	Yes – PE (from Jacobs, Stillwater associates were used previously) had to come and see the reservoir was still empty [unsure if this was a formal representation, or whether the PE submitted evidence prior]
If Y, was the representation successful?	Yes
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	No, assistance was not required. Took a while to reassess all of the sites, there is a perception that the low risk reservoirs were at the end of the pile. Would have spoken to PE as first port of call
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Not required now it is not in the legislation. Once the reservoir is discontinued will appoint a QCE for the de-registration process. 5 years likely for No. 2 when it has been infilled and the outfall tower removed.
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Not required now not in legislation.
c) Have you changed your frequency of monitoring and surveillance?	No, still visit monthly
d) How often do you visit the reservoir? What are the associated costs?	Monthly
e) Will you keep and maintain the Prescribed Form of Record?	Yes PFR to be maintained
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	No costs – PE just wrote a letter. Painless process

b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* SE would cost £1350 a year, after now £0 £4000 for S10 saving every 10 years Maintenance costs - no change as very little/no maintenance conducted (clay bunded wall) If using the lagoon and it was overflowing, then would have to have sampling costs. Will potentially save a further £1000 a year following discontinuance (however this is not connected to designation)
c) Will the overall change in cost be significant in terms of operating your business?	Not significant (but good to have saving to be spent elsewhere)
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	No – but will have the discontinuance via wall removal in ~5 years. *<£10k, < 10-100, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	No change
Section 6 – Legislation	
a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	No risk to housing, environment (e.g. SSSI in this case), or agricultural land.
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	*We need a briefing sheet in case we need to explain what the changes are* ‘Not aware of common law’. But secure site which is fenced off with 24/7 security, aware of duty of care (e.g. have providing signs on sinking areas of ground). Had letter from the EA about flooding responsibilities
c) Are there any notable disadvantages of the change in regulations?	No
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	Designation is sensible for this site. It should have been obvious to make it not high risk, but understand that the designation process had to occur

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Private landowners and trusts

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting 08/08/2017 approx. 16:00

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	Dam height is correct, capacity seems a bit low, more like 200k m^3. Potentially could be the storage below natural ground
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes – since construction in 2009 No disputes
d) Are you the undertaker for any other reservoirs?	Not personally, RSPB have a number of LRRs and SRRs
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes – reservoirs have been split into high risk and not high risk
b) From your understanding, what were the intended / expected benefits of the regulation changes?	To focus attention to the reservoirs that are dangerous. Of the view that this is a reflection of the fact that no major incidences at LRRs in recent times – i.e. that the legislation in place is easily meeting standards. Large raised reservoirs can be not dangerous whereas SRR can, hence the change is absolving what can be an onerous process for the not dangerous ones
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	'Dangerous' is loss of life which is the highest concern, damage to property is secondary. Reservoirs in upland areas with houses and homes below which would be catastrophic if the dam breached. Whereas a reservoir in a flat environment such as this one has less impact. This one would flood footpaths but is not going to hurt anyone.
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3* ***4*** *5 – Very simple* Conversation with panel engineer to assist in the process.

	Generally terminology of the legislation can be confusing (including PE vs SE vs IE) Knew that there were changes to the legislation and there is a chance to be Not High Risk. Atkins had a contract to do some remedial works at the time, so asked them for advice. Wouldn't have known what would happen if designated as high risk, including that no timescales were provided. Not a formal process, but didn't personally mind as no concerns that wouldn't be not high risk. However if the site was a bit more ambiguous, would have wanted some more advice. Someone visited [assuming PE], said doesn't look like not high risk, then wrote a report, report sent off, then got letter saying not high risk.
c) Was the risk designation result anticipated and why?	Yes
d) Was a representation made?	No
If Y, was the representation successful?	N/A
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	Spoke to PE/Atkins for advice as established relationship with Atkins. Could have asked EA but PE was first port of call
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No – unless particular aspects come up for ad hoc inspections
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As they felt the site is not high risk, they felt that very little benefit to having a SE if not necessary. If there are any issues with reservoir in terms of function then they would get back in touch as in their interest to retain the water. Consequences are personal inconvenience (including damage to property) but no danger to anyone else. EA guidance [unsure which] recommends that even if have not high-risk reservoirs, the reservoirs should have inspections as best practice, but internally the organisation assessed it as not required (including as the cost is significant). If there were some specifics where the PE engineering expertise is required (e.g. if there were erosion issues) then they may have retained their services. Monitoring and maintenance is in place from the construction and inspection processes (defined by the PE etc); very straightforward and the in-house team will continue this going ahead. They can spot the signs of issues themselves now they know what to look out for. Also the first 5 years were regulated so had more inspections anyway; therefore had assurance of multiple inspections and the risks were noted
b) Have you retained an Inspecting Engineer?	No [not required yet as hasn't been constructed for 10 years]
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As above

c) Have you changed your frequency of monitoring and surveillance?	No – will continue with the in-house routine
d) How often do you visit the reservoir? What are the associated costs?	Offices are around the corner, so someone walking around it daily. Visitors centre on the reservoir bank (reservoir has become a reed bed) not like a standard agricultural reservoir. (Reeds currently block the wave action so risk is less)
e) Will you keep and maintain the Prescribed Form of Record?	Still have the book, nothing being added at the moment. Just keeping a watching eye, i.e. more informal record keeping. Water levels are monitored for other purposes, integrity is a secondary check. Sluice checked every 6 months and this will continue
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	Close to £5k for site visit time, reports, preliminary certificate, and final inspections. When constructed needed the PE advice to construct which was useful [talking about all costs of the Act. Would estimate that the cost of the designation would be £500 based on the SE cost of half a day's visit]
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* £500 (after final certificate, had to have top level PE quicker report from lower PE engineer. £0 after Never had a S10. Maintenance no difference as nothing really to do. Some checks on the sluices (costs are staff time), some maintenance might be needed in the future.
c) Will the overall change in cost be significant in terms of operating your business?	Yes; as a charity is a notable cost
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	No remedial works required yet as new reservoir *<£10k, < 10-100, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	In the future might split the reservoir in two via a bund for an access track [not remedial works]
Section 6 – Legislation	
a) What does not "High Risk"' mean to you? What are the main differences to a 'High Risk' reservoir?	As above, not dangerous/no risk of loss of life
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	*We need a briefing sheet in case we need to explain what the changes are* Yes, as a public site, always undergoing risk assessment procedures. E.g. if a car was flooded by a dam breach or fields flooded, aware of liability. Generally have a duty of care.

c) Are there any notable disadvantages of the change in regulations?	No
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	No, generally happy. When first had the reservoir and entered into the Act, aware that this is a big deal (expensive). As soon as a PE came, they advised that the site is not dangerous and hopefully would come out of the act in the future. Hence it made sense when the not high risk designation came through. Generally this risk designation approach is a more pragmatic approach, hence a positive step forward. SRRs - if they come onto the Act the risk designation process/legislation could be seen as a bad thing by other undertakers, but if the reservoirs are a risk to life then they should be on the list

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Farm

Attendees

Name	Company/organisation	Initials
Carrie Eller	Mott MacDonald	CE
Undertaker		GL

Date and time of meeting	09/08/2017 approx. 12:30

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	[Question not asked]
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes – for 10 years No disputes, solely on their land.
d) Are you the undertaker for any other reservoirs?	3 reservoirs, one is sunken into the ground. All are not high risk (help from a surveyor during the process)
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Not really. But aware of risk designation
b) From your understanding, what were the intended / expected benefits of the regulation changes?	Not too sure, high risk depends on where it is situated e.g. if nearer houses, or would flood other land. Volume stored above ground is minimal in this case
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	As above, near houses, flooding land
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4* ***5 – Very simple*** 5 – had it surveyed and all sorted out by the panel engineer
c) Was the risk designation result anticipated and why?	Yes
d) Was a representation made?	No
If Y, was the representation successful?	N/A

e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	No, assistance not required [other than the surveyor- assuming PE]
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Not needed
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Not needed
c) Have you changed your frequency of monitoring and surveillance?	No as the maintenance routine is all up and running e.g. making sure trees are not growing. Maintenance done themselves, and it is common sense to keep in order to stop deterioration. Wide bank and crest so risk is lower, and the reservoir was constructed around 20 years ago
d) How often do you visit the reservoir? What are the associated costs?	Very frequent, as it is on the main part of the farm. Staff are not far away in winter. They are winter storage pits so only extract in winter. Pumped as and when needed, anytime from November to March
e) Will you keep and maintain the Prescribed Form of Record?	Yes to be maintained, including submitting to the EA.
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	Yes - £3000 (was surprised at the high cost as the visit was only 2 hours, produced a folder of information), (Generally no costs other than surveyor [assuming PE] as in very good order; substantial and well-made reservoir. Banks very wide. Costs are just tree maintenance)
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* They weren't having annual visits before that so no cost saving [unsure if the reservoir has only just come on the register?]
c) Will the overall change in cost be significant in terms of operating your business?	Unsure
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	No major works *<£10k, < 10-100, £100- 500, £500k – 2M, > £2M*

e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	No, can't foresee any issues, the bank is well grassed over.
Section 6 – Legislation	
a) What does not "High Risk"' mean to you? What are the main differences to a 'High Risk' reservoir?	Not incurring damage to other places
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	*We need a briefing sheet in case we need to explain what the changes are* Yes – but all on our land in this case. Have signs up for 'danger of deep water' etc.
c) Are there any notable disadvantages of the change in regulations?	No
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	No

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Farm

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting	09/08/17 approx 10.15

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes – this year
b) Reservoir capacity / dam height / dam type	Yes - 227,000m^3, earthfill, 8m
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes – since it was built in 2011 No disputes
d) Are you the undertaker for any other reservoirs?	Yes – 3 other LRR
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes
b) From your understanding, what were the intended / expected benefits of the regulation changes?	Only benefit in this case is that there will be less site visits in the coming ten years. This is the only change, will look after the management and maintenance in house in the same way
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	If dam were to break, there are no people around that area of concern. My perception is that there is no risk to human life
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4* ***5*** *– Very simple* Didn't have to do anything, MM surveyor [assuming PE] went around the site, filled out the paperwork, then recommended to the EA that it was not high risk. Since construction less than 5 years ago has always been classed as High Risk until the survey was complete. Just got a letter to say no longer high risk
c) Was the risk designation result anticipated and why?	Possibly – it's something that wasn't seen as an issue, i.e. didn't perceive it as high risk.

d) Was a representation made?	No
If Y, was the representation successful?	N/A
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	No assistance sought. Would have gone to the PE if required
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	Yes - because of the nature of the estate, the designer comes in to do all annual inspections of the 4 reservoirs (the engineer designed 3 out of 4 of the reservoirs)
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	To make sure that nothing is eroding or deteriorating; don't want to have the high costs if deterioration has occurred.
b) Have you retained an Inspecting Engineer?	Yes would do (haven't had one yet as was constructed in 2011)
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As above, to make sure that the site is not deteriorating as it was a big investment
c) Have you changed your frequency of monitoring and surveillance?	No stayed the same
d) How often do you visit the reservoir? What are the associated costs?	When filling the reservoir (over winter) someone would be there every week (and is able to monitoring the clay lining). In the summer the pumps are operating so staff go daily. The visits do not include the full circumference of the reservoir but they do include the dam area
e) Will you keep and maintain the Prescribed Form of Record?	No the PFR will not be maintained- will record levels elsewhere in personal documents
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	Yes - paid the cost of the surveyor [assuming PE] to visit, which was approximately £350. This was included in the cost of him signing off the new reservoir
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* All costs staying the same. It is in own interest to maintain, this would be different if the reservoir was lined with a liner as then it would have a shorter design life and degradation is expected. Hence you wouldn't inspect annually. This reservoir is clay lined so inspected annually.
c) Will the overall change in cost be significant in terms of operating your business?	N/A

d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	None (newly constructed) *<£10k, < 10-100, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	Further works are to be anticipated. For a clay lined reservoir this will probably involve removing some silt and re-clay the major dam, also looking at establishing reed banks for wave erosion. Following this we would then have to do little works.
Section 6 – Legislation	
a) What does not "High Risk"' mean to you? What are the main differences to a 'High Risk' reservoir?	As above – no risk to human life
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	[Undertaker originally answered no] but have public liability insurance. Am aware of public liability
c) Are there any notable disadvantages of the change in regulations?	No can't see any, not as a private owner
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	We weren't particularly aware of the process, it just sort of happened. The survey was completed by MM and the engineer pointed out that the legislation was changing. But we haven't actually changed the management systems or the way the reservoir is looked after. If we had had to appeal then we would have wanted more information about the process. But in this case it went through easily

MOTT MACDONALD

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Private landowner and trusts

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting 09-08-2017 approx. 15:00

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	Yes all correct
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes, since it was rebuilt in 1993/4 (restructuring the surrounding banks and generally tidying up, adding clay interlinking piles to the dam structure)
d) Are you the undertaker for any other reservoirs?	No LRRs or SRRs
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Only from the high risk to low risk point of view
b) From your understanding, what were the intended / expected benefits of the regulation changes?	Saves £1500 from annual inspection fees
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	No risk at all as the dam has never breached, there is a properly constructed concrete spillway that is maintained. Generally the site is always maintained. The reservoir is non-impounding so there is control over the water levels which tend to deplete in summer. Some steel poles were put in that are always measured throughout the year, especially in winter, finding there has never been a mm of movement [focus on likelihood of risk]
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4* ***5*** *– Very simple* Very simple process
c) Was the risk designation result anticipated and why?	Yes – we'd already asked the question whether it should be on the list in the first place
d) Was a representation made?	No

If Y, was the representation successful?	N/A
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	No, the engineer that came provided advice (she has been on the site for a number of years for the annual inspections). No battle or confrontation about the process
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Any works are done ourselves. Management program is in place, including ensuring there are no trees and shrubs, keep clean and tidy, measure the points, maintaining the grass bank, revetment boards and brickwork.
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	If any issues will hire a PE or engineer as and when they happen
c) Have you changed your frequency of monitoring and surveillance?	No change
d) How often do you visit the reservoir? What are the associated costs?	The reservoir is within site of the owner. Other surveillance aspects include 3 monthly measurements, in the summer am down there regularly to maintain the grass, remove small weeds etc.
e) Will you keep and maintain the Prescribed Form of Record?	No maintenance of the PFR- records kept in separate file
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	None, the final inspection was £1200 and risk designation was done as part of this S12.
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* £1200 to £0 Inspecting engineer costs unknown Maintenance the same (can't put a figure on)
c) Will the overall change in cost be significant in terms of operating your business?	Yes significant
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	None *<£10k, < 10-100, £100- 500, £500k – 2M, > £2M*

e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	None anticipated
Section 6 – Legislation	
a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	No danger that the dam will give way and create flood further down the valley. No reason for it to move, no major issues [general focus on likelihood of dam failing, rather than consequence, but the latter was understood]
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	Will maintain the dam and keep at low risk and get an engineer in if required. Money spent on the sheet pilling, would take something very seriously wrong for the pilling to give way. Yes am aware of public liability.
c) Are there any notable disadvantages of the change in regulations?	No
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	No

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Industrial and commercial

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting 11/08/2017 14:00

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	112,000m^3 - difference in capacities likely accounting for storage below ground level. Seen as a reservoir because there is capacity above ground level, but different interpretations as to what is 'natural' ground as the land on site is built up ground
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes – since the ponds were built in the 1960s No disputes
d) Are you the undertaker for any other reservoirs?	Yes, reservoirs in England and in Scotland under both legislation
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes
b) From your understanding, what were the intended / expected benefits of the regulation changes?	To consider risk and allow for smaller reservoirs that may pose a risk to be accounted for. In addition, to reduce the burden on undertakers. The benefits were intended to be a combination of both of the above reasons, but it hasn't currently worked as many more reservoirs than expected have been kept as high risk.
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	There is a wide range of risks from reservoirs - from hundreds of lives being at risk to no one. SSE have reservoirs that span that range, where both lives and industry are at risk. Scotland legislation includes a wider range of aspects at risk, for example environment, heritage
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex* ***1*** *2 3 4 5 – Very simple* Unsure as we weren't involved in the decision-making process, generally not as simple as it should have been.

	Key reasons to improve- SSE gave a sensible representation but this wasn't believed and the EA had to get an independent engineer from MM to undertake a review. No point in asking people for representations if they are not going to be believed. Martin Airey came with the document produced by SSE, had the visit and had the same conclusion using own independent engineering judgment. Shouldn't have asked for personal information unless it was going to be believed/considered
c) Was the risk designation result anticipated and why?	No, it was anticipated it would be designated high risk, but not because it was believed it should be high risk. This is due to negative publicity stating that the majority of reservoirs were being designated high risk to be conservative, not accounting for site specific factors. This site in particular is a unique site. However, conservatism is to be expected as it is a national methodology
d) Was a representation made?	Yes
If Y, was the representation successful?	Originally not based on the information from the undertaker, but it was eventually with the PE information. Took 18 months all together.
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	SE engineer in SSE hence in-house advice.
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Not required; have engineers already looking after the towers, which the tanks come under
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Not required as above
c) Have you changed your frequency of monitoring and surveillance?	Not as such as it is a partially operational site (currently being decommissioned) with regular staff, not reservoir inspection specifically but it comes under the general one
d) How often do you visit the reservoir? What are the associated costs?	3 or 4 times a week (not weekends)
e) Will you keep and maintain the Prescribed Form of Record?	Keep the PFR, but unknown if will maintain it going forward
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	Not direct cost but staff time; approximately a week and a half worth of time which is equivalent to approximately £5000 (if applying an equivalent consultant charge rate). Primarily time preparing the representation. MA was paid for by EA so no charge there
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures*

	in the Interest of Safety) *Other* £1000, now will be £0 Typically £3.5k to £4000, now will be £0 Maintenance and Measures are the same
c) Will the overall change in cost be significant in terms of operating your business?	Not significant for SSE as a whole or the site itself
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	Not as a direct result of it being a reservoir, works occurred on the tower above. Smaller works on valves etc in-between which add up to between 10-1000 *<£10k,* ***< 10-100****, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	Unknown - waiting on decommission decision
Section 6 – Legislation	
a) What does not "High Risk"' mean to you? What are the main differences to a 'High Risk' reservoir?	Cost savings doesn't come into it. They are a responsible owner as they need to use the asset, so not High Risk comes down to legislation which is also defined differently in Scotland and England
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	Yes aware of liabilities
c) Are there any notable disadvantages of the change in regulations?	How it is has been handled and how it went could have been done better. But it is understood that there are not as many low risk sites than were expected so it has been more work [by the overseeing bodies/consultants] to handle them. Scotland regulations – defining a medium risk category in England and Wales as per the Scottish regulations would have given some leeway (however there have not actually been that many medium level designations in Scotland).
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	No

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Farm

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting	11/08/2017 Afternoon

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	[limited time so question not asked]
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes sole undertaker
d) Are you the undertaker for any other reservoirs?	No
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes
b) From your understanding, what were the intended / expected benefits of the regulation changes?	PE regulating the sites is not required. The size not risk method wasn't good. The statuary requirement for inspections boosted the PE cost notably
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	High risk reservoirs with dams across valleys and village downstream with not enough concrete. If a low area with puddle then not high risk if in middle of area with no houses and it's in the lowest part. Only risk if there is a break in and if someone vandalises but can't control this
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3* ***4*** *5 – Very simple* Just had a letter. The 80 page email complicated things
c) Was the risk designation result anticipated and why?	Yes
d) Was a representation made?	No
If Y, was the representation successful?	N/A

e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	No
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Cost savings, in house staff that could see if there was a hole
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	As abve
c) Have you changed your frequency of monitoring and surveillance?	No
d) How often do you visit the reservoir? What are the associated costs?	In winter the pumps run twice a week, which involves walking along the bank
e) Will you keep and maintain the Prescribed Form of Record?	Only used to fill it in the day before PE visits previously, so no
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	No
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* £700 for a nice booklet with pictures in that was similar to the one from the year before. Now £0 IE/S10 unknown
c) Will the overall change in cost be significant in terms of operating your business?	It will make them loose less money
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	None *<£10k, < 10-100, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	No

Section 6 – Legislation	
a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	As 1c
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	*We need a briefing sheet in case we need to explain what the changes are* Yes but couldn’t flood anyone if they tried.
c) Are there any notable disadvantages of the change in regulations?	No, only pluses
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	Why the government thinks it can employ people in useless jobs at great taxpayer expense to keep everyone busy [assuming generally reservoir safety staff], wouldn’t it be better to get people to do real jobs like manufacturing

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Farm

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting	201-08-11 Afternoon

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	Yes, information provided by undertaker based on construction report
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes as the General manager or the organisation
d) Are you the undertaker for any other reservoirs?	3 LRR
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	
b) From your understanding, what were the intended / expected benefits of the regulation changes?	Make sure that if flooded there is no risk to habitation, make sure the banks are sound. No risk to habitation or surrounding land
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	This site is in the middle of nowhere, all farmland all owned by the organisation
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2* ***3*** *4 5 – Very simple* Inspection visits by MM to check the site, deemed not required
c) Was the risk designation result anticipated and why?	Yes – dam is well constructed, not close to habitations, all surrounding farmland
d) Was a representation made?	Yes
If Y, was the representation successful?	Yes
e) Was an appeal made?	No

If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	I spoke to the Panel Engineer
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	Yes
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Richard Jackson is SE. Rosedene Reservoir is newly constructed and viewed as important to carry on (2 years constructed previously), keeping an expert to keep an eye on things. Likely every other year
b) Have you retained an Inspecting Engineer?	Yes
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Expertise
c) Have you changed your frequency of monitoring and surveillance?	Walk around frequently as have an active interest in maintaining it, monitor closely especially the newer ones on iste
d) How often do you visit the reservoir? What are the associated costs?	
e) Will you keep and maintain the Prescribed Form of Record?	Deemed not necessary to do a monthly level check after the first few. Will keep the PFR as a record as is quite useful for information e/g depth of dam board
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	No, panel engineer looking at other reservoir on site so no great expense
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* SE £800 roughly, stay the same Unknown considerably more ~£2000, stay the same Costs need reviewing at a later date– no savings experienced yet. Now aware of the legislation, new reservoir not inspected as often. They will review costings and see the difference and see if worth carrying with annual inspections at a later date
c) Will the overall change in cost be significant in terms of operating your business?	Yes
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	No *<£10k, < 10-100, £100- 500, £500k – 2M, > £2M*

e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	No
Section 6 – Legislation	
a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	As above, no risk to habitation
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	Yes public liability etc
c) Are there any notable disadvantages of the change in regulations?	No. Advantages of cost savings from non-compulsory inspections
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	The changes has been good for MM as have had lots of work producing the flood maps, unfortunately they have not been accurate

Prompt Sheet for Interviews

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews of undertakers of partially deregulated reservoirs
Interview reference	Farm

Attendees

Name	Company/organisation	Initials
Carrie Eller Undertaker	Mott MacDonald	CE

Date and time of meeting 2017/08/11 3pm approx.

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir is designated NOT 'High Risk'	Yes
b) Reservoir capacity / dam height / dam type	Yes approximately correct
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	Yes through Peter Waring Ltd as they are the landlord, Sutton Hoo manage the trading business.
d) Are you the undertaker for any other reservoirs?	There are several under PWL
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes – received notification
b) From your understanding, what were the intended / expected benefits of the regulation changes?	Didn't identify any benefits as a business; they were originally worried if the legislation changes would add anything in addition to the current regime. Incurred additional costs for the consultation at around £300 Advice that they received was that because the type of construction that they had that, there would not be major changes in terms of inspections. Already having to do the procedure even considered low risk. Some things in the regulation that they already knew about e.g. veg control already done as part of stewardship. Wasn't quite as first read the notification – the letter sounded that the regulations would have addition red tape. When they spoke to the consultant, the consultant said they have 20 other sites to review and return, so they were not alone in the process. Could argue that the only one benefitted has been the consultancy as lots of works have come through to them
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	Consequence of a breach considering properties within the designated overflow, the amount of water and the speed of the water. Also if have highway or byway flooding. Overarching aspect is the potential risk life

	There used to be a link through Defra to see the modelling where the water will go. [CE asked how SiE knew about this level of detail, was it through the information provided or personal research] Based on the letter drop, research was done online via the implications, when this was exhausted, spoke to a consultant (that they used for water and irrigation) to get a feel for the impacts. SiE from a risk management background.
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4* ***5*** *– Very simple* Consultant produced the technical responses. Very simple from their point of view, would take half an hour done via on online link in the letter.
c) Was the risk designation result anticipated and why?	No, only just because of the perception of the legislation changes and conservatism. Risk is about likelihood (for us, very remote risk of breach as its maintained as it should be) but consequence is very high. From a Defra perspective, more of a tendency to err on the side of caution due to the consequence. If a PE or Defra/EA make recommendation to downgrade, putting their reputation on the line. View that there is a tendency to be risk averse
d) Was a representation made?	No – researched about 2 mins to establish that success of appeal was very slim. Consultant said that anecdotally only 1 out of 20 of the ones they had seen were in a position with a likelihood of getting through the appeal process
If Y, was the representation successful?	N/A
e) Was an appeal made?	No
If Y, was the appeal successful?	N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	Consultant
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	Yes – the same consultant that advises is the same who was the same designer
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	Expertise
b) Have you retained an Inspecting Engineer?	No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	S10 covered by S12
c) Have you changed your frequency of monitoring and surveillance?	No stayed the same
d) How often do you visit the reservoir? What are the associated costs?	Production director is there at least weekly consistently over the year. There is a small fish syndicate through the business that are there regularly. For irrigation, from around April to Sept someone is there every day. Pumping station adjacent to the reservoir

e) Will you keep and maintain the Prescribed Form of Record?	Continue to use this system, not longer a requirement but internally it works well
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	£300 consultant time
b) What are the costs of the following aspects before and after partial deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* Unknown – include a visit and review paperwork. Will stay the same
c) Will the overall change in cost be significant in terms of operating your business?	No – minimal compared to other irrigation costs
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	None, only the pumphouses which are ancillary *<£10k, < 10-100, £100- 500, £500k – 2M, > £2M*
e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	No. Generally they looking at how to manage the resource better, maybe an additional reservoir (just initial discussion) [but this is not remedial works]
Section 6 – Legislation	
a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	As 1c
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	*We need a briefing sheet in case we need to explain what the changes are* Yes from their perspective is business as usual, not managed differently
c) Are there any notable disadvantages of the change in regulations?	No not that aware of. Other than the initial notification and working their way through it, they handed over to the consultant
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	No

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews with small business owners
Interview reference	Small Business Owner

Attendees

Name	Company/organisation	Initials
Peter Brinded	Mott MacDonald	PB
Unknown		

Date and time of meeting 04/08/17

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm the reservoir designated	• Not high risk
b) Reservoir capacity / dam height / dam type	• Embankment
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	• Sole undertaker
d) Are you the undertaker for any other reservoirs?	• No
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	• Aware that their reservoir has been designated as 'not high risk' but not aware of specifics of the legislation or the anticipated benefits etc.
b) From your understanding, what were the intended / expected benefits of the regulation changes?	
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	• Perception of the risk posed by their reservoir is that it is minimal risk as it is so remote. • However, MA lives downstream of Kilder Reservoir and so is generally aware of the need for reservoir legislation
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1* ***2*** *3 4 5 – Very simple* • Feels the process is unnecessarily complicated. The form was difficult to complete as it required very technical information. The contact person for the form was not helpful.
c) Was the risk designation result anticipated and why?	• Expected 'not high risk' as so remote but was 'high risk' • Noted that the reservoir is very remote
d) Was a representation made?	• Yes
If Y, was the representation successful?	• Yes it was successful…eventually. Took about a year. • Supervising Engineer did the majority of the work to get the designation.

	• Supervising Engineer was also surprised by the designation
e) Was an appeal made?	• N/A
If Y, was the appeal successful?	
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	• Sought advice from whoever sent the initial designation, but this was not helpful (recollection was that it wasn't the EA or Defra but perhaps a Consultant?)
Section 4 – Reservoir management of partially deregulated reservoirs	
a) Have you retained a Supervising Engineer?	• No, but if needed advice then would go back to previous SE
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
b) Have you retained an Inspecting Engineer?	• No
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
c) Have you changed your frequency of monitoring and surveillance?	• No surveillance. The reservoir is not used for commercial business
d) How often do you visit the reservoir? What are the associated costs?	
e) Will you keep and maintain the Prescribed Form of Record?	• No
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	• No, as Supervising Engineer gave his assistance for free
b) What are the costs of the following aspects before and after partial deregulation?	• Unknown
c) Will the overall change in cost be significant in terms of operating your business?	• No – not commercial use
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	• N/A

e) Do you anticipate similar works in the future now that the reservoir is only partially deregulated?	• N/A
Section 6 – Legislation	
a) What does not “High Risk”’ mean to you? What are the main differences to a ‘High Risk’ reservoir?	• Advice from Supervising Engineer
b) Are you aware of your remaining responsibilities for the partially deregulated reservoir?	
c) Are there any notable disadvantages of the change in regulations?	• None as yet
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	• No

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews with small business owners
Interview reference	Small Business Owner

Attendees

Name	Company/organisation	Initials
Peter Brinded Undertaker	Mott MacDonald	PB

Date and time of meeting 04/08/17

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm reservoir designation	• High risk • (Supervising Engineer comes once a year) • (Next S10 Inspection 2020)
b) Reservoir capacity / dam height / dam type	• Embankment dam
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	• Sole undertaker for dam and reservoir. • However, a different landowner of the land immediately downstream which is a difficult relationship.
d) Are you the undertaker for any other reservoirs?	• No
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	• Not fully aware of the changes, and doesn't really understand the engineering behind reservoir safety manager. • This undertaker appears to have an excellent relationship with his Supervising Engineer who manages dam safety
b) From your understanding, what were the intended / expected benefits of the regulation changes?	
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	• Based on risks downstream. Didn't expect the reservoir to be 'high risk' as there is only one occupied residential property downstream (Moat House and Mill House)
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4 5 – Very simple* • No comment as it was left to Supervising Engineer
c) Was the risk designation result anticipated and why?	• Anticipated 'not high risk' as the dam is of new construction (large dam, wide crest etc.) and the structure itself appears safe. • Dam was reconstructed in 2008 (with delays due to foot and mouth road closures and poor weather).

d) Was a representation made?	• No representation made, following advice from Supervising Engineer
If Y, was the representation successful?	• N/A
e) Was an appeal made?	
If Y, was the appeal successful?	
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	
Section 4 – Reservoir management of partially deregulated reservoirs	**Applicable to 'not high risk' reservoirs**
a) Have you retained a Supervising Engineer?	• N/A as remained 'high risk'
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
b) Have you retained an Inspecting Engineer?	
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
c) Have you changed your frequency of monitoring and surveillance?	
d) How often do you visit the reservoir? What are the associated costs?	
e) Will you keep and maintain the Prescribed Form of Record?	
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	• No
b) What are the costs of the following aspects before and after deregulation?	
c) Are these costs significant in terms of operating your business?	• Reservoir is loosely used for angling but is mainly private use. • Undertaker has restored the area/nature/beauty and wants to keep the area "wild" • Was used by Haywards Heath and District Angling Society but there was a disagreement on fishing techniques
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	• Unknown but 2008 works were in the thousands
Section 6 – Legislation	
a) What does "High Risk"' mean to you?	

b) Are there any notable advantages or disadvantages of the change in regulations?	
Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	• 2008 works were paid out of own pocket. Located in Area of Outstanding Natural Beauty and near the River Ouse but no financial assistance from any environmental bodies. • The previous undertaker was in to water skiing. Required a permit by the local council. Local council put reservoir on register. Previous undertaker lowered the water level (to get out of the 1975 Act). Fell in to disrepair. • 2008 works brought the reservoir up to scratch. Problems with unauthorised access to the crest (despite there being a PROW nearby). Wear and tear of the dam crest could be a dam safety issue. Had hoped for assistance from Environment Agency. Supervising Engineer was a big help.

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews with small business owners
Interview reference	Small Business Owner

Attendees

Name	Company/organisation	Initials
Peter Brinded Undertaker	Mott MacDonald	PB

Date and time of meeting 07/08/17

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm reservoir designation	• High risk
b) Reservoir capacity / dam height / dam type	• No details to hand
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	• Sole undertaker
d) Are you the undertaker for any other reservoirs?	• Just the one
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	• Not in great detail but a letter was received
b) From your understanding, what were the intended / expected benefits of the regulation changes?	• Unknown
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	• Aware that there are residents that could be affected a quarter of a mile downstream. However, the channel is deep and the perception is that the properties would be ok in the event of a breach.
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4 5 – Very simple* • Did not engage with the risk designation process. Accepted the designation.
c) Was the risk designation result anticipated and why?	• Thought it would not high risk (for reason discussed above)
d) Was a representation made?	• No. Assumed the Environment Agency was correct.
If Y, was the representation successful?	• Undertaker appeared reluctant to engage with government body for fear it would make the situation worse (management more onerous)
e) Was an appeal made?	

If Y, was the appeal successful?	• N/A
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	• No advice was sought
Section 4 – Reservoir management of partially deregulated reservoirs	**Applicable to 'not high risk' reservoirs**
a) Have you retained a Supervising Engineer?	• N/A
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
b) Have you retained an Inspecting Engineer?	
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
c) Have you changed your frequency of monitoring and surveillance?	
d) How often do you visit the reservoir? What are the associated costs?	
e) Will you keep and maintain the Prescribed Form of Record?	
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	• No costs incurred as accepted the designation
b) What are the costs of the following aspects before and after deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* • Not applicable
c) Are these costs significant in terms of operating your business?	• The costs are considered significant (reservoir used for fishing)
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	• Yes – new wave wall (3ft), remove stoplog from spillway (which artificially raised top water level), remove vegetation from embankment • Around £4k • Perception was that the design scenario (snow melt + wind + heavy rain) was over the top
Section 6 – Legislation	
a) What does "High Risk"' mean to you?	• Impact on residents downstream
b) Are there any notable advantages or disadvantages of the change in regulations?	• Not to a 'high risk' reservoir

Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	• Would have preferred to have received the reasons for the provisional risk designation so that he could have considered a representation. • Fear of speaking to the authorities in case it makes the situation worse (seeking advice raises the profile of the reservoir)

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews with small business owners
Interview reference	Small Business Owner

Attendees

Name	Company/organisation	Initials
Peter Brinded Undertaker	Mott MacDonald	PB

Date and time of meeting 08/08/17

Question	Response
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm reservoir designation	• 'high risk'
b) Reservoir capacity / dam height / dam type	• 5.7m high earthfall dam
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	• Sole undertaker
d) Are you the undertaker for any other reservoirs?	• No, just Manley Mere
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	• Yes
b) From your understanding, what were the intended / expected benefits of the regulation changes?	• None seen
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	• Understands that reservoirs pose a risk to those living downstream • However, cannot see the risk from this reservoir. If the dam fails the water would flow down Peckmill Brook. There are no houses only fields. Nearest town Helsby is 2 miles away. • Supervising Engineer also thought the reservoir would be 'not high risk'.
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4 5 – Very simple* • Did not engage with the risk designation process.
c) Was the risk designation result anticipated and why?	• No – anticipated 'not high risk' as reservoir should only flood fields
d) Was a representation made?	• No • A phone call was made to the Environment Agency for the reason for the designation

	• Did not agree but did not want to argue • Perception that the representation would be costly (time and money)
If Y, was the representation successful?	• N/A
e) Was an appeal made?	
If Y, was the appeal successful?	
f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	• Spoke to Supervising Engineer who also thought it was 'not high risk'
Section 4 – Reservoir management of partially deregulated reservoirs	**Applicable to 'not high risk' reservoirs**
a) Have you retained a Supervising Engineer?	
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
b) Have you retained an Inspecting Engineer?	
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
c) Have you changed your frequency of monitoring and surveillance?	
d) How often do you visit the reservoir? What are the associated costs?	
e) Will you keep and maintain the Prescribed Form of Record?	
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	• No as did not engage in the process
b) What are the costs of the following aspects before and after deregulation?	• N/A
c) Are these costs significant in terms of operating your business?	• £800 a year for Supervising Engineer; £ks for ten-year inspection. • (Unknown whether this is significant in terms of business)
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	• Been the undertaker for 20 years with no significant works • General tidying, extra stone pitching, removal of vegetation etc.
Section 6 – Legislation	
a) What does "High Risk"' mean to you?	• Discussed in section 2
b) Are there any notable advantages or disadvantages of the change in regulations?	• No changes

Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	• That the reservoir's designation should be revisited as the perception is that it is not high risk • Reservoir is their livelihood and checked every day. Lives on site. Constant surveillance. Perhaps this should be considered in risk designation. • Has heard that reservoirs are being kept as 'high risk' so that "backs are covered" in the event of a failure (i.e. the process has been conservative)

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interviews with small business owners
Interview reference	Small Business Owner

Attendees

Date and time of meeting	By e-mail 15 August 2017

Question	
Introduction	
Section 1 – Confirmation of baseline data / designation history	
a) Confirm reservoir designation	High Risk
b) Reservoir capacity / dam height / dam type	67,800 cum, height 10m, type earth embankment.
c) Are you the sole undertaker of the reservoir? How long have you been undertaker for?	No – primary undertaker since 2013
d) Are you the undertaker for any other reservoirs?	No
Section 2 – General	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	In outline
b) From your understanding, what were the intended / expected benefits of the regulation changes?	A more risk based approach to reservoir safety so that resources can be better directed.
c) What is your perception of the risk posed by Large Raised Reservoirs to those living downstream?	Direct risk of inundation and secondary risk of loss of infrastructure.
Section 3 - Risk designation process	
a) How would you rate the simplicity of the risk designation process? What is the reason for your score?	*0 – Complex 1 2 3 4 5 – Very simple* Not a question that can be answered simply.
c) Was the risk designation result anticipated and why?	Yes – has always been a Cat A dam.
d) Was a representation made?	No
If Y, was the representation successful?	
e) Was an appeal made?	No
If Y, was the appeal successful?	

f) Did you seek assistance during the process? Did you feel there was suitable information available to you? Would you know who to ask if your required assistance?	No. Would have sought assistance via the Supervising Engineer if required.
Section 4 – Reservoir management of partially deregulated reservoirs	**Applicable to 'not high risk' reservoirs**
a) Have you retained a Supervising Engineer?	
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
b) Have you retained an Inspecting Engineer?	
If Y, what are the key reasons for doing so? And what is the planned frequency of visits?	
c) Have you changed your frequency of monitoring and surveillance?	
d) How often do you visit the reservoir? What are the associated costs?	
e) Will you keep and maintain the Prescribed Form of Record?	
Section 5 - Costs	
a) Did you incur costs as part of the reservoir risk designation process? Please provide some information	No
b) What are the costs of the following aspects before and after deregulation?	*Before* *After* *Supervising engineer & record keeping* *Inspection by an inspecting engineer* *Maintenance* *Cost of remedial works (including Measures in the Interest of Safety)* *Other* *No change before and after*
c) Are these costs significant in terms of operating your business?	Yes
d) What major works have occurred in the last 30 years? Please provide the nature of the works and indicative cost	*Improvements to the northern spillway and total rebuild of the southern* spillway. In excess of £500,000
Section 6 – Legislation	
a) What does "High Risk"' mean to you?	We continue as before.
b) Are there any notable advantages or disadvantages of the change in regulations?	No

Section 7 – Other	
d) Are there any other comments the interviewee would like to make about the deregulation process and its impact?	

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interview with Emergency Planners

Attendees

Name	Company/organisation	Initials

Date and time of meeting	Questionnaire was returned via email

Question	Response
Introduction	
Section 1	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes
b) Are you aware of how this could lead to partial deregulation of LRRs within your jurisdiction?	Yes. The introduction of a risk based approach to large raised reservoirs means that 'Non-high risk' reservoirs are not subject to the full requirements of the Reservoir Act 1975.
c) What is your / your LRF's perception of the risk posed by LRRs?	The LRF has risk assessed 'H44: Major reservoir dam failure/collapse'. The outcome of the assessment was: · Likelihood: 1 · Impact: Significant · Overall: Medium
Section 2 – Emergency response	
a) How might the introduction of partially deregulated LRRs change how you plan for an emergency	The plan was only written in October 2016 and exercised in February 2017. Therefore the partial deregulation of the 'Non-high risk' reservoirs had already started, and plan was written accordingly.
b) How might the introduction of partially deregulated LRRS change how you manage an emergency	The response to the reservoir emergency would not change. The plan is generic and its scope includes both high risk and non-high risk reservoirs.
c) Based on the above, do you think partial deregulation of LRRs is positive / negative development?	
Section 3 – Response to changes	
a) What changes have occurred since the changes brought about by FWMA2010	No changes because the plan was only written in 2016.
b) Has your perception of the risk of LRRs been changed by the FWMA2010?	After looking at the LRF risk assessments in 2009 and in 2016, the likelihood has remained the same but the impact has reduced from a 5 in 2009 to a 4 in 2016. It's not clear though as to whether this change was influenced by the change in legislation.
c) How do you perceive the risk of SRRs in your jurisdiction, noting they are not regulated	The number of SRR's in Cambridgeshire and Peterborough are currently unknown to us and they are not included in the risk assessment. However, I

	think that as they are unregulated they are likely to pose more of a risk than LRR's. The LRF plan is generic and will cover the response to an unknown SRR, but they aren't explicitly mentioned in the plan. In terms of emergency planning, if SRR's were regulated it would mean they need adding to the local risk assessments and the plan would need to be reviewed to ensure the response is still valid. A list would need to be added as an Appendix as well as updating the Resilience Direct Map that shows the location of the LRR's in the Cambs and Peterborough.
Close	No further comments.

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interview with Emergency Planners (West Mercia)

Attendees

Name	Company/organisation	Initials

Date and time of meeting	27/07/17 at 09:30

Question	Response
Introduction	
Section 1	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	· In a broad sense, reservoirs are maintained based on a volume threshold: above the threshold requires more maintenance than below the threshold.
b) Are you aware of how this could lead to partial deregulation of LRRs within your jurisdiction?	· Noted that interviewee is a Tactical Coordinator and has a high-level understanding of a broad range of subjects regarding emergency planning. The West Mercia LRF region covers Herefordshire, Shropshire, Worcestershire · MML explained the changes brought about by the FWMA2010, including the designation of 'high risk' and 'not high risk' and the differences between LRRs and SRRs.
c) What is your / your LRF's perception of the risk posed by LRRs?	· The understanding of high risk hazards tends to come from local knowledge. · In the region, one reservoir has been specifically risk assessed (including a visit) as it is located on top of the Malvern Hills and the potential projected flood wave is directed at a populated area. Flood inundation map is available for this asset. · It is known that if a reservoir fails there will be a potential emergency situation, but reservoir failure is seen as low consequence in the region (example gave was Ulley Reservoir, which had a large potential consequence – there is only one reservoir like this known to SP, as above, in the region). · Typically, the approach in the LRF is to have a generic plan for reservoirs. Individual reservoirs are not individually planned. The generic plan can be applied to all reservoirs.
Section 2 – Emergency response	
a) How might the introduction of partially deregulated LRRs change how you plan for an emergency	· No – approach is still to have a generic plan for reservoirs. Noted that this generic plan may be hindered (e.g. evacuations) if inundation maps are not available for 'not High Risk' reservoirs (noted that evacuations are not likely required if the reservoir is 'not high risk') · LRF have a catalogue of inundation maps · Main concern of LRF is fluvial flooding (2 main rivers in region) and creating emergency plans for that. For flooding it is a case of WHEN not IF. · The generic plan for reservoirs was created ten years ago and updated two years ago.

b) How might the introduction of partially deregulated LRRS change how you manage an emergency	· Have not been influenced by FWMA 2010
c) Based on the above, do you think partial deregulation of LRRs is positive / negative development?	
Section 3 – Response to changes	
a) What changes have occurred since the changes brought about by FWMA2010	· None
b) Has your perception of the risk of LRRs been changed by the FWMA2010?	
c) How do you perceive the risk of SRRs in your jurisdiction, noting they are not regulated	· Regardless of LRR or SRR, understanding is that if the reservoir is a threat to the community, there will be a plan in place. Generic plan is for all reservoirs. · Only those perceived as dangerous are looked at, decided by Defra/EA information given to emergency planners and councils.
Close	· In the LRF the biggest drivers for emergency planning are: o Things that actually happen in the region (e.g. fluvial flooding) o The National Resilience Planning Assumptions provided by the Cabinet Office in the National Risk Assessment. It gives a range of hazards (naturally occurring) and threats (malicious). If reservoirs are not in this document then they will unlikely be a priority to LRF (particularly with budget cuts). · A change in legislation may not necessarily be communicated through to LRF emergency planners in the same way that the above is.

MOTT MACDONALD

Questionnaire

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interview with Emergency Planners
Interview reference	

Attendees

Name	Company/organisation	Initials

Date and time of meeting	Returned by email

Question	Response
Introduction	
Section 1	
a) Are you aware of the changes to reservoir risk legislation brought about by the Flood and Water Management Act 2010?	Yes
b) Are you aware of how this could lead to partial deregulation of LRRs within your jurisdiction?	Yes
c) What is your / your LRF's perception of the risk posed by LRRs?	We currently assess reservoirs utilising the National Risk Assessment and Local Risk Management Guidance. This is done by a Risk Assessment Working Group (a sub group of the LRF). We currently categorise Major reservoir dam failure/collapse as a low likelihood but catastrophic impact giving an overall risk rating as High. This is in line with national guidance.
Section 2 – Emergency response	
a) How might the introduction of partially deregulated LRRs change how you plan for an emergency	LRF currently has a number of site specific plans and a generic reservoir plan. The principles in the generic plan can be applied to any reservoir. The plan currently has the maps available for all regulated LRRs. If maps and reservoir information was not produced for de regulated LRRs the LRF response to a LRR emergency would certainly be hindered.
b) How might the introduction of partially deregulated LRRS change how you manage an emergency	The management of a LRR emergency would be changed as key information about the undertaker, flood extent hazard and travel times may not be known. This could increase risks to responders and decrease response times as information would have to be acquired at the time.
c) Based on the above, do you think partial deregulation of LRRs is positive / negative development?	The category system already helped to prioritise the reservoirs so this is a further aid to this. However the lack of information on the low risk reservoirs would be a negative development.
Section 3 – Response to changes	
a) What changes have occurred since the changes brought about by FWMA2010	Prior to 2010 there was a plan for the Derwent Valley Reservoirs (a 3 reservoir cascade) but no plans for any others. When the 2010 requirements came in, funding was available for the "top 100" reservoirs for plans to be written. As such we completed plans for a number of our reservoirs that were in the top 100. We also completed a generic plan which covered the remaining reservoirs for which maps had now been produced.

	The site specific plans are very detailed and include for example: property information, evacuation zones and points, and details for the establishment of forward control points for emergency services. The generic plan is less detailed, the reservoirs are split into their category designation (A-D) and the amount of information available is graded between the designations with category A reservoirs having more information available than category D. Moving forward, there is no extra funding for reservoir planning, however as it has been identified as a high risk as part of the risk assessment process, a generic plan covering all high risk reservoirs will continue to be produced. All Derbyshire LRF plans are now written following the JESIP principles.
b) Has your perception of the risk of LRRs been changed by the FWMA2010?	Yes, due to the change in risk assessment and increase in available information about LRRs, reservoir emergencies are now considered high risk in line with national guidance.
c) How do you perceive the risk of SRRs in your jurisdiction, noting they are not regulated	Are they considered in any planning? – Not currently How many are in the local area? – Unknown What burden would be created if SRRs were regulated? If maps were produced, they would be added into the generic plan along with current LRRs. There would be a significant increase in work due to their inclusion initially but this would decrease long term as plans are updated as appose to being created from scratch.
Close	

MOTT MACDONALD

Interview Notes

Project title	380648 – Defra Risk-based Approach and Improving the Evidence Base Related to Small Raised Reservoirs
Subject	Interview with the Environment Agency (as Enforcement Authority)

Attendees

Name	Company/organisation	Initials
	Mott MacDonald (MML)	
	Mott MacDonald	
	Environment Agency (EA)	
	Environment Agency	

Date and time of meeting	18/07/17 at 1pm (teleconference)

Question	Response (notes taken by PB)
Introduction	
Section 1 – Impact on Environment Agency	
a) Has the FWMA 2010 increased or decreased the regulatory burden on the EA?	*In terms of the following aspects:* *i) In the short term (i.e. the designation process, representations etc.)* *ii) Anticipated in the long term now that the reservoirs are designated (managing incoming reports, representations, re-designations etc.)* *iii) Pressure regarding non-compliant undertakers – legal proceedings* *iv) Processing payments* *v) Other (e.g. – the Inspecting Engineer may make recommendations of measures to be taken with regard to the maintenance of the reservoir. These recommendations, under section 10(3), relate to maintenance works, which if not undertaken could lead to deterioration of the reservoir to such an extent as to impair safety)* · It has increased the regulatory burden. · Defra drafted the secondary legislation to the FWMA 2010. · The Environment Agency provided Defra with advice and evidence for the changes. · Also developed the risk designation methodology (with MML as consultant). · A temporary 12 month full time post was created to provide the advice and evidence. Developing the methodology took approximately 2 years (including running a consultation on the proposals) · Once the legislation was in force, a lot of time and resource was required. New post was created for at least a year (maybe longer). · Now that the majority of reservoirs are designated it should be “business as usual” from now on. · Although there are 10% less reservoirs that are actively regulated (‘high risk’) they still remain on the register, therefore there is still admin. work to undertake. · These 10% require periodic review in case conditions change that could change the risk designation. They are still subject to the Reservoirs Act 1975. They still remain a risk to the public. And so there is still work for the EA to do on the ‘not high risk’ reservoirs. · A medium risk category (where there is perhaps not an Inspecting Engineer but still a Supervising Engineer) would have reduced / transferred the burden from the EA to the Supervising Engineer (as in Scotland). · There should be a reduction in MIOS to enforce (perhaps too soon to say) but in general the deregulated reservoirs are flood category C and

	D which tend to have lower incidents of MIOS to enforce. Also, the EA put less resource in to chasing MIOS of Cs and Ds as (from a risk assessment) the risk to public is less than for As and Bs. So, it is clear that the reduction in burden of deregulating Cs and Ds is not great. · S12 reports are now sent to the EA to register/acknowledge, and therefore this has increased the admin. burden. · Matters in the Interest of Maintenance has also increased burden to EA. EA reviews the report and decides how to enforce and record on register. · Note that the introduction of maintenance to the Act has been difficult to enforce as there is no timeframe/deadline. It could have been useful, but Supervising Engineer's main power is to call for a S10, so there has been no benefit to date. · In the long term, it is difficult to see a reduction in burden on the EA. Burden would have been reduced by keeping Supervising Engineers for all reservoirs. In the absence of a Supervising Engineer, the EA will be regularly reviewing the hazard of 'not high risk' reservoirs (this is a good thing in terms of maintaining information on hazards such as reservoirs, but does not reduce burden to EA). · Noted that some of the flood maps were poor for risk designation. There is now a new specification and will soon be new flood maps. The EA may have to review all flood maps which could be a significant burden. This will increase burden again on the EA. · The general feeling is that, so far, deregulation hasn't helped as it has taken out only a limited number of Cs and Ds which weren't a large burden anyway. · The wording of the FWMA 2010 clause 2C is unhelpfully worded; "human life could be endangered" is quite open ended (poorly defined) and puts the responsibility for interpretation on to the EA. · So even if the reservoir is a minor hazard, the EA has been apprehensive to deregulate. Noted that if the EA was less risk adverse there could have been a greater reduction in burden. However, it is encouraging that the Appeal Court has upheld the EA's interpretation. · Drafting process for the FWMA 2010 Schedule 4 was EA to Defra to Parliamentary Draftsman. There was not the opportunity for the EA to review the draft bill. For example, the EA provided Defra with evidence for reasons to amend incident reporting. But only some, not all, of this recommendation was taken onboard. So, in hindsight the bill is adequate but could have been better. · There was a perception that politics rather than reservoir safety may have influenced the final wording of the amendments.
b) Are the regulations delivering the benefits to the Environment Agency as originally identified?	*Impact Assessment stated that the rationale for the risk-based policy is largely to correct a regulatory failure as current regulation does not properly account for the risk associated with different reservoirs and as a result forces an over-allocation of resources devoted to the safety of LRRs* *i) Does the regulation account for the risk associated with different reservoirs to be considered – is the risk being considered?* *ii) We understand that the number of deregulated reservoirs has not met expectations, is this seen as regulation not delivering the benefits anticipated?* · Noted that the interviewees were not involved in Defra's Impact Assessment, however we need to review/understand whether the EA's time was scoped in the Impact Assessment as there was much more EA time / resource than anticipated. Is this included in any reported cost saving?

	· Also noted that, with a full risk assessment, more reservoirs could be deregulated. However, the way the amendments to the Act are written ("human life could be endangered") the EA cannot do this. · The wording of the amendments was given careful consideration by EA's legal team. The FWMA 2010 gives them a duty to designate a reservoir but there is no strategy for how to designate a reservoir. Therefore, the EA felt the requirement to be cautious. · Appeals are seen as a positive thing and it allows an independent judge to review. To date, the judge has had the same interpretation as the EA. · The amendments to the FWMA 2010 went through a Red Tape Challenge (i.e. it is not acceptable to increase regulatory burden to UK PLC). Therefore, regulatory burden on LRRs has to decrease before regulatory burden on SRRs can increase. This is why the FWMA 2010 for reservoirs is to be implemented in two phases. Noted that this philosophy has little to do with reservoir safety. · The industry (British Dam Society) thought the legislation would deregulated Ds and some Cs and regulated SRRs however the legislation hasn't allowed that. Noted that it is the EA's role to implement the changes, not to review/amend them. · Including the probability component of risk is very difficult to assess and consequence is much simpler. However, should be noted that by using the LLOL algorithm in flood modelling, probability of loss to life is considered…probability of dam failure is not. · Noted that although the risk designation guidance presents criteria for determining whether life could be endangered on the basis of computation of Likely Loss of Life, it does not set down how Likely Loss of Life should be calculated. This has effectively allowed flexibility in determining an appropriate fatality rate. · The wording of the FWMA 2010 "in the event of an uncontrolled release of water from the reservoir" suggests a probability of failure of one. · Noted that the probability of failure of a dam changes on a daily basis. Supervising Engineers would be very useful if this is implemented. · The Act does not state what should happen when a reservoir is deregulated. It should be noted that the risk of failure will increase with a 'not high risk' designation as it is likely that maintenance and surveillance stops (or at least is reduced). · However, if the reservoir is deemed 'not high risk' then the consequence of failure (by implication) is negligible (i.e. not human life endangered).
c) Have there been any unexpected benefits to the changes?	· Records of reservoirs and data management has improved. · All LRR undertakers have been contacted. · EA has a greater presence / has engaged more with the BDS. · EA has greater contact with Supervising Engineers (particularly during the risk designation process). · Flood maps for LRRs have been reviewed and identified poor maps (which are prioritised for renewal). · The possibility of regulating SRRs means that evidence has been gathered for SRRs and by identifying waterbodies a number of LRRs have been identified and regulated.
d) Has there been any obvious omissions?	*If you could do the process again, what would be done differently?* · Not having a 'medium' risk designation, maintaining Supervising Engineers, was an omission and would have been helpful to EA. · Incident reporting could have been clearer. Undertakers must report incidents to the EA within a year. EA wanted sooner. EA seem to receive interim reports which tick the 'within a year' box and prevents the offence of not reporting an incident, but doesn't not fully report on

	the incident, which may take longer to receive, and is the reason for wanting incident reporting.
Section 2 – Impact on reservoir undertakers	
a) Are there any particular groups that seem to be benefiting from the new regulations	· Non-impounding reservoirs, farmers, flat catchment/land are the reservoirs that are typically deregulated.
b) Are there any groups that are not benefiting?	· Typically, water companies. Very few water company reservoirs were deregulated and most companies took the view that supervision and inspection would continue regardless of designation as this in an integral part of managing their assets
c) Has deregulation decreased the burden on rural communities and small business owners, as anticipated?	· The majority of beneficiaries have been farmers (East Anglian) and majority of private, single reservoir owners. · Noted here that there have been two challenges to 'not high risk' designation (one from the EA). Explained to undertaker that they still have a duty of care for the asset. · Believed that not spending the money on Supervising Engineers is a short-term benefit only. In the long term, without having an expert look at the structure regularly, the undertakers may find themselves needing a capital scheme to keep the asses in operation, where previously simple maintenance and help from the Supervising Engineer was sufficient. · Noted here that during the designation process the EA reported that 10% (not the anticipated 50%) of reservoirs would be deregulated. There is a briefing note from EA to Defra. · Also noted here that is has been difficult to find even category Ds which are 'not high risk' in the words of the amended Act. · With a view on SRRs, if there are 1300 SRRs (say) that would need to be registered, and only 10% would be 'high risk' (current EA estimates) then perhaps it is not worth the regulatory burden to register and designate (from a regulation/tax money perspective). Noted that perhaps hazards should be regulated regardless of reservoir capacity/volume.
d) Are reservoir undertakers retaining a voluntary element of self-regulation?	*In terms of:* *i) Volunteering information for designation and representation* *ii) Continuing to supervise and inspect their assets* · There are a number of undertakers known to be retaining Supervising Engineers (as they understand their civil liability and insurance responsibilities). Noted that a 'not high risk' reservoir undertaker no longer has to deal with the EA and can chose the frequency of Supervising Engineer visits…so there is an inherent cost saving here without jeopardising asset performance. · However, thought is that the majority may be pleased to dispense with the short-term cost.
e) In the opinion of the interviewee, are reservoir undertakers of partially deregulated reservoirs still aware of their responsibilities?	*Under the RA75 and FWMA2010* *Under common law / liabilities following a breach* · Probably not! Most undertakers do not appreciate the risk from the asset.

Section 3 - Risk designation	
a) Open question – how satisfied are you with the risk designation process?	· Discussed below.
b) How satisfied are you with the industry guidance available for assigning risk to reservoirs?	*The use of EA's Reservoir Risk Designation Guidance* *Use of other guidance e.g. FD2321* · The guidance doesn't discuss how to deal with new reservoirs, just existing ones. · There is an obvious caveat in the *EA's Reservoir Risk Designation Guidance* whereby if the risk thresholds are met it is 'high risk' and if there's no real evidence otherwise it is 'high risk'. Noted that perhaps there should have been trial runs/pilot studies to test the guidance. · The guidance document hasn't been updated since publication. The process has been followed but if rewritten today the process could be streamlined perhaps. · Perhaps the risk thresholds in the guidance and the wording of the Act ("endangerment to human life") are not compatible. For example, the flood map may show a LLOL of less than one, however the same flood map identifies a hazard to people. · In principle, the risk designation process looks at PAR rather than LLOL as the EA are looking at risk to people (e.g. roads…the LLOL calculation looks at properties only and not roads). · During the consultation on the process, it was believed the risk thresholds would be followed strictly. But as the flood maps were poor (distrusted) the precautionary principle was needed which recognises the data isn't perfect and requires a detailed review to make the risk designation. Examples of poor data include reporting of high LLOL which in fact were pylons not properties. · Also, if there is one property and the LLOL is reported as 0.3 (for example), the LLOL threshold was moved away from due to a lack of faith in the LLOL algorithm and flood maps. The EA couldn't accept the risk that the reservoir should be 'not high risk'. Noted that the reality of a flood could be very different to the one shown on the flood map. · There should be a published document which is the EA's response to the consultation of the guidance document. This should document the concerns over the flood maps and the need for the precautionary principle.
c) How would you rate the simplicity of the reservoir risk designation process? If below 3, what was the key issue?	*0 – Complex 1 2 3* ***4*** *5 – Very simple* · Became simpler as the process went on…and became more comfortable with the precautionary principle.
d) How would you rate the simplicity of the representation process? If below 3, what was the key issue?	*0 – Complex 1 2 3* ***4*** *5 – Very simple* · Should be simple for the undertaker to contest the designation. Expert opinion and evidence is not required for the EA to look again. · The frustration undertakers may have had is with the time taken for representations. This is because the representation process was undertaken simultaneously with the designation process. Now designations are largely over, the representations should be quicker. · Noted that new reservoirs should have construction documents, FRAs etc. to help with designations.
e) What are your thoughts on the Tribunal process	· The appeal process is OK from the EA perspective, although it is the EA that provides the information for the judge's determination.

	· It is simple for undertakers as every appeal is accepted with very little information/evidence needed (even as simple as "I appeal this decision"). · Noted that anyone with a grievance could have appealed and in fact the number of appeals is very small. · EA is happy as it has been a good test of their interpretation of the legislation.
f) Have you been surprised by the number of high risk designations?	*Under construction* ***114*** *High Risk* ***1664*** *Not High Risk* ***201*** *Unassigned* ***50*** *Total* ***2027*** *Plus thoughts on A, B, C and D versus high risk / not high risk* · The legislation is not what was expected by the EA, Defra or the reservoir industry. · But it has been implemented now 2000+ times without serious issues. · There has been a large learning curve which will be useful if needed to do again. · For the EA it has been a success as they have implemented what they were asked to do.
Section 4 - Costs	
a) What has been the typical cost of the process to the Environment Agency as the regulatory authority?	*In terms of the following aspects:* *i) To process designations* *ii) To process representations* *iii) To process legal proceedings* *iv) Ongoing administration of high risk reservoirs* · EA will revisit costs and come back to MML · EA time will be at least three person years of time as well as legal costs etc. · Plus consultancy fees
b) Moving forwards, are the costs to the Environment Agency expected to decrease?	· Costs and work load are likely to stay the same. Although designations have reduced, other admin. work is still ongoing (e.g. review of reservoirs)
Section 5 - Other	
a) Are there any other comments the Environment Agency wish to make about the risk designation process and its implications?	· Seems to be a big difference between what is expected in industry and what was drafted by government. The criticism levelled at the EA is perhaps unjust as the EA has delivered what they could / needed to within the Act. · Industry also expected the regulation of SRRs and LRRs and then the deregulation of 'not high risk' assets. This has not happened. · Noted that there is a perception in the industry that probability (in terms of risk) is important however the complexity of including probability with consequence should not be underestimated. Also stressed that probability may vary over time. · All reservoirs that present a hazard to life should be considered regardless of capacity.