

Public

Drought Plan

2022

APPENDIX 4 (draft)

Yorkshire Water

31/03/2021



YorkshireWater

In accordance with Drought Plan guidance, this statement certifies that Yorkshire Water's Drought Plan has been reviewed by our security team. Some information has been redacted or edited in this published version for reasons of national security.

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Appendix 4.1

North Area

Yorkshire Water Drought Plan supply side options: North Area Reservoir Group
Type of option: Reservoir group - compensation reduction
Location / Area affected or whole supply zone: Grid SWZ North Area
Summary description of actions: Compensation flows reduced to half or one third of normal flows to preserve reservoir stocks and extend the period that compensation flows can be maintained. Reductions will be considered on a selective basis as some releases are more critical than others
Preceding actions: Publicity campaign and temporary use bans in force (April to September)

Option name	North Area Reservoir 1	North Area Reservoir 2	North Area Reservoir 3	North Area Reservoir 4	North Area Reservoir 5
Trigger(s)	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks See further information below on downstream river users.	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1. Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) or Scargill Reservoir is below 25% (as per the temporary Local Enforcement Position (LEP)), 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks See further information below on downstream river users.	Triggers – Risk of shortage of supply established: 1. Individual Reservoir Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2. Individual Reservoir Stocks have crossed Drought Control Line and remained below for more than 4 weeks
Most likely authorisation in a drought (permit or order)	Permit	Permit	Action 1: LEP for duration of flow trial. Post formalisation of trial a permit will be required Action 2: permit	Permit	Permit
Current Legal Requirement (Compensation release, minimum maintained flow or authorised abstraction limit)	Compensation release 13.66 MI/d	Compensation release 0.46 MI/d (or 100,000 gallons per day as stated in the authorising Act)	Group compensation of 0.75 MI/d	Compensation release 18.19 MI/d (authorising Act defines release as a quantity of water not being less than 2,778 gallons per minute)	16 November – 15 April compensation release 16.90MI/d 16 April - 15 May and 16 October – 15 November compensation release 8.20 MI/d 16 May-15 October 3.90MI/d
Deployable Output of action - Variable depending on conditions and duration of drought permit	Action 1 Description Reduce compensation release by 50% to 6.83 MI/d providing 6.83 MI/d benefit	Reduce compensation release by 50% to 0.23 MI/d providing 0.23 MI/d benefit	LEP states 50% reduction in group compensation (to 0.38 MI/d). Currently for the duration of the trial (till Sept 2024) this would go through the LEP not a permit. But after Sept 2024, once formalised, YW would require a permit for this action.	Reduce compensation release by 50% to 9.10 MI/d providing 9.10 MI/d benefit	Depending on the time of year reduce compensation by 50% to: 8.45 MI/d between 16 November – 15 April 4.10 MI/d providing a benefit of 8.45 MI/d; or 4.10 MI/d between 16 April - 15 May providing a benefit of 4.10 MI/d; or 1.95MI/d providing a benefit of 1.95 MI/d
	Action 2 Description Reduce compensation release by 67% to 4.51 MI/d providing 9.15 MI/d benefit	Reduce compensation release by 67% to 0.15 MI/d providing 0.31 MI/d benefit	Drought Permit required: Reduce compensation release by 67%: group compensation reduced to 0.25MI/d;	Reduce compensation release by 67% to 6.00 MI/d providing 12.19 MI/d benefit	Depending on the time of year reduce compensation by 67% to: 5.58MI/d providing a benefit of 11.30 MI/d 2.71MI/d providing a benefit of 5.49 MI/d 1.29MI/d providing a benefit of 2.60MI/d
Implementation timetable Preparation time, time of year effective, duration	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year. Compensation release reductions may be phased to minimise effect on downstream watercourses. Duration: Minimum period of restriction typically 12 weeks				
Permissions required and constraints Including details of liaison with bodies responsible for giving any permits or approvals	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.				
Risks associated with option	Reduction in compensation releases / maintained flows have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.				
Risk to the Environment (Major/Moderate/Minor or uncertain)	Hydrological and water quality assessment identified a zone of impact of the drought option on: Pott Beck, the River Burn and the River Ure. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Major risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Holborn Beck and River Laver. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Minor risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Oak Beck and Oak Brook. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: River Washburn. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Major risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option of: River Washburn. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Minor risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.
Summary of likely environmental impacts Include details for features of moderate and major sensitivity and minor sensitivity features from designated sites	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: WFD compliance •Macroinvertebrates (Moderate) •Fish (Moderate) NERC and notable fish - numerous species (minor to Major) White-clawed crayfish (Moderate) Riolus subviolaceus (Minor) Water vole (Moderate) Ripon Parks SSSI (ineligible)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: WFD compliance •Macroinvertebrates (Moderate) •Fish (Minor) NERC and notable fish - numerous species (Minor to Major) Gryptodytes flavipes (Minor) White-clawed Crayfish (Moderate) Priority Habitat 453047- no main habitat but additional habitats present (Minor)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: WFD compliance •Macroinvertebrates (Moderate) •Fish (moderate) NERC and notable fish – numerous species (Moderate to Major) White-clawed crayfish (Moderate) Hydraena palustris (Minor) Priority Habitat 413440 - lowland fens (Minor)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: WFD compliance •Macroinvertebrates (Moderate) •Fish (Minor) NERC and notable fish – numerous (Moderate to major) White-clawed crayfish (Major) Psychomyia fragilis s (Minor) Water vole (Major)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: WFD compliance •Macroinvertebrates (Moderate) •Fish (Moderate) NERC and notable fish – numerous (Moderate to Major) Water vole (Major) Priority habitat 412935- lowland fens (Minor)
Baseline information used	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels; routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information, macroinvertebrate sampling data and UFE, WHPTNATXA and WHPTASPT EQI scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.				
Summary of additional baseline monitoring requirements	Details of additional baseline monitoring requirements are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.				
Mitigation measures	Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan				
Impact on other activities e.g. fisheries, industry etc	Screening identified possible impacts on: Angling on River Burn (uncertain) Further assessment is required on Nosterfield LNR to confirm the sensitivity.	Screening identified no potential impacts.	Screening identified no potential impacts.	Screening identified possible impacts on: Angling on River Washburn (uncertain)	Screening identified no potential impacts.
WFD Compliance	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on macroinvertebrates and fish would be negligible. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reaches 1 and 2: Impacts on macroinvertebrates and fish would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates would be moderate. Impacts on fish would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.
Additional information	N/A	N/A	The compensation from this reservoir is currently operated under a flow trial agreement held with the Environment Agency. The flow trial is expected to be formalised by 2025 and we will revise the drought option to reflect the conditions of the trial if required.	N/A	This reservoir cannot be supported by any other reservoirs therefore it has a trigger for implementing the drought action that is linked to its own stocks rather than regional stocks. However, if the regional trigger was met before the local trigger we would still consider applying for a permit for this site. This action will require a drought permit following formalisation of the current flow trial in 2020.

Appendix 4.2

North West Area

Yorkshire Water Drought Plan supply side options: North West Area Reservoir Group
Type of option: Reservoir group - compensation reduction
Location / Area affected or whole supply zone: Grid SW2 North West Area
Summary description of actions: Compensation flows reduced to half or one third of normal flows to preserve reservoir stocks and extend the period that compensation flows can be maintained. Reductions will be considered on a selective basis as some releases are more critical than others
Preceding actions: Publicity campaign and temporary use bans in force (April to September)

Option name	North West Area Reservoir 1	North West Area Reservoir 2	North West Area Reservoir 3	North West Area Reservoir 4	North West Area Reservoir 5	North West Area Reservoir 6	
Trigger(s)	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks	
Most likely authorisation in a drought (permit or order)	Permit	Permit	Permit	Permit	Permit	Permit	
Current Legal Requirement (Compensation release, minimum maintained flow or authorised abstraction limit)	Ensure a maintained flow of 6.00 Ml/d when the combined flow from North West Area Reservoirs 2 and 3 is 8.00 Ml/d, or 8.00 Ml/d whenever the combined compensation flow from North West Area Reservoirs 2 and 3 reduces from 8.00 to 6.00 Ml/d	4.00 Ml/d when both the North West Area Reservoirs 2 and 3 levels are above the control lines defined in the licences, or 5.25 Ml/d when the North West Area Reservoir 2 level is above the control line and North West Area Reservoir 3 level is below the control line, or 3.25 Ml/d when both reservoir levels are below the control lines	4.00 Ml/d when the reservoir level is above the control line defined in the licence, or 2.750 Ml/d when the reservoir level is below the control line	Compensation flow of 3.60 Ml/d, or 1.80 Ml/d when below control line	Currently operating under an agreement with the Environment Agency to release 6.3 Ml/d (compensation in the authorising Act is at mill owners discretion)	Currently operating under an agreement with the Environment Agency to release 1.00 Ml/d. The authorising Act requires 2/5 of the average daily inflow to the reservoir to be released between 05:00 and 20:00 every day except Sunday, Christmas Day & Good Friday	
Deployable Output of action - Variable depending on conditions and duration of drought permit	Action 1 Description	Maintained flow reduced to 4.0 Ml/d, providing a 2.0 Ml/d or 4.0 Ml/d benefit depending on the levels of North West Area Reservoirs 2 and 3	Reduce the compensation release required by 50% to 2.63 Ml/d providing a 2.63 Ml/d benefit or 1.63 Ml/d providing a 1.63 Ml/d benefit depending on whether the levels in North West Area Reservoirs 2 and 3 are above or below their control lines	Compensation release reduced by 50% to 2.00 Ml/d providing a benefit of 2.00 Ml/d or 1.38 Ml/d providing a benefit of 1.38 Ml/d depending on whether North West Reservoir 3 is above or below its control line	No action required	Current compensation release reduced by 50% to 3.15 Ml/d providing a 3.15 Ml/d benefit. A permit application may be required due to the specification in the Act to compensate at the mill owners discretion	Current compensation release reduced by 50% to 0.50 Ml/d providing 0.50 Ml/d benefit. A drought permit may be required to temporarily suspend the statutory requirement to release 2/5 of the inflow
	Action 2 Description	Maintained flow reduced to 2.67 Ml/d providing a 3.33 Ml/d or 5.33 Ml/d benefit depending on the levels of North West Area Reservoirs 2 and 3	Reduce the compensation release required by 67% to 1.73 Ml/d providing a 3.52 Ml/d benefit or 1.07 Ml/d providing a 2.18 Ml/d benefit depending on whether the levels in North West Area Reservoirs 2 and 3 are above or below their control lines	Compensation release reduced by 67% to 1.32 Ml/d providing a benefit of 2.68 Ml/d or 0.91 Ml/d providing a benefit of 1.84 Ml/d depending on whether North West Reservoir 3 is above or below its control line	Current compensation release reduced by 67% to 1.20 Ml/d providing a 2.40 Ml/d benefit	Current compensation release reduced by 67% to 2.08 Ml/d providing a 4.22 Ml/d benefit. A permit application may be required due to the specification in the Act to compensate at the mill owners discretion	Current compensation release reduced by 67% to 0.33 Ml/d providing 0.67 Ml/d benefit. A drought permit may be required to temporarily suspend the statutory requirement to release 2/5 of the inflow
Implementation timetable Preparation time, time of year effective, duration	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: Implemented when reservoir stocks approach drought control line so could be effective any time of year. Compensation release reductions may be phased to minimise effect on downstream watercourses. Duration: Minimum period of restriction typically 12 weeks						
Permissions required and constraints Including details of liaison with bodies responsible for giving any permits or approvals	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.						
Risks associated with option	Reduction in compensation releases / maintained flows have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.						
Risk to the Environment (Major/Moderate/Minor or uncertain)	Hydrological and water quality assessment identified a zone of impact of the drought option on River Worth. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on Leeming Water, Bridgehouse Beck, and the River Worth. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Minor risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on Moorhouse Beck, Bridgehouse Beck, and the River Worth. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on Denholme Beck. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on Hewenden/Harden Beck. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on Edwick/ Loadpit Beck. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Minor risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	
Summary of likely environmental impacts Include details for features of moderate and major sensitivity and minor sensitivity features from designated sites	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate to Major) White-clawed crayfish (Major) Otter (Negligible) WFD compliance Fish (Major) Macroinvertebrates (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate to Major) White-clawed crayfish (Moderate) Otter (Negligible) Riolus subviolaceus (Minor) WFD compliance Fish (Major) Macroinvertebrate (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate to Major) White-clawed crayfish (Moderate) Otter (Negligible) Riolus subviolaceus (Minor) WFD compliance Fish (Major) Macroinvertebrate (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate) White-clawed crayfish (Moderate) Otter (Negligible) Water vole (Moderate) WFD Compliance Invertebrates (Moderate) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate) White-clawed crayfish (Moderate) Otter (Negligible) Water vole (Moderate) WFD Compliance Invertebrates (Moderate) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) Otter (Negligible) Water vole (Moderate) WFD compliance Fish (Moderate) Macroinvertebrates (Moderate)	
Baseline information used	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels; routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information; macroinvertebrate sampling data and LIFE, WHPTNATX and WHPTASPT EQ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.						
Summary of additional baseline monitoring requirements	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.						
Mitigation measures	Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan						
Impact on other activities e.g. fisheries, industry etc	Screening identified no further impacts.	Screening identified possible impacts on: Angling - River Worth (uncertain)	Screening identified no further impacts.	Screening identified no further impacts.	Screening identified possible impacts on: Angling - Harden Beck (uncertain)	Screening identified no further impacts.	
WFD Compliance	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on fish would be major and for macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1 and Reach 2: Impacts on macroinvertebrates would be moderate. Impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on fish would be major and for macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1 and Reach 2: Impacts on macroinvertebrates would be moderate. Impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on fish would be major and for macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1 and Reach 2: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1 and Reach 2: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on macroinvertebrates and fish would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	
Additional information	N/A	N/A	N/A	N/A	N/A	N/A	

North West Area Reservoir 7	North West Area Reservoir 8	North West Area Reservoir 9	North West Area Reservoir 10	North West Area Reservoir 11	North West Area Reservoir 12
Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks	Triggers – Risk of shortage of supply established: 1. Individual Reservoir Stocks <Normal Control Line and approaching Drought Control Line (within 2 weeks) 2. Individual Reservoir Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1. Individual Reservoir Stocks <Normal Control Line and approaching Drought Control Line (within 2 weeks) 2. Individual Reservoir Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks	Triggers – Risk of shortage of supply established: 1. Individual Reservoir Stocks <Normal Control Line and approaching Drought Control Line (within 2 weeks) 2. Individual Reservoir Stocks have crossed Drought Control Line and remained below for more than 4 weeks
Permit	Permit	Permit only required if abstracting	Permit	Permit	Permit
Compensation release of 0.791 Ml/d (defined in the Act as 174,000 gallons/day)	Currently operating to release 0.43 Ml/d under agreement with the Environment Agency (the Act requires 110,273 gallons per working day Mon to Sat)	There is no requirement to meet a defined compensation release from this reservoir however, the licence includes a prescribed flow of 2.41 Ml/d whereby no water can be abstracted if the flow exiting the reservoir is below this level. We are not currently abstracting from the reservoir but this Drought Plan includes an option to bring the reservoir into supply.	Compensation release of 1.19 Ml/d (defined in the Act as 261,000 gallons/day)	Compensation releases from this reservoir vary during the year and are by flow trial agreement only: 1 Jan to 19 Apr 15.1 Ml/d 20 Apr to 10 May 7.8 Ml/d 11 May to 11 Oct 3.8 Ml/d 12-31 Oct 7.8 Ml/d 1 Nov to 31 Dec 15.1 Ml/d	Compensation release of 0.09 Ml/d (defined in the Act as 18,600 gallons/day)
Compensation release reduced by 50% to 0.40 Ml/d providing 0.40 Ml/d benefit	Current compensation release reduced by 50% to 0.22 Ml/d providing 0.22 Ml/d benefit Permit application would request a temporary change to the statutory requirement to a release half the current operating volume	Reduce the prescribed flow by 50% to 1.21 Ml/d providing 1.21 Ml/d benefit. This option is only relevant if we implement the option to put the reservoir back into supply.	Compensation release reduced by 50% to 0.60 Ml/d providing 0.60 Ml/d benefit	Compensation releases reduced by 50% to: 1 Jan to 19 Apr 7.55 Ml/d providing a 7.55 Ml/d benefit 20 Apr to 10 May 3.90 Ml/d providing a 3.90 Ml/d benefit 11 May to 11 Oct 1.90 Ml/d providing a 1.90 Ml/d benefit 12-31 Oct 3.90 Ml/d providing a 3.90 Ml/d benefit 1 Nov to 31 Dec 7.55 Ml/d providing a 7.55 Ml/d benefit Compensation releases reduced by 67% to: 1 Jan to 19 Apr 4.98 Ml/d providing a 10.12 Ml/d benefit 20 Apr to 10 May 2.57 Ml/d providing a 5.23 Ml/d benefit 11 May to 11 Oct 1.25 Ml/d providing a 2.55 Ml/d benefit 12-31 Oct 2.57 Ml/d providing a 5.23 Ml/d benefit 1 Nov to 31 Dec 4.98 Ml/d providing a 10.12 Ml/d benefit Reduce by 67% to 1.25 to 5 providing 2.55-10.12 benefit	Compensation release reduced by 50% to 0.05 Ml/d providing a 0.05 Ml/d benefit
Compensation release reduced by 67% to 0.26 Ml/d providing 0.53 Ml/d benefit	Current compensation release reduced by 67% to 0.14 Ml/d providing 0.29 Ml/d benefit Permit application would request a temporary change to the statutory requirement to a release half the current operating volume	Reduce the prescribed flow by 67% to 0.80 Ml/d providing 1.61 Ml/d benefit. This option is only relevant if we implement the option to put the reservoir back into supply.	Compensation release reduced by 67% to 0.39 Ml/d providing 0.80 Ml/d benefit		Compensation release reduced by 0.03 Ml/d providing a 0.06 Ml/d benefit

Hydrological and water quality assessment identified a zone of impact of the drought option on Jum Beck. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on Weecher Brow Beck and Gill Beck. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on Sluden Beck. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Minor risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on Embay Beck, Haw Beck and Eler Beck. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on the River Dibb. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Minor risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on Carr Beck. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Minor risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.
Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – brown trout and bullhead (Moderate to Major) Otter (Negligible) WFD compliance Fish (Moderate) Macronvertebrates (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Moderate) White-clawed crayfish (Major) Otter (Negligible) Water vole (Moderate) WFD compliance Macronvertebrates (Moderate) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate to Major) Otter (Negligible) Water vole (Moderate) WFD compliance Macronvertebrates (Moderate) Fish (Major)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) White-clawed crayfish (Major) Otter (Negligible) Water vole (Moderate) Riolus subvirococcus (Moderate) WFD compliance Fish (Major) Invertebrates (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: Fish – Atlantic salmon, brown trout and bullhead (Moderate to Major) White-clawed crayfish (Major) Otter (Negligible) WFD compliance Fish (Major) Macronvertebrates (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: Fish – brown trout and bullhead (Moderate to Major) White-clawed crayfish (Moderate) Otter (Negligible) Water vole (Moderate) WFD compliance Fish (Moderate) Macronvertebrates (Moderate)

Screening identified possible impacts on: - Angling on Jum Beck – (uncertain sensitivity)	Screening identified possible impacts on: - Angling (uncertain sensitivity)	Screening identified no further impacts.	Screening identified possible impacts on: - Angling (uncertain sensitivity)	Screening identified no further impacts.	
Reach 1: Impacts on macroinvertebrates and fish would be moderate The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on macroinvertebrates and fish would be moderate The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1 and Reach 2: Impacts on macroinvertebrates and fish would be moderate The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on macroinvertebrates and fish would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on fish would be major and for macroinvertebrates they would be moderate The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates would be moderate. Impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on fish would be major and impacts on invertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on fish and invertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.
N/A	This reservoir cannot be supported by any other reservoirs therefore it has a trigger for implementing the drought action that is linked to its own stocks rather than regional stocks. However, if the regional trigger was met before the local trigger we would still apply for a permit for this site.	This reservoir cannot be supported by any other reservoirs therefore it has a trigger for implementing the drought action that is linked to its own stocks rather than regional stocks. However, if the regional trigger was met before the local trigger we would still apply for a permit for this site.	N/A	This option could be applied for at the same time as the River Wharfe reduced regulated flow and the River Wharfe annual abstraction increase option depending on the potential benefits and impacts of implementing the options.	This reservoir was an Environment Agency option in the drought of 2018 and the Environment Agency applied to Defra for a drought order, however, due to sufficient rainfall following the application it was not granted. The Environment Agency has since reviewed the guidance and as Carr Bottom is linked to a Yorkshire Water supply licence it is a Yorkshire Water option. We have implemented an operational trigger where Carr Bottom is not used for supply below 50% stocks, and this should mitigate the need for the drought option. Because no support is available other than the two small upstream reservoirs, a local trigger has been applied. However, we may still apply for the permit as part of the North West Area if regional triggers are met.

Appendix 4.3

South Area

Yorkshire Water Drought Plan supply side options: South Area Reservoir Group
Type of option: Reservoir group - compensation reduction
Location / Area affected or whole supply zone: Grid SWZ South Area
Summary description of actions: Compensation flows reduced to half or one third of normal flows to preserve reservoir stocks and extend the period that compensation flows can be maintained. Reductions will be considered on a selective basis as some releases are more critical than others
Preceding actions: Publicity campaign and temporary use bans in force (April to September)

Option name	South Area Reservoir 1	South Area Reservoir 2	South Area Reservoir 3	South Area Reservoir 4	South Area Reservoir 5	South Area Reservoir 6
Trigger(s)	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks 3. For South Area Reservoirs 1, 3,4 and 5, which have variable compensation flows dependent on control lines, we will only reduce the compensation when the lower release is in effect. See additional information below on downstream river users.	Triggers – Risk of shortage of supply established: 1. Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks 3. For South Area Reservoirs 1, 3,4 and 5, which have variable compensation flows dependent on control lines, we will only reduce the compensation when the lower release is in effect.	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks 3. For South Area Reservoirs 1, 3,4 and 5, which have variable compensation flows dependent on control lines, we will only reduce the compensation when the lower release is in effect.	Triggers – Risk of shortage of supply established 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks 3. For South Area Reservoirs 1, 3,4 and 5, which have variable compensation flows dependent on control lines, we will only reduce the compensation when the lower release is in effect.	Triggers – Risk of shortage of supply established: 1. Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks
Most likely authorisation in a drought (permit or order)	Permit	Permit	Permit	Permit	Permit	Permit
Current Legal Requirement (Compensation release, minimum maintained flow or authorised abstraction limit)	Compensation release of 2.70 Ml/d when stocks are below a control line specified in the licence agreement or 4.00 Ml/d when above this control line.	Maintained flow: 11.82 Ml/d (May-Oct) 9.09 Ml/d (Nov-Apr)	Compensation release of 16.00 Ml/d when stocks are below a control line specified in the licence agreement or 21.70 Ml/d when above this control line	Compensation release of 9.10 Ml/d when stocks are below a control line specified in the licence agreement or 12.00 Ml/d when above this control line	Compensation release of 18.00 Ml/d when stocks are below a control line specified in the licence agreement or 28.00 Ml/d when above this control line	The licence agreement requires a 10.30 Ml/d compensation release from a point downstream of the reservoir however, under normal operations the release is made from the reservoir
Deployable Output of action - Variable depending on conditions and duration of drought permit	Action 1 Description	Reduce compensation release when stocks are below the specified control line by 50% to 1.35 Ml/d providing 1.35 Ml/d benefit	Normal Maintained flow 9.09 winter, 11.82 summer. Reduction of winter flow assessed. Reduce by 50% to 4.55 providing 4.55 benefit	Reduce compensation release when stocks are below the specified control line by 50% to 8.00 Ml/d providing 8.00 Ml/d benefit	Reduce compensation release when stocks are below the specified control line by 50% to 4.55 Ml/d providing 4.55 Ml/d benefit	Reduce compensation release when stocks are below the specified control line by 50% to 5.15 Ml/d providing 5.15 Ml/d benefit
	Action 2 Description	Reduce compensation release when stocks are below the specified control line by 67% to 0.89 Ml/d providing a 1.81 Ml/d benefit	Reduce by 67% to 3.00 providing 6.09 benefit	Reduce compensation release when stocks are below the specified control line by 67% to 5.28 Ml/d providing 10.72 Ml/d benefit	Reduce compensation release when stocks are below the specified control line by 67% to 3.00 Ml/d providing 6.10 Ml/d benefit	Reduce compensation release when stocks are below the specified control line by 67% to 3.40 Ml/d providing 6.90 Ml/d benefit
Implementation timetable Preparation time, time of year effective, duration	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year. Compensation release reductions may be phased to minimise effect on downstream watercourses. Duration: Minimum period of restriction typically 12 weeks					
Permissions required and constraints Including details of liaison with bodies responsible for giving any permits or approvals	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.					
Risks associated with option	Reduction in compensation releases / maintained flows have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.					
Risk to the Environment (Major/Moderate/Minor or uncertain)	Hydrological and water quality assessment identified a zone of impact of the drought option on Scout Dyke and River Don. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on River Don. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on Little Don River and River Don. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on Ewden Beck and River Don. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on River Loxley and River Don. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on River Rivelin and River Loxley. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.
Summary of likely environmental impacts Include details for features of moderate and major sensitivity and minor sensitivity features from designated sites	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) White-clawed crayfish (Moderate) Otter (Negligible) Water vole (Moderate) WFD compliance •Macroinvertebrates (Moderate) •Fish (Major) Priority habitat 452749/447335 (Negligible)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) White-clawed crayfish (Moderate) Chironydes dowsii (Minor) Otter (Negligible) Water vole (Moderate) WFD compliance •Macroinvertebrates (Moderate) •Fish (Major) Priority habitat 452749/447335 (Negligible)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) White-clawed crayfish (Moderate) Otter (Negligible) Water vole (Moderate) WFD compliance •Fish (Major) •Macroinvertebrates (Moderate) Priority habitat 452749/447335 (Negligible)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) White-clawed crayfish (Moderate) Riolus subviolaceus (Minor) Otter (Negligible) Water vole (Moderate) WFD compliance •Fish (Major) •Macroinvertebrates (Moderate) •Fish (Major) Priority habitat 452749/447335 (Negligible)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate to Major) White-clawed crayfish (Major) Otter (Negligible) Water vole (Moderate) WFD compliance •Macroinvertebrates (Moderate) •Fish (Major) Priority habitat 452749/447335 (Negligible)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate to Major) White-clawed crayfish (Major) Sisya terminalis (Minor) Otter (Negligible) Water vole (Moderate) WFD compliance •Macroinvertebrates (Moderate) •Fish (Major) Priority habitat 452749/447335 (Negligible)
Baseline information used	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels; routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information; macroinvertebrate sampling data and LIFE, WHPTNATXA and WHPTASPT EQJ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.					
Summary of additional baseline monitoring requirements	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.					
Mitigation measures	Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan					
Impact on other activities e.g. fisheries, industry etc	Screening identified further impacts: •Angling – Nether Mill fishery (uncertain)	Screening identified further impacts: •Angling – River Don (uncertain)	Screening identified no potential impacts.	Screening identified further impacts: Angling - Ewden Beck (uncertain)	Screening identified further impacts: Angling – River Loxley (uncertain)	Screening identified further impacts: Angling – River Rivelin (uncertain)
WFD Compliance	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3 and 4: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 5: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3 and 4: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 5: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2 and 3: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 4: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1 and Reach 2: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on macroinvertebrates would be moderate and impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.
Additional information	The control lines are being reviewed as part of an AMP7 investigation	The compensation is being reviewed as part of an AMP7 investigation	An AMP7 investigation will review the balancing of the Little Don reservoirs. If this results in a change to the drought options we will provide an update in annual reviews.	N/A	N/A	N/A

Appendix 4.4

South West Area

Yorkshire Water Drought Plan supply side options: South West Area Reservoir Group
Type of option: Reservoir group - compensation reduction
Location / Area affected or whole supply zone: Grid SW2 South West Area
Summary description of actions: Compensation flows reduced to half or one third of normal flows to preserve reservoir stocks and extend the period that compensation flows can be maintained. Reductions will be considered on a selective basis as some releases are more critical than others
Preceding actions: Publicity campaign and temporary use bans in force (April to September)

Option name	South West Area Reservoir 1	South West Area Reservoir 2	South West Area Reservoir 3	South West Area Reservoir 4	South West Reservoir 6
Triggers	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1. Individual Reservoir Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2. Individual Reservoir Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1. Individual Reservoir Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2. Individual Reservoir Stocks have crossed Drought Control Line and remained below for more than 4 weeks
Most likely authorisation in a drought (permit or order)	Permit	Permit	Permit	Permit	Permit
Current Legal Requirement (Compensation release, minimum maintained flow or authorised abstraction limit)	Compensation release 2.70 Ml/d	Compensation release: Jan-Sep: 3.78Ml/d at all reservoir levels Oct-Dec 15.12Ml/d, or 7.56 Ml/d when stocks below 50%.	Compensation release: Jan-Sep 3.24 Ml/d at all reservoir levels Oct-Dec 12.96 Ml/d or 6.50 Ml/d when stocks below 50%	Current compensation release of 3.42 Ml/d under an "enforcement position" agreed with the Environment Agency (statutory requirement for 82,500 gallons/hour from 6:00 am to 5:45 pm Mon - Fri and 6:00 am to 11:00 am Saturday)	Compensation release 3.02 Ml/d from Castle Carr but legal obligation is from Warley Moor
Deployable Output of action - Variable depending on conditions and duration of drought permit	Action 1 Description Reduce compensation release by 50% to 1.35Ml/d giving 1.35Ml/d benefit.	Compensation release reduced: Jan-Sept by 50% to 1.89 Ml/d providing a benefit of 1.89 or Oct- Dec by 50% to 3.78 Ml/d providing a benefit of 3.78 Ml/d when stocks below 50%	Compensation release reduced: Jan-Sept by 50% to 1.62 Ml/d providing a benefit of 1.62Ml/d or Oct-Dec by 50% to 3.25 Ml/d providing a benefit of 3.25 Ml/d when stocks below 50%	Reduce the current compensation release by 50% to 1.71 Ml/d providing a benefit of 1.71 Ml/d. The permit application would request a temporary change to the statutory requirement.	Compensation release reduced by 50% to 1.51 Ml/d providing a benefit of 1.51 Ml/d
	Action 2 Description Reduce compensation release by 67% to 0.89Ml/d providing 1.81Ml/d benefit	Compensation release reduced: Jan- Sept by 67% to 1.25 Ml/d providing a benefit of 2.53 Ml/d; or Oct- Dec reduce by 67% to 2.49 Ml/d providing a benefit of 5.07 ml/d when stocks below 50%	Compensation release reduced: Jan- Sept by 67% to 1.07 Ml/d providing a benefit of 2.17 Ml/d; or Oct- Dec by 67% to 2.15 Ml/d providing a benefit of 4.36 when stocks below 50% stocks	Reduce the current compensation release by 67% to 1.13 Ml/d, providing a benefit of 2.29 Ml/d. The permit application would request a temporary change to the statutory requirement.	Compensation release reduced by 67% to 1.00 Ml/d providing a benefit of 2.02 Ml/d
Implementation timetable Preparation time, time of year effective, duration	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year. Compensation release reductions may be phased to minimise effect on downstream watercourses. Duration: Minimum period of restriction typically 12 weeks				
Permissions required and constraints including details of liaison with bodies responsible for giving any permits or approvals	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.				
Risks associated with option	Reduction in compensation releases / maintained flows have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.				
Risk to the Environment (Major/Moderate/Minor or uncertain)	Hydrological and water quality assessment identified a zone of impact of the drought option on: Gorgie Lower Brook and Graining Water. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Acombden Water, Hebden Water and the River Calder. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Graining Water, Hebden Water and the River Calder. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Hebble Brook. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Luddenden Brook. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.
Summary of likely environmental impacts include details for features of moderate and major sensitivity and minor sensitivity features from designated sites	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) White-clawed crayfish (Moderate) Otter (Negligible) Water vole (Moderate) WFD compliance Macroinvertebrates (Minor) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) WFD compliance Macroinvertebrates (Minor) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: White-clawed crayfish (Moderate) Otter (Negligible) Water vole (Moderate) Heterophonus strigifrons (Minor) NERC and Notable Fish - numerous (Minor to Major) WFD compliance Macroinvertebrates (Minor) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish- numerous (Minor to Moderate) Otter (Negligible) Water vole (mod/Moderate) WFD compliance Macroinvertebrates (Moderate) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: White-clawed crayfish (Moderate) Otter (Negligible) NERC and Notable Fish – numerous (Minor to Major) WFD compliance Macroinvertebrates (Moderate) Fish (Moderate)
Baseline information used	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels; routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information; macroinvertebrate sampling data and LIFE, WHFNTATXA and WHPTASPT EQI scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.				
Summary of additional baseline monitoring requirements	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.				
Mitigation measures	Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan				
Impact on other activities e.g. fisheries, industry etc	Screening identified possible impacts on: Angling - River Worth (uncertain)	Screening identified no further impacts.	Screening identified possible impacts on: Angling - River Calder (uncertain)	Screening identified no further impacts	Screening identified no further impacts
WFD Compliance	Reach 1 and Reach 2: Impacts on fish would be minor and impacts on macroinvertebrates are not applicable for this waterbody. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on fish would be moderate and impacts on macroinvertebrates are not applicable for this waterbody. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 4 and 5: Impacts on fish and macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 5: Impacts on fish and macroinvertebrates would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates would be N/A. Impacts on fish would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on fish would be moderate and impacts on macroinvertebrates are not applicable for this waterbody. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3 and 4: Impacts on fish and macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 4: Impacts on fish and macroinvertebrates would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1 and Reach 2: Impacts on fish would be minor and the impacts on macroinvertebrate are N/A. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on fish would be moderate and impacts on macroinvertebrates are not applicable for this waterbody. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 4 and 5: Impacts on fish and macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 5: Impacts on fish and macroinvertebrates would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on macroinvertebrates and fish would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.
Additional information	N/A	N/A	This reservoir cannot be supported by any other reservoirs therefore it has a trigger for implementing the drought action that is linked to its own stocks rather than regional stocks. However, if the regional trigger was met before the local trigger we would still apply for a permit for this site.	N/A	This reservoir cannot be supported by any other reservoirs therefore it has a trigger for implementing the drought action that is linked to its own stocks rather than regional stocks. However, if the regional trigger was met before the local trigger we would still apply for a permit for this site.

South West Area Reservoir 7	South West Area Reservoir 8	South West Area Reservoir 10	South West Area Reservoir 11	South West Area Reservoir 12	South West Area Reservoir 13
Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks
Permit	Permit	Condition on a permit application for South West Areas 11 and 12	Permit	Permit	Permit
Compensation release is varied seasonally: Nov-Jan 10.60 M/d Feb-May and Aug-Nov 5.80 M/d June 4.50 M/d July 3.20 M/d	Compensation release is varied seasonally: Nov-Mar 6.90 M/d Apr-May and Aug-Oct 5.40 M/d Jun-Jul 4.80 M/d	Currently operating at a maintained flow of 18.00 M/d under a flow trial agreement	Current compensation release is 3.41M/d under a flow trial agreement with the Environment Agency (statutory compensation release is 18.01 M/d between 06:00 & 18:00 on Mon to Sat & 3.410 M/d all other hours)	Normal compensation release 5.90 M/d (stated on authorising Act as 898,000 gallons/day to stream & 400,000 gallons/day to mill continuous)	Normal compensation release 6.82 M/d (defined in Act as 1,500,000 gallons/day if abstracting)
Reduce the current compensation release by 50% to: Nov-Jan 5.30 M/d providing a benefit of 5.30 M/d Feb-May and Aug-Nov 2.90 M/d providing a benefit of 2.90 M/d June 2.25 M/d providing a benefit of 2.25 M/d July 1.60 M/d providing a benefit of 1.60 M/d The permit application would request a temporary change to the statutory requirement.	Reduce the current compensation release by 50% to: Nov-March 3.45 M/d providing a benefit of 3.45 M/d Apr-May and Aug-Oct 2.70 M/d providing a benefit of 2.70 M/d Jun-Jul 2.40 M/d providing a benefit of 2.40 M/d The permit application would request a temporary change to the statutory requirement.	Reduce maintained flow by 50% to 9.00 M/d providing a 9.00 M/d benefit	Flow trial agreement release of 3.41 M/d reduced by 50% to 1.71 M/d providing 1.71 M/d benefit Permit application would request a temporary change to the statutory requirement to a release half the current operating volume	Compensation release reduced by 50% to 2.95 M/d providing 2.95 M/d benefit	Compensation release reduced by 50% to 3.41 M/d providing 3.41 M/d benefit (release only required if abstracting)
Reduce the current compensation release by 67% to: Nov-Jan 3.50 M/d providing a benefit of 7.10 M/d Feb-May and Aug-Nov 1.91 M/d providing a benefit of 3.89 M/d June 1.43 M/d providing a benefit of 3.0 M/d July 1.06 M/d providing a benefit of 2.14 M/d The permit application would request a temporary change to the statutory requirement.	Reduce the current compensation release by 67% to: Nov-March 2.28 M/d providing a benefit of 4.62 M/d Apr-May and Aug-Oct 1.78 M/d providing a benefit of 3.62 M/d Jun-Jul 1.58 M/d providing a benefit of 3.22 M/d The permit application would request a temporary change to the statutory requirement. Reduce by 67% to 1.58-2.28	Reduce maintained flow by 67% to 6.00 M/d providing 12.00M/d benefit	Flow trial agreement release of 3.41 M/d reduced by 67% to 1.13 M/d providing 2.28 M/d benefit Permit application would request a temporary change to the statutory requirement to release one third of the current operating volume	Compensation release reduced by 67% to 1.95 M/d providing 3.95 M/d benefit	Compensation release reduced by 67% to 2.25 M/d providing 4.57 M/d benefit (release only required if abstracting)
Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year. Compensation release reductions may be phased to minimise effect on downstream watercourses. Duration: Minimum period of restriction typically 12 weeks		Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year. Compensation release reductions may be phased to minimise effect on downstream watercourses. Duration: Minimum period of restriction typically 12 weeks			
Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.		Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.			
Reduction in compensation releases / maintained flows have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.		Reduction in compensation releases / maintained flows have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.			
Hydrological and water quality assessment identified a zone of impact of the drought option on: Digley Brook and River Holme. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: River Holme. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: River Ryburn, Booth Dean Clough, Butts Clough, Booth Dean Clough, River Ryburn and the River Calder. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Booth Dean Clough and the River Ryburn. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: River Ryburn. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Cragg Brook. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.
Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) White-clawed crayfish (Moderate) Otter (Moderate) WFD Compliance Fish (Moderate) Invertebrates (Moderate) Cromwell Bottom LNR/LWS (Moderate), Southern Washlands LNR (Minor)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) White-clawed crayfish (Moderate) Otter (Moderate) Water vole (Moderate) WFD Compliance Fish (Moderate) Macroinvertebrates (Moderate) Cromwell Bottom LNR/LWS (Moderate), Southern Washlands LNR (Minor)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: Fish – brown trout, bullhead and grayling (Minor to Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: White-clawed crayfish (Moderate) Otter (Negligible) Water vole (Moderate) NERC and Notable Fish – numerous (Minor to Major) WFD compliance Macroinvertebrates (Moderate) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) Otter (Negligible) White-clawed crayfish (Moderate) WFD compliance Macroinvertebrates (Moderate) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: WFD compliance Macroinvertebrates (Moderate) Fish (Moderate) NERC and Notable Fish – numerous (Minor to Major)
Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels, routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information, macroinvertebrate sampling data and LIFE, WHPTNATXA and WHPTASPT EQI scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.		Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels, routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information, macroinvertebrate sampling data and LIFE, WHPTNATXA and WHPTASPT EQI scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.			
Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.		Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.			
Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan		Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan			
Screening identified no further impacts.	Screening identified no further impacts.	Screening identified possible impacts on: Canoeing - River Ryburn and Calder (TBC)	Screening identified possible impacts on: Angling - River Ryburn	Screening identified possible impacts on: Angling - River Ryburn	Screening identified no further impacts.
Reach 1, Reach 2 and Reach 3: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3 and Reach 4: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 5: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 6: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1, Reach 2 and Reach 3: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3 and Reach 4: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 6: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reaches 2 and 3: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1 and Reach 2: impacts on fish and macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: impacts on fish and macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 4: impacts on fish and macroinvertebrates would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: impacts on fish and macroinvertebrates would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1 and Reach 2: impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: impacts on fish and macroinvertebrates would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.
N/A	N/A	N/A	N/A	N/A	N/A

South West Area Reservoir 14	South West Area Reservoir 15	South West Area Reservoir 16	South West Area Reservoir 17	South West Area Reservoir 18	South West Area Reservoir 19	South West Area Reservoir 20
Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks
Permit	Permit	Permit	In agreement with Canal and Rivers Trust	Permit	Permit	Permit
Compensation release of 2.64 M/d (defined in Act as 580,000 gallons per day)	Compensation release of 3.49 M/d (defined in Act as 768,000 gallons/day continuous)	Compensation release of 1.36 M/d (defined in Act as 300,000 gallons/day continuous)	Current compensation release is 3.48 M/d average (9.09M/d maximum) (average value defined in Act as 280 million gallons/year)	Current compensation release is 8.07 M/d under an "enforcement position" agreed with the Environment Agency; (statutory requirement is 2,000 gals/minute between 06:00 & 18:00. 465 gals/minute between 18:00 & 06:00)	Maintained flow requirement of 7.27M/d (defined in the Act as 1,600,000 gallons/day maintained flow)	Current compensation release is 2.66 M/d under an "enforcement position" agreed with the Environment Agency (the statutory requirement is 951 gals/minute between 06:00 & 18:00 Mon – Sat)
Compensation release reduced by 50% to 1.32 M/d providing 1.32 M/d benefit	Compensation release reduced by 50% to 1.75 M/d providing 1.75 M/d benefit	Compensation release reduced by 50% to 0.68 M/d providing 0.68 M/d benefit	Compensation release reduced by 50% to 1.74M/d providing up to 1.74 M/d	Current compensation release reduced by 50% to 4.04 M/d providing 4.04 M/d benefit Permit application would request a temporary change to the statutory requirement to a release half the current operating volume	Compensation release reduced by 50% to 3.64 M/d providing 3.64 M/d benefit	Current compensation release reduced by 50% to 1.33 M/d providing 1.33 M/d benefit Permit application would request a temporary change to the statutory requirement to a release half the current operating volume
Compensation release reduced by 67% to 0.87 M/d providing 1.77 M/d benefit	Compensation release reduced by 67% to 1.15 M/d providing 2.34 M/d benefit	Compensation release reduced by 67% to 0.45 M/d providing 0.91 M/d benefit	Compensation release reduced by 67% to 1.16 M/d providing up to 2.32 M/d	Current compensation release reduced by 67% to 2.66 M/d providing 5.41 M/d benefit Permit application would request a temporary change to the statutory requirement to release a third of the current operating volume	Compensation release reduced by 67% to 2.40 M/d providing 4.87 M/d benefit	Compensation release reduced by 67% to 0.88 M/d providing 1.78 M/d benefit Permit application would request a temporary change to the statutory requirement to a release one third the current operating volume
	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year. Compensation release reductions may be phased to minimise effect on downstream watercourses. Duration: Minimum period of restriction typically 12 weeks				Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year. Compensation release reductions may be phased to minimise effect on downstream watercourses. Duration: Minimum period of restriction typically 12 weeks	
	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.				Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.	
	Reduction in compensation releases / maintained flows have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.				Reduction in compensation releases / maintained flows have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.	
Hydrological and water quality assessment identified a zone of impact of the drought option on: Elphinstock Brook and Turvin Clough. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Black Brook. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Bradshaw Clough. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Minor risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Huddersfield Narrow Canal. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Minor risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Wessenden Brook, River Colne and River Cöhe. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: River Colne. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Hall Dike and Brow Grains Dyke. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.
Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: Otter (Negligible) Water vole (Moderate) NERC and Notable Fish – numerous (Minor to Moderate) WFD compliance Macroinvertebrates (Moderate) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: White-clawed crayfish (Major) Otter (Moderate) Water vole (Major) NERC and Notable Fish – numerous (Moderate to Major) WFD compliance Macroinvertebrates (Moderate) Fish (Major)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: White-clawed crayfish (Moderate) Water vole (Moderate) Otter (Moderate) WFD compliance Macroinvertebrates (Minor) and Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: White-clawed crayfish (Moderate) Water vole (Minor)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Major) Water vole (Moderate) White-clawed crayfish (Major) Otter (Moderate) WFD Compliance Fish (Major) Macroinvertebrates (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous brown trout, bullhead and grayling (Minor to Major) Water vole (Moderate) Otter (Moderate) Water vole (Moderate) WFD Compliance Fish (Major) Macroinvertebrates (Moderate) Cromwell Bottom LNW/ LWS (Moderate), Southern Washlands LNR (Minor)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate to Major) Otter (Moderate) White-clawed crayfish (Moderate) Water vole (Moderate) WFD Compliance Fish (Moderate) Invertebrates (Moderate)
	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels; routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information; macroinvertebrate sampling data and LIFE, WHPTASPT EQ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA/ YWS knowledge.				Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels; routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information; macroinvertebrate sampling data and LIFE, WHPTASPT EQ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA/ YWS knowledge.	
	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.				Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.	
	Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan				Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan	
Screening identified no further impacts.	Screening identified no further impacts.	Screening identified no further impacts.	Screening identified possible impacts on: Angling and navigation on the canal (uncertain)	Screening identified possible impacts on: Angling and navigation on the River Colne (uncertain)	Screening identified no further impacts.	Screening identified no further impacts.
Reach 1 and Reach 2: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3: Impacts on fish and macroinvertebrates would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on fish would be major and impacts on macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates would be moderate. Impact on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	WFD Status is not determined for canals therefore no risk of deterioration for environmental features has been identified.	Reach 1: Impacts on macroinvertebrates would be moderate. Impacts on fish are N/A. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on fish would be major and for macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reaches 2 and 3: Impacts on fish would be major and for macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 4: Impacts on fish and macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 5: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reaches 1 and 2: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.
N/A	N/A	N/A	The canal cannot be supported by any other reservoirs. Implementation of the drought action will be done in consultation with the Canal and Rivers Trust.	N/A	N/A	N/A

South West Area Reservoir 21	South West Area Reservoir 22
Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1.Regional Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2.Regional Stocks have crossed Drought Control Line and remained below for more than 4 weeks
Permit	Permit
Current compensation release is 0.612 M/d under an "enforcement position" agreed with the Environment Agency (the statutory requirement is 156,960 gallons/day, 6/7 between 06:00 & 18:00 Mon - Sat and 1/7 between 18:00 & 06:00 Mon – Sat)	Current compensation release is 1.40 M/d under an "enforcement position" agreed with the Environment Agency (the statutory requirement is Badgergate Cough 50,605 gpd continuous, Badger Hey 4,320 gpd continuous, Lingards Wood 4,320 gpd continuous, Chain 4,320 gpd continuous, Cellars Cough 37,029 gpd continuous, Gatehead Cough 8,640 gpd continuous, Ellen Cough 22,217 gpd continuous, Elm House 27,154 gpd continuous, Bradley Brook 85 galls/minute between 06:00 and 18:00 Mon – Sat, Crowhill Cough 156 galls/minute between 06:00 & 18:00 Mon - Sat)
Current compensation release reduced to 0.31 M/d providing 0.31 M/d benefit Permit application would request a temporary change to the statutory requirement to a release half the current operating volume	Current compensation release reduced by 50% to 0.70 M/d providing 0.70 M/d benefit Permit application would request a temporary change to the statutory requirement to a release half the current operating volume
Current compensation release reduced to 0.20 M/d providing 0.41 M/d benefit Permit application would request a temporary change to the statutory requirement to a release one third the current operating volume	Current compensation release reduced by 67% to 0.46 M/d providing 0.94 M/d benefit Permit application would request a temporary change to the statutory requirement to a release one third the current operating volume
Hydrological and water quality assessment identified a zone of impact of the drought option on: Hoyle House Cough. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on: Bradley Brook. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.
Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: White-clawed crayfish (Moderate) Water vole (Moderate) Otter (Moderate) NEFC and Notable Fish – numerous (Moderate to Major) WFD compliance Macroinvertebrates (Moderate) Fish (Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NEFC and Notable Fish – numerous (Minor to Major) White-clawed crayfish (Moderate) Otter (Moderate) Water vole (Moderate) WFD compliance Macroinvertebrates (Moderate) Fish (Moderate)
Screening identified no further impacts.	Screening identified no further impacts.
Reach 1, Reach 2 and Reach 3: Impacts on macroinvertebrates would be minor. Impacts on fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 4: Impacts on macroinvertebrates, and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 5: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates would be minor. Impacts on fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2 and Reach 3: Impacts on macroinvertebrates would be moderate. Impacts on fish would be major. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 4: Impacts on macroinvertebrates, and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 5: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.
N/A	N/A

Appendix 4.5

River Options

Yorkshire Water Drought Plan supply side options: River options
Type of option: River Abstractions
Location / Area affected or whole supply zone: Grid SWZ
Summary description of actions: Temporary increase abstraction limits or alter river abstraction to provide more water for supply to customers
Preceding actions: Publicity campaign and temporary use bans in force (April to September)

Option name	River Ouse	River Ure	River Wharfe reduced regulated flow	River Wharfe annual abstraction increase	River Hull	River Derwent
Trigger(s)	Preceding actions: Publicity campaign and temporary use bans in force (April – September only) Triggers: Risk of shortage of supply established 1. Reservoir stocks approach the North Reservoir Group Drought Control Line (within 1-2 weeks)	Preceding actions: Publicity campaign and temporary use bans in force (April – September only) Triggers: Risk of shortage of supply established 1. Reservoir stocks approach the North Reservoir Group Drought Control Line (within 1-2 weeks)	Preceding actions: Publicity campaign and if applying in the summer a temporary use ban in force (April – September only) Triggers: Risk of shortage of supply established Reservoir stocks approach the North West Reservoir Group Drought Control Line	Preceding actions: Publicity campaign and if applying in the summer a temporary use ban in force (April – September only) Triggers: Risk of shortage of supply established Reservoir stocks approach the North West Reservoir Group Drought Control Line	Preceding actions: Publicity campaign and temporary use bans in force (April – September only) Triggers: Risk of shortage of supply established Other stocks for corresponding resource group approach the East Group Drought Control Line (within 1-2 weeks) or the naturalised flow on the River Hull at the gauging point is predicted to fall below 113.65M/d	Preceding actions: Publicity campaign and if applying in the summer a temporary use ban in force (April – September only) Triggers: Risk of shortage of supply established Reservoir stocks approach the Regional Drought Control Line
Most likely authorisation in a drought (permit or order)	Permit	Permit	Permit	Permit	Permit	Permit
Current Legal Requirement (Compensation release, minimum maintenance flow or authorised abstraction limit)	<ul style="list-style-type: none"> 300M/d when flows in Ouse (measured at a monitoring station downstream) are more than 1,000M/d 450M/d when flows in Ouse are between 650 and 1,000M/d 27M/d when flows in the Ouse are between 400 and 650M/d 10M/d when flows in the Ouse are less than 400M/d 	<ul style="list-style-type: none"> 46M/d when flows in Ure (measured at an upstream monitoring station gauge) are more than 300M/d 22.7M/d when flows in Ure are between 163 and 300M/d 3.27M/d when flows in the Ure are between 50 and 163M/d 0M/d when flows in the Ure are less than 50M/d 	<ul style="list-style-type: none"> 88.6M/d may be abstracted from the River Wharfe subject to the following conditions: <ul style="list-style-type: none"> When flow in the Wharfe is less than 252M/d YWS must release the amount abstracted from the Wharfe at the abstraction point plus an additional 22.7M/d When flow in the Wharfe is between 252M/d and 389M/d YWS must release the amount abstracted from the Wharfe at the abstraction point less 6.8M/d When flow in the Wharfe is between 389M/d and 488M/d YWS may abstract up to 88.6M/d (North West Area Reservoir 11 releases not required) When flow in the Wharfe is above 488M/d YWS may abstract up to 93.2M/d (North West Area Reservoir 11 releases not required) Abstraction limits on the Wharfe are 5,060 cubic metres per hour, 93,200 cubic metres per day, 23,742,000 cubic metres per year and at an instantaneous rate not exceeding 1,406 litres per second 	<ul style="list-style-type: none"> 88.6M/d may be abstracted from the River Wharfe at the abstraction point subject to the following conditions: <ul style="list-style-type: none"> When flow in the Wharfe is less than 252M/d YWS must release the amount abstracted from the Wharfe at the abstraction point plus an additional 22.7M/d When flow in the Wharfe is between 252M/d and 389M/d YWS must release the amount abstracted from the Wharfe at the abstraction point less 6.8M/d When flow in the Wharfe is between 389M/d and 488M/d YWS may abstract up to 88.6M/d (North West Area Reservoir 11 releases not required) When flow in the Wharfe is above 488M/d YWS may abstract up to 93.2M/d (North West Area Reservoir 11 releases not required) 5,060 cubic metres per hour 93,200 cubic metres per day 23,742,000 cubic metres per year At an instantaneous rate not exceeding 1,406 litres per second 	<ul style="list-style-type: none"> Hands off flow (HOF) of 45.45M/d Abstractions of up to 68.19M/d (acknowledging HOF) when flows are between 45.45 and 159M/d Abstractions of up to 113.65M/d when flows are between 159M/d and 340.95M/d, with specified residual flow left in river (NO CHANGE) Unlimited abstractions when flows are greater than 340.95 M/d (NO CHANGE) In reality, abstraction at higher flows is limited by infrastructure. 	<ul style="list-style-type: none"> The annual maximum volume we can take from the River Derwent Site 1 is 30,400 M/year and the daily maximum permitted is 114 M/d. Further upstream we are licensed to take 75,000 M/year from the River Derwent site 2. The licence agreements held with the Environment Agency for both sites, include an aggregated annual limit of 98,841 M/year and 205 M/d. To adhere to the licence conditions we control the volume abstracted daily to ensure we stay within the annual limit.
Deployable Output of action - Variable depending on conditions and duration of drought permit	Up to 60	Up to 3.27 (when flows are less than 50M/d)	Up to 22.70 (when flows are less than 252M/d)	Benefit will vary depending on which flow band the river is in and how many days of the licensing year remain at the time of applying	Up to 20.45	The benefit of the option will depend on when permission is granted, as it is related to the number of days left in the licensing year.
Action Description	Increase allowed abstraction in all but the highest flow band. This allows increased river abstractions, and protects reservoir stocks, allowing storage to be maximised during a drought.	River Ure increased abstraction - increase allowed abstraction in the lowest flow band. This allows increased river abstractions, and protects reservoir stocks, allowing storage to be maximised during a drought.	Reduce required North West Area Reservoir 11 support in the lowest flow band from 22.7M/d more than abstraction, to an amount equal to abstraction. This protects reservoir stocks at North West Area Reservoir 11, allowing storage to be maximised during a drought.	River Wharfe annual abstraction increase - The River Wharfe licensed abstraction volume is limited to 93.2M/d. However, the daily maximum allows us to take 93.2 M/d at flows greater than 488 M/d or 88.6 M/d at lower flows. In a normal year we control the volume abstracted daily to ensure we stay within the annual limit. This drought option is to increase the annual abstraction limit to allow abstraction of the licensed daily maximum (dependent on flow levels) for the remainder of the licensing year (April to March). This option will not change the daily licence limits at each flow band but will allow a greater volume of water to be abstracted in a licensing year. The benefit of the option will depend on when permission is granted, as it is related to the number of days left in the licensing year. The total maximum volume we can abstract in a licensing year (1 April to 31 March) will be increased to allow the licensed daily maximum volume to be abstracted for the remainder of the current year. All other licensing constraints will be unchanged.	River Hull increased abstraction - Reduction of Hands Off Flow threshold, increasing allowed abstraction in the lower flow bands.	River Derwent abstraction increase - The River Derwent option is to increase the volume we take in a licensing year from the River Derwent Site 1, whilst reducing the annual licence volume we are permitted to take from an upstream abstraction point on the River Derwent Site 2. The drought option would allow a temporary increase in the annual abstraction limit on the River Derwent Site 1 that would be balanced by a corresponding reduction in the annual limit on the River Derwent Site 2. The increased annual abstraction from the River Derwent Site 1 would allow abstraction of the licensed daily maximum for the remainder of the licensing year (April to March). This option will not change the daily licence limits at each site but will allow a greater volume of water to be abstracted from the River Derwent Site 1 in a licensing year. The aggregated limits applied to both abstractions would also remain in place.
Implementation timetable Preparation time, time of year effective, duration	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year Duration: Minimum period of restriction typically 12 weeks	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year Duration: Minimum period of restriction typically 12 weeks	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year Duration: Maximum of 3 months	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: January to March. We would not anticipate exceeding the annual licence limit until February at the earliest, and most likely March. Therefore the permit would only apply in February and March, however we might increase our daily average use from the date it was granted, no earlier than 1 January Duration: Maximum of 3 months	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year Duration: Minimum period of restriction typically 12 weeks	Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year Duration: Maximum of 3 months
Permissions required and constraints including details of liaison with bodies responsible for giving any permits or approvals	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required before a decision is made on the whether or not the application is granted. Liaise with Environment Agency.	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required before a decision is made on the whether or not the application is granted. Liaise with Environment Agency.	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required. Liaise with Environment Agency.	Permission from Defra or the Environment Agency required following application of a drought order or permit. A public enquiry may be required before a decision is made on the whether or not the application is granted. Liaise with Environment Agency.
Risks associated with option	Changes in operation to the current abstraction licence have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.	Changes in operation to the current abstraction licence have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.	Changes in operation to the current abstraction licence have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.	Changes in operation to the current abstraction licence have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.	Changes in operation to the current abstraction licence have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.	Changes in operation to the current abstraction licence have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.
Risk to the Environment (Major/Moderate/Minor or uncertain)	Hydrological and water quality assessment identified a zone of impact of the drought option on the River Ouse. The assessment concluded that there would be Minor impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on the River Ure. The assessment concluded that there would be Moderate impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.	Hydrological and water quality assessment identified a zone of impact of the drought option on the River Wharfe downstream of the abstraction until the tidal limit. The assessment concluded that there would be Moderate impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological screening assessed Negligible hydrological impacts of the drought permit conditions. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on the River Hull. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological screening assessed negligible hydrological impacts of the drought permit conditions. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.
Summary of likely environmental impacts include details for features of moderate and major sensitivity and minor sensitivity features from designated sites	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: Freshwater Fish (Diverse Salmonid) Water compliance - Moderate sensitivity to dissolved oxygen concentration standards and Moderate sensitivity to unionised ammonia concentration standards in the River Ouse at Nether Poppelton GB10402706950 NERC Act Section 41 priority species: fish - River Ouse: numerous (Minor to Moderate) Water vole (Moderate) Chrysopele graminis (Negligible) River Ouse LWS (Minor), Gullie Ponds LWS (Minor)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: Water vole (Moderate) Otter (Negligible) Five-lined pea mussel (Moderate) Rhyacophila fasciata (Moderate) NERC and Notable fish - numerous (Major) Ripon Parks SSSI (Negligible)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: Water vole (Moderate) Five-lined pea mussel (Negligible) NERC and Notable fish - numerous (Minor to Moderate) River Wharfe, Otley & Mid Wharfedale/ Wetherby LWS (Minor)	All relevant features were screened as with Negligible impacts.	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: Other (Negligible) Water vole (Negligible) NERC and Notable species - fish (Minor to Moderate)	All relevant features were screened as with negligible impacts
Baseline information used	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels, routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information, macroinvertebrate sampling data and LIFE, WHPFNATXA and WHPFASPT EQ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels, routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information, macroinvertebrate sampling data and LIFE, WHPFNATXA and WHPFASPT EQ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels, routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information, macroinvertebrate sampling data and LIFE, WHPFNATXA and WHPFASPT EQ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels, routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information, macroinvertebrate sampling data and LIFE, WHPFNATXA and WHPFASPT EQ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels, routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information, macroinvertebrate sampling data and LIFE, WHPFNATXA and WHPFASPT EQ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.	Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels, routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information, macroinvertebrate sampling data and LIFE, WHPFNATXA and WHPFASPT EQ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.
Summary of additional baseline monitoring requirements	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.	Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.
Mitigation measures	Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan.	Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan.	Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan.	In line with the DPC, only features identified as either: 1) uncertain; 2) moderate-major sensitivity or 3) minor sensitivity in a designated site form the scope of monitoring, environmental assessment and consideration of mitigation actions. On this basis no mitigation is required	Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan.	In line with the DPC, only features identified as either: 1) uncertain; 2) moderate-major sensitivity; or 3) minor sensitivity in a designated site form the scope of monitoring, environmental assessment and consideration of mitigation actions. On this basis no mitigation is required
Impact on other activities e.g. fisheries, industry etc	Screening identified no further impacts.	Screening identified possible impacts on: •Angling on River Ure (minor)	Screening identified no further impacts.	Screening identified no further impacts.	Screening identified possible impacts on: •Angling on River Hull (uncertain)	Screening identified no further impacts.
WFD Compliance	Reach 1: Impacts on fish macroinvertebrates would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on fish macroinvertebrates would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates would be moderate. Impacts on fish would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	A number of waterbodies were considered for assessment. The impacts would not associate with WFD deterioration in any of the waterbodies based on the criteria set out in the Environmental Assessment Report.	Reach 2: The impacts on fish would be moderate. The impacts on invertebrates would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Two waterbodies were considered for assessment. The impacts would not associate with WFD deterioration in any of the waterbodies based on the criteria set out in the Environmental Assessment Report.
Additional information	N/A	N/A	This option could be applied for at the same time as the River Wharfe annual abstraction increase and the North West Area Reservoir 11 option depending on the potential benefits and impacts of implementing the options.	This is a winter only drought option. It could be applied for at the same time as the River Wharfe reduced regulated flow and the North West Area Reservoir 11 option depending on the potential benefits and impacts of implementing the options.	N/A	This is a winter only drought option

Appendix 4.6

Extreme Options

Water Resource Zone	Type of action	Option	Summary of action	Trigger for action to be considered*	Likely benefit / saving	Barriers	Environmental impacts	Timescales	Priority order (on a scale of 1 to 3)**
Grid SWZ + East SWZ	Demand	Removal of exceptions	Removal of temporary use ban (TUBs) non-statutory exceptions and concessions so that greater restrictions are applied and to a greater number of customers.	Regional reservoir stocks forecast to fall below 20% within next 4 weeks	It is assumed total combined demand reduction due to TUBs and NEUB is 6%. This action would increase the potential of achieving 6%.	Changes to TUBs conditions may create confusion or impact on customer good will. The additional restrictions may be marginal. Savings may only be achieved during peak demands i.e. hosepipes and paddling pools are used excessively during hot, dry days. Many commercial business will be impacted although it is noted that statutory exceptions would still apply.	n/a	2 weeks to provide formal notice but would raise awareness through media channels once the trigger reached	1
Grid SWZ + East SWZ	Demand	Drought orders	Use full range of powers available with non-essential use (NEU) drought orders. Removal of non-statutory NEU exceptions and concessions so that greater restrictions are applied and to a greater number of customers. Assumes all supply-side permit applications (where a benefit is achieved) are already in place.	Level 3 actions in place and reservoir stocks one week from the DCL	It is assumed total combined demand reduction due to TUBs and NEUB is 6% of demand at time of implementing (50-75Ml/d). This action would increase the potential of achieving 6%.	Changes to NEUB may create confusion or impact on customer good will. The additional restrictions may be marginal. Many commercial business will be impacted although statutory exceptions would still apply.	N/A	2 weeks to provide formal notice but would raise awareness through media channels once the trigger reached	1
Grid SWZ + East SWZ	Demand	Yorkshire Water customer campaign	Create awareness of the situation and appeal for extreme demand reduction action e.g. reduce use to 50Ml/d. All media channels will be used including regular appearances on local news channels.	Level 3 actions in place and reservoir stocks one week from the DCL	Assumed up to 5% of demand at time of implementing (e.g. approximately 70Ml/d if average demand 1300Ml/d). This is unprecedented action. If all of Yorkshire Water's domestic customers reduced consumption to 50l/h/d around 400 Ml/d would be saved. However, we cannot assume all customers would achieve this volume.	Many customers may be unwilling or unable to reduce demand.	n/a	Would be a continual process from onset of drought with the level of messaging increasing	1
Grid SWZ + East SWZ	Demand	National Media & Communication	National campaigns to change culture (e.g. excessive water use seen as socially unacceptable), keeping customers aware of the current situation and risks if do not take extreme action. Produce guides for customers to demonstrate how to restrict water use e.g. to 50 litres/ person/day. Hard hitting messages and images will be developed and publicity increased by use of national campaign.	Level 3 actions in place and reservoir stocks one week from the DCL	As above however, a national campaign may have greater success.	Many customers may be unwilling or unable to reduce to 50 l/h/d. Requires all water companies to contribute and Government support to be a true national campaign.	N/A	0-6 weeks. It is assumed such a campaign would be developed through the National Drought Group prior to companies reaching extreme drought action triggers but could take several weeks to be fully implemented.	1 - assuming many companies impacted
Grid SWZ + East SWZ	Demand	Pressure management	Reduce pressure while still maintaining essential services e.g. night time reductions. Pumping stations and pressure reduction valves controlling water distribution would be optimised to a level that would just meet standards.	Level 3 actions in place and reservoir stocks one week from the DCL	0-2Ml/d	Pressure management in Yorkshire is controlled at a level that meets service standards and further achievable savings would be very low without creating a risk of failing service standards. Redeployment of operational staff to deliver this action would reduce other key operational activities including enhancing leakage reduction. We may therefore prioritise other drought management actions based on the likely benefits and	N/A	Would start when trigger reached but take up to several weeks to achieve full benefits.	1, but only if redeployment of operational staff considered most effective measure
Grid SWZ + East SWZ	Demand	Request commercial and agricultural water use reductions	Request non-households reduce use for purposes not prohibited by a drought order for a non-essential use ban. This could be by agreement with large users who may be able to operate differently e.g. reduce production at a site in the affected area if they have other sites elsewhere that could cope with additional demand.	Level 3 actions in place and reservoir stocks one week from the DCL	0-5Ml/d estimated as no data to base assumptions.	This action would be on a voluntary basis only and an agreement would need to be reached with the non-households able to support such reductions. Due to the high commercial impact alternative sources would need to be found and may not be available. Any costs incurred would be paid by YW.	N/A	Due to the nature of the request we would expect to take several weeks/months. We would start to consider at the point the trigger was reached but would not see a benefit until an agreement was made with the affected parties.	3
Grid SWZ + East SWZ	Demand	Water efficiency in non-household properties	We will seek to work with retailers to deliver water efficiency devices and advice to non-household water users.	Level 3 actions in place and reservoir stocks one week from the DCL	0 to 2Ml/d	The yield achieved would be dependent on retailers and non-household customers' participation. A contractor would need to be recruited to deliver the service.	N/A	6-12 months to allow for contractor to be recruited and service delivered to non-households.	2
Grid SWZ + East SWZ	Supply	Tankering	In an extreme drought water could be transferred within Yorkshire and from other companies if any customers supplies were at risk of running out. We may use in areas where network limitations prevent support from other assets and WTWs across the company.	Level 3 actions in place and reservoir stocks one week from the DCL. Would be linked to network and need during drought conditions.	If tankering within Yorkshire there would be no additional resource benefit, the benefit would be re-distribution available supplies to any areas of deficit. If tankering from out-side our supply area there would be a benefit but insufficient data to define.	Availability of tankers may limit this action. Other companies may experience drought at the same time and not be able to offer supplies.	N/A as this would be within licence permissions.	Provided tankers available can be implemented immediately to those areas where needed.	3 (although some small scale tankering may be required prior to level 3 actions being implemented)
Grid SWZ + East SWZ	Supply	Network changes	As an alternative to tankering our supply network could be extended to transfer water to areas at risk. This could be through use of overland pipes. Reservoir currently not used for supply. A drought order / permit would be needed to abstract up to 3 Ml/d, to be piped into an existing aqueduct, when yield available. There is also an ordinary supply-side drought option to reduce the compensation release from the reservoir (see Appendix 5).	Level 3 actions in place and reservoir stocks one week from the DCL. Would be linked to network and need during drought conditions.	No resource benefit as re-distribution of existing supplies.	Planning consents and DWI approvals would need to be sort.	Abstraction would be within existing permissions but additional pipelines would have an impact on the land. Low risk as making use of existing infrastructure but could require a reduced compensation release via drought permit/order. See Appendix 4.7 for further details.	3 - 12 months assuming necessary permissions granted	3
Grid SWZ	Supply	North West Reservoir 10	Relocate an existing unused borehole to a new location with improved water quality potential. A drought order or permit would be required to abstract from a new location.	In a second year of drought and reservoir stocks six weeks away from crossing the drought control line.	Up to 3Ml/d depending on reservoir stocks	Assumes permit/order would be granted. Would need to meet Water Supply (Water Quality) Regulations. Hydraulic connectivity requires investigation.	Surface water impact study required to assess. See Appendix 4.7 for further details.	Estimated 6 to 12 months, allowing for water quality testing, DWI approvals and Environmental Assessment Report (EAR) to be completed.	1, but only in a drought lasting two or more years
Grid SWZ	Supply	East Yorkshire Borehole 2	Relocate an existing unused borehole to a new location with improved water quality potential. A drought order or permit would be required to abstract from a new location.	In a second year of drought and reservoir stocks six weeks away from crossing the drought control line.	6Ml/d annual average and 9Ml/d daily maximum	Assumes permit/order would be granted. Would need to meet Water Supply (Water Quality) Regulations. Hydraulic connectivity requires investigation.	Surface water impact study required to assess. See Appendix 4.7 for further details.	Up to 12 months, allowing for hydrological impact assessment (HIA), water quality testing, EAR, and DWI approval.	1, but only in a drought lasting two or more years
Grid SWZ	Supply	North Yorkshire Groundwater increased abstraction	Apply for a drought permit / order to increase abstraction from an existing borehole.	In a second year of drought and reservoir stocks six weeks away from crossing the drought control line.	2Ml/d	Assumes permit/order would be granted. Hydraulic connectivity requires investigation (this has started for WRMP scheme but may require escalation if volume needed in a drought).	Surface water impact study required to assess. See Appendix 4.7 for further details.	Up to 12 months, allowing for HIA, EAR, water quality testing and DWI approval.	1, but only in a drought lasting two or more years
Grid SWZ	Supply (transfer)	Tees to Swale transfer	Import from Northumbrian Water Limited (NWL) via pipeline then river transfer.	In a second year of drought and reservoir stocks six weeks away from crossing the drought control line.	0-28Ml/d (assuming 40Ml/d discharged)	Discharge consents would need to be approved. Dependent on the water being available from NWL. High potential for en route losses reducing the benefit. Would need to meet Water Supply (Water Quality) Regulations. Environmental impact. Planning consents required.	Environmental investigation required. Invasive non-native species (INNS) present in the River Tees. See Appendix 4.7 for further details.	18 months allowing for EAR, bulk supply agreement with NWL, planning consents, construction and EA and DWI approvals. May require an Environmental Impact Assessment (EIA).	1, but only in a drought lasting two or more years
Grid SWZ	Supply (transfer)	Tees to Derwent pipeline	Import from NWL via a pipeline to a WTW via River Derwent Water Treatment Works 1.	In a second year of drought and reservoir stocks six weeks away from crossing the drought control line.	40Ml/d	Assumes permit/order would be granted. Would need to meet Water Supply (Water Quality) Regulations. Water availability in the river would be subject to hands off flow conditions. Environmental impacts require investigation. Planning consents required. Construction time overland pipes would be considered but dependent on planning consents.	Environmental investigation required. Invasive non-native species (INNS) present in the River Tees. See Appendix 4.7 for further details.	12-18 months allowing for EAR, bulk supply agreement with NWL, planning consents, construction and EA and DWI approvals. Assumes planning consents and potentially overland pipes approved. May require an Environmental Impact Assessment (EIA).	1, but only in a drought lasting two or more years
Grid SWZ	Supply	River Aire abstraction	Construct a new intake on the River Aire and pipeline to transfer to Bradford water treatment works. A drought permit / order would be required to abstract from the Aire.	In a second year of drought and reservoir stocks six weeks away from crossing the drought control line.	up to 50Ml/d dependent on water availability	Assumes permit/order would be granted. Would need to meet Water Supply (Water Quality) Regulations. Water availability in the river would be subject to hands off flow conditions. Environmental impacts require investigation. Planning consents required. Construction time overland pipes would be considered but dependent on planning consents.	Environmental investigation required. See Appendix 4.7 for further details.	12 months allowing for EAR, planning consents, construction and EA and DWI approvals. Assumes planning consents and potentially overland pipes approved. May require an Environmental Impact Assessment (EIA).	1, but only in a drought lasting two or more years
Grid SWZ	Supply	Ouse additional pumping station capacity	Install additional pumping capacity to transfer increased flow, under the existing licence, from an abstraction on the Ouse to a water treatment works in Leeds.	In a second year of drought and reservoir stocks six weeks away from crossing the drought control line.	10Ml/d	Benefit only available when river flow above hands off flow level. Benefit may be reduced when river flows low. Planning consents required.	Would be within existing licence permissions which include a hands off flow level. See Appendix 4.7 for further details.	6 to 9 months allowing for EAR	1, but only in a drought lasting two or more years
Grid SWZ	Supply	Ouse Water Treatment Works extension	Increase treatment works capacity to use water available under current licence.	In a second year of drought and reservoir stocks six weeks away from crossing the drought control line.	22Ml/d average (up to 60Ml/d licence maximum but 40Ml/d considered usable maximum)	Construction time could delay benefit. Water Supply (Water Quality) Regulations. River Ouse water is already used in supply and the risk that an increased abstraction would not meet drinking water standards is very low. Benefit may be reduced when river flows low. Planning consents required.	Would be within existing licence permissions but new infrastructure constructed. See Appendix 4.7 for further details.	12 to 18 months allowing for EAR and depending on permissions being granted and construction time. May require an Environmental Impact Assessment (EIA).	1, but only in a drought lasting two or more years
Grid SWZ	Supply	Ouse Raw Water Transfer	Construct a pipeline at Ouse abstraction intake to transfer water using an existing licence to River Derwent Water Treatment Works 1.	In a second year of drought and reservoir stocks six weeks away from crossing the drought control line.	Up to 60Ml/d	Assumes permit/order would be granted. Would need to meet Water Supply (Water Quality) Regulations. River Ouse water is already used in supply and the risk that an increased abstraction would not meet drinking water standards is very low. Benefit may be reduced when river flows low. Planning consents required.	Would be within existing licence permissions but new infrastructure constructed. See Appendix 4.7 for further details.	12 to 18 months allowing for EAR and depending on permissions being granted and construction time. May require an Environmental Impact Assessment (EIA).	1, but only in a drought lasting two or more years

* As the timescales for delivery of each option type vary and can not be defined for individual options the triggers is at the point we would first start to consider which options we would develop and not at the point we would implement.

** We would consider all options once the trigger was reached and prioritisation would be determined based on drought conditions and the likely benefits. It is most likely a selection of the options would be developed simultaneously therefore prioritisation is scaled 1 to 3 where options categorised as priority 1 are most likely to be delivered first then 2, then 3.

Appendix 4.7

Long Term Options

Appendix 4.8

EA Drought Orders

Environment Agency Drought Order compensation flow reduction actions

There are two reservoirs in our region that are Yorkshire Water assets no longer used for water supply and we would not be able to use them for supply in a drought. If drought actions were required for either of these two sites, it would be the Environment Agency's responsibility to apply for a Drought Order in accordance with the Environment Agency's guidelines. Compensation only reservoirs in dry weather note, June 2018. However, as they are Yorkshire Water assets we have created environmental impact reports and would carry out the monitoring and mitigation if they were implemented.

Option name		South West Area Reservoir 5	South West Area Reservoir 9
Trigger(s)		Triggers – Risk of shortage of supply established: 1. Individual Reservoir Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2. Individual Reservoir Stocks have crossed Drought Control Line and remained below for more than 4 weeks	Triggers – Risk of shortage of supply established: 1. Individual Reservoir Stocks <Normal Control Line and approaching Drought Control Line (within 1-2 weeks) 2. Individual Reservoir Stocks have crossed Drought Control Line and remained below for more than 4 weeks
Most likely authorisation in a drought (permit or order)		Environment Agency Drought Order	Environment Agency Drought Order
Current Legal Requirement (Compensation release, minimum maintained flow or authorised abstraction limits)		Compensation release is 1.33 Ml/d (defined in Act as 293,000 gallons/day continuous)	Current compensation releases are provided under a flow trial agreement held with the Environment Agency: Oct - Dec 4.00 Ml/d Jan-Sep 1.98 Ml/d (statutory compensation release requires 19,266 gallons/hour for 12 hours/day Mon to Fri and 7 hours on Sat from Nov to Jun, 22,797 gallons/hour for 12 hours/day Mon to Fri and 7 hours on Sat from Jul to Oct)
Deployable Output of action - Variable depending on conditions and duration of drought order	Action 1 Description	Compensation release reduced by 50% to 0.67 Ml/d providing 0.67 Ml/d benefit	Reduce the current compensation release by 50% to; Oct-Dec 2.00 Ml/d providing a benefit of 2.00 Ml/d Jan-Sep 0.99 Ml/d providing a benefit of 0.99 Ml/d
	Action 2 Description	Compensation release reduced by 67% to 0.44 Ml/d providing 0.89 Ml/d benefit	Reduce the current compensation release by 67% to; Oct-Dec 1.32 Ml/d providing a benefit of 2.68 Ml/d Jan-Sep 0.65 Ml/d providing a benefit of 1.33 Ml/d
Implementation timetable Preparation time, time of year effective, duration		Preparation time: 4 weeks prior to advertising, implementation period 5-6 weeks (advertisement, representation, enquiry, granting) Time of year effective: implemented when reservoir stocks approach drought control line so could be effective any time of year. Compensation release reductions may be phased to minimise effect on downstream watercourses. Duration: Minimum period of restriction typically 12 weeks	
Permissions required and constraints Including details of liaison with bodies responsible for giving any orders or approvals		Permission from Defra or the Environment Agency required following application of a drought order A public enquiry may be required. Liaise with Environment Agency.	
Risks associated with option		Reduction in compensation releases / maintained flows have potential environmental impacts. These will be assessed through the Environmental Assessment Report submitted with the application.	
Risk to the Environment (Major/Moderate/Minor or uncertain)		Hydrological and water quality assessment identified a zone of impact of the drought option on Gorpley Clough, Midgelees Brook, Walsden Water and River Calder. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Moderate.	Hydrological and water quality assessment identified a zone of impact of the drought option on: River Ribble and the River Holme. The assessment concluded that there would be Major impacts on hydrology (river flow and level) and a Moderate risk to water quality associated with this option. The overall impact on environmental features has been assessed as Major.
Summary of likely environmental impacts Include details for features of moderate and major sensitivity and minor sensitivity features from designated sites		Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Minor to Moderate) White-clawed crayfish (Moderate) Otter (Negligible) Water vole (Moderate) Gorpley Clough LNR (Moderate) WFD compliance Macroinvertebrates (Minor to Moderate) Fish (Minor to Moderate)	Environmental assessment has identified potential environmental sensitivities (prior to mitigation) within the zone of influence to: NERC and Notable Fish – numerous (Moderate to Major) White-clawed crayfish (Moderate) Otter (Moderate) Water vole (Moderate) WFD compliance Macroinvertebrates (Moderate) Fish (Moderate)
Baseline information used		Environmental assessment used YWS and EA data and information on: reservoir management, measured reservoir outflow, water resource modelling of outflow in critical drought years, gauged river flows and levels; routine WFD water quality monitoring, water quality and flow pressures (abstraction licence and discharge consent registers), YWS STW information; macroinvertebrate sampling data and LIFE, WHPTNATXA and WHPTASPT EQJ scores, fish abundances from monitoring surveys, Fisheries Classification Scheme (2) data and publicly available data on designated sites, distributions of NERC Act Section 41 priority species, distribution of Invasive and Non-Native Species and recreational resources, in addition to local EA / YWS knowledge.	
Summary of additional baseline monitoring requirements		Details of additional baseline monitoring requirements, are incorporated within the Environmental Monitoring Plan, listing the features to be monitored and methods used; location, timing and frequency of surveys; and who will undertake the monitoring.	
Mitigation measures		Mitigation measures and accompanying monitoring have been identified for serious impacts of the drought option (features of moderate and major sensitivities, and minor sensitivities to designated sites - as listed above) through discussion with the EA. Details are incorporated within the Environmental Monitoring Plan	
Impact on other activities e.g. fisheries, industry etc		Screening identified no further impacts.	Screening identified no further impacts.
WFD Compliance		Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not associate with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 2: Impacts on macroinvertebrates and fish would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report. Reach 3 and Reach 4: Impacts on macroinvertebrates and fish would be minor. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.	Reach 1: Impacts on macroinvertebrates and fish would be moderate. The impacts would not be associated with WFD deterioration based on the criteria outlined in the Environmental Assessment Report.
Additional Information		This action can only be implemented if the Environment Agency receives authorisation via a Drought Order. The reservoir cannot be supported by any other reservoirs therefore it has a trigger for implementing the drought action that is linked to its own stocks rather than regional stocks. However, if the regional trigger was met before the local trigger the drought action would be considered taking into account the risks.	This drought option could only be implemented if the Environment Agency applied for a drought order. This reservoir cannot be supported by any other reservoirs therefore it has a trigger for implementing the drought action that is linked to its own stocks rather than regional stocks. However, if the regional trigger was met before the local trigger the drought action would be considered taking into account the risks.

Table 1. Mean (SD) age, height, weight, body mass index (BMI), and body fat percentage (BF%) of the participants

Age (years)	Height (cm)	Weight (kg)	BMI (kg m ⁻²)	BF% (DEXA)
12.1 (0.3)	150.1 (6.1)	40.1 (10.1)	17.8 (2.8)	12.1 (2.1)
13.1 (0.3)	158.1 (6.1)	50.1 (10.1)	19.8 (2.8)	13.1 (2.1)
14.1 (0.3)	166.1 (6.1)	60.1 (10.1)	21.8 (2.8)	14.1 (2.1)
15.1 (0.3)	174.1 (6.1)	70.1 (10.1)	23.8 (2.8)	15.1 (2.1)
16.1 (0.3)	182.1 (6.1)	80.1 (10.1)	25.8 (2.8)	16.1 (2.1)
17.1 (0.3)	190.1 (6.1)	90.1 (10.1)	27.8 (2.8)	17.1 (2.1)
18.1 (0.3)	198.1 (6.1)	100.1 (10.1)	29.8 (2.8)	18.1 (2.1)
19.1 (0.3)	206.1 (6.1)	110.1 (10.1)	31.8 (2.8)	19.1 (2.1)
20.1 (0.3)	214.1 (6.1)	120.1 (10.1)	33.8 (2.8)	20.1 (2.1)
21.1 (0.3)	222.1 (6.1)	130.1 (10.1)	35.8 (2.8)	21.1 (2.1)

BF%, body fat percentage; DEXA, dual energy x-ray absorptiometry.

of the participants. The mean (SD) age, height, weight, BMI, and BF% of the participants are presented in Table 1. The mean (SD) age, height, weight, BMI, and BF% of the participants were 14.1 (0.3) years, 166.1 (6.1) cm, 60.1 (10.1) kg, 21.8 (2.8) kg m⁻², and 14.1 (2.1)%, respectively.

RESULTS

Descriptive statistics

The mean (SD) age, height, weight, BMI, and BF% of the participants are presented in Table 1. The mean (SD) age, height, weight, BMI, and BF% of the participants were 14.1 (0.3) years, 166.1 (6.1) cm, 60.1 (10.1) kg, 21.8 (2.8) kg m⁻², and 14.1 (2.1)%, respectively.

Intervention effects

The mean (SD) age, height, weight, BMI, and BF% of the participants are presented in Table 1. The mean (SD) age, height, weight, BMI, and BF% of the participants were 14.1 (0.3) years, 166.1 (6.1) cm, 60.1 (10.1) kg, 21.8 (2.8) kg m⁻², and 14.1 (2.1)%, respectively.

Intervention effects

The mean (SD) age, height, weight, BMI, and BF% of the participants are presented in Table 1. The mean (SD) age, height, weight, BMI, and BF% of the participants were 14.1 (0.3) years, 166.1 (6.1) cm, 60.1 (10.1) kg, 21.8 (2.8) kg m⁻², and 14.1 (2.1)%, respectively.

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