Appendix A.4

SOUTH AREA REACHES

Appendix A.4 Contents

Reach Overview Sheet

Don 1

WFD Waterbody:

Don from Source to Scout Dyke (GB104027057500)

Relevant Drought Option(s):

Winscar/Windleden Lower Reservoirs

Sensitive Features and Impact Assessment:

- *Oreodytes davisii* (Minor)
- Otter (Negligible)
- Water vole (Moderate)
- Brown trout (Moderate)
- Bullhead (Minor)
- European eel (Moderate)
- Grayling (Moderate)
- Fish (Moderate)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Bullhouse Minewater Project discharge outfall SE2155002910 (Uncertain)

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional dissolved iron threshold of 1mg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge
- Additional bioavailable manganese threshold of 123µg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge
- Additional bioavailable copper threshold of 1µg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge
- Additional bioavailable zinc threshold of 10.9µg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge
- Additional dissolved arsenic threshold of 50µg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites

- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.
- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.
- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- None

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SE15611 02467 to SE 16093 02441
  - Site 2: 500m located within SE 18629 02824 to SE 19067 02824
  - Site 3: Locally at Bullhouse Mill Weir fish pass SE 20902 02675 (fish pass effectiveness only)

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SE 15611 02467 to SE 16093 02441
  - Site 2: 500m located within SE 18629 02824 to SE 19067 02824
  - Site 3: Locally at Bullhouse Mill Weir fish pass SE 20902 02675 (fish pass effectiveness only)
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows (analysis suite to include dissolved iron, bioavailable manganese, bioavailable copper, bioavailable zinc, and dissolved arsenic):
  - Site 4: Bullhouse Minewater Project, 10m upstream and at least 100m downstream of the outfall at SE2155002910
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - None

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_4 - Artificial freshet release to dilute/displace water quality reduction

- IDMIT_5 - Aeration of discharge from third party facility identified as a 'significant' water quality pressure
- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)
- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)
- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)
- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_13 - Provision of piscivorous “visual” bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- None

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Don 2

WFD Waterbody:

Don from Scout Dyke to the Little Don (GB104027057490)

Relevant Drought Option(s):

Winscar/Windleden Lower Reservoirs / Scout Dyke Reservoir

Sensitive Features and Impact Assessment:

- Forge Rocher and Tin Mill Rocher LWS (Minor)
- Romticle Viaduct & Thurgoland Tunnels LWS (Minor)
- Otter (Negligible)
- Water vole (Moderate)
- Brown trout (Major)
- Bullhead (Moderate)
- European eel (Major)
- Grayling (Major)
- Fish (Major)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Cheesebottom WwTW discharge outfall: SE 28000 01000
- Thurgoland CSO: SE 29300 00100

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional unionised ammonia threshold of 40µg/l further to WFD requirements

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.
- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- None

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SK 29271 98654 to SK 29640 98922
  - Site 2: 500m located within SE 29262 00052 to SK 29607 99872

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SK 29271 98654 to SK 29640 98922
  - Site 2: 500m located within SE 29262 00052 to SK 29607 99872
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows:
  - Site 3: Cheesebottom WwTW, 10m upstream and at least 100m downstream of the outfall at SE 28000 01000
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - Thurgoland CSO: SE 29300 00100

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_1 - Negotiation with the licence holder of a temporary reduction of third party abstractions presenting 'significant' impacts to sensitive features, including financial compensation by Yorkshire Water.
- IDMIT_3 - Improving the effluent quality from Yorkshire Water WwTWs presenting 'significant' impacts to sensitive features, thereby reducing the water quality pressure (ammonia and oxygen balance) on the impacted features.
- IDMIT_4 - Artificial freshet release to dilute/displace water quality reduction
- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)

- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)
- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)
- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)
- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_13 - Provision of piscivorous “visual” bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_23 - For CSOs identified as significant water quality prioritise planned maintenance work on and reactive pollution prevention work, including visits by operators.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- None

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)
- PDMIT_8 - Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Don 3

WFD Waterbody:

Don from the Little Don to River Loxley confluence (GB104027057411)

Relevant Drought Option(s):

Winscar/Windleden Lower Reservoirs / Scout Dyke Reservoir / Underbank Reservoir

Sensitive Features and Impact Assessment:

- Lower Ewden Beck LWS (Negligible)
- Upper River Don: Deepcar to Hillsborough LWS (Minor)
- Upper River Don: Station Road, Deepcar LWS (Minor)
- Wheata Woods LNR (Negligible)
- Otter (Negligible)
- Water vole (Moderate)
- Barbel (Minor)
- Brown trout (Moderate)
- Bullhead (Minor)
- European eel (Moderate)
- Grayling (Moderate)
- Fish (Moderate)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Ewden WwTW discharge outfall SK2982195770

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional unionised ammonia threshold of 40µg/l further to WFD requirements

Baseline Monitoring

***Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps** and reduce uncertainty **identified during the environmental assessment**.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.

- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.
- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- None

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SK 29768 95925 to SK 29890 95506

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within ~~SK 29700 95900 to SK 29900 95500~~ SK 29768 95925 to SK 29890 95506
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows:
  - Site 2: Ewden WwTW, 10m upstream and at least 100m downstream of the outfall at SK 29821 95770
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - None

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_3 - Improving the effluent quality from Yorkshire Water WwTWs presenting 'significant' impacts to sensitive features, thereby reducing the water quality pressure (ammonia and oxygen balance) on the impacted features.
- IDMIT_4 - Artificial freshet release to dilute/displace water quality reduction
- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)

- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)
- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)
- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)
- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_13 - Provision of piscivorous “visual” bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- PDMON_1 - White-clawed crayfish sampling to monitor recovery of their distribution and abundance

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)
- PDMIT_8 - Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Don 4

WFD Waterbody:

Don from the Little Don to River Loxley confluence (GB104027057411)

Relevant Drought Option(s):

Winscar/Windleden Lower Reservoirs / Scout Dyke Reservoir / Underbank Reservoir / Morehall Reservoir

Sensitive Features and Impact Assessment:

- Lower Ewden Beck LWS (Negligible)
- Upper River Don: Deepcar to Hillsborough LWS (Moderate)
- Middle River Don: Deepcar to Hillsborough LWS
- White-clawed crayfish (Moderate)
- Otter (Negligible)
- Water vole (Moderate)
- Brown trout (Moderate)
- Bullhead (Minor)
- European eel (Moderate)
- Grayling (Moderate)
- Fish (Moderate)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Wharncliffe Side WwTW discharge outfall SK 29990 94550
- Herries Road No 2 CSO: SK 33767 90737

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional unionised ammonia threshold of 40µg/l further to WFD requirements

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.

- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.
- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- BMON_5 - White-clawed crayfish surveys to determine distribution and abundance in reaches under serious (i.e. moderate or major) hydrological stress

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SK 31049 93598 to SK 30794 93327 incorporating Upper River Don: Deepcar to Hillsborough LWS
  - Site 2: Locally at Wharncliffe Side Weir fish pass SK 29925 94461 (fish pass effectiveness only)
  - Site 3: Locally at Niagara Weir fish pass SK 32867 91532 (fish pass effectiveness only)

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SK 31049 93598 to SK 30794 93327
  - Site 2: Locally at Wharncliffe Side Weir fish pass SK 29925 94461 (fish pass effectiveness only)
  - Site 3: Locally at Niagara Weir fish pass SK 432867 91532 (fish pass effectiveness only)
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows:
  - Site 4: Wharncliffe Side WwTW, 10m upstream and at least 100m downstream of the outfall at SK 29990 94550
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - Herries Road No 2 CSO: SK 33767 90737

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_3 - Improving the effluent quality from Yorkshire Water WwTWs presenting 'significant' impacts to sensitive features, thereby reducing the water quality pressure (ammonia and oxygen balance) on the impacted features.
- IDMIT_4 - Artificial freshet release to dilute/displace water quality reduction
- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)
- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)
- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)
- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_13 - Provision of piscivorous "visual" bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing

which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.

- IDMIT_23 - For CSOs identified as significant water quality prioritise planned maintenance work on and reactive pollution prevention work, including visits by operators.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- PDMON_1 - White-clawed crayfish sampling to monitor recovery of their distribution and abundance

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)
- PDMIT_8 - Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Don 5

WFD Waterbody:

Don from River Loxley conf to River Don Works (GB104027057412); Don from River Don Works to River Rother (GB104027057413)

Relevant Drought Option(s):

Winscar/Windleden Lower Reservoirs / Scout Dyke Reservoir / Underbank Reservoir / Morehall Reservoir / Damflask Reservoir / Rivelin Reservoir

Sensitive Features and Impact Assessment:

- Centenary Riverside LNR/LWS (Negligible)
- Salmon Pastures LNR/LWS (Negligible)
- Lower River Don: River Don (City Centre to Blackburn LWS Meadows) (Minor)
- Lower Don Valley: Sheffield and Tinsley Canal LWS (Minor)
- Middle River Don: Hillsborough to City Centre LWS (Moderate)
- Sandersons Mill Race LWS (Minor)
- Blackburn Meadows LWS (Minor)
- Kelham Island LWS (Minor)
- NERC Habitat - 452749 (Negligible)
- NERC Habitat - 447335 (Negligible)White-clawed crayfish (Moderate)
- Otter (Negligible)
- Water vole (Moderate)
- Atlantic salmon (Major)
- Barbel (Moderate)
- Brook lamprey (Major)
- Brown trout (Major)
- Bullhead (Moderate)
- European eel (Major)
- Grayling (Moderate)
- River lamprey (Moderate)
- Fish (Major)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Blackburn Meadows WwTW discharge outfall at SK 40220 91890
- Vickers Road CSO: SK 36777 91072

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 54% dissolved oxygen saturation; in excess of 1.1mg/l total ammonia)
- Additional unionised ammonia threshold of 40µg/l further to WFD requirements

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.
- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.
- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- BMON_5 - White-clawed crayfish surveys to determine distribution and abundance in reaches under serious (i.e. moderate or major) hydrological stress
- BMON_7 - Targeted juvenile lamprey surveys to identify distribution of habitat and an indicative population status within reaches subject to serious hydrological stress

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SK 36552 88196 to SK 37000 88100
  - Site 2: Locally at Steelbank Weir fish pass SK 34465 88670 (fish pass effectiveness only)
  - Site 3: Locally at Kelham Weir fish pass SK 35030 88270 (fish pass effectiveness only)
  - Site 4: Locally at Lady's Bridge Weir fish pass SK 35714 87797 (fish pass effectiveness only)
  - Site 5: Locally at Walk Mill Weir fish pass SK 36208 88114 (fish pass effectiveness only)
  - Site 6: Locally at Burton's Weir fish pass SK 36767 88219 (fish pass effectiveness only)
  - Site 7: Locally at Sanderson's Weir fish pass SK 37240 88920 (fish pass effectiveness only)
  - Site 8: Locally at Brightside Weir fish pass SK 38680 90140 (fish pass effectiveness only)
  - Site 9: Locally at Hadfield's Weir fish pass SK 39015 91004 (fish pass effectiveness only)
  - Site 10: Locally at Jordan's Weir fish pass SK 40272 92031 (fish pass effectiveness only)
  - Site 11: Locally at Ickles Weir fish pass SK 41792 91871 (fish pass effectiveness only)

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SK 36552 88196 to SK 37000 88100
  - Site 2: Locally at Steelbank Weir fish pass SK 34465 88670 (fish pass effectiveness only)
  - Site 3: Locally at Kelham Weir fish pass SK 35030 88270 (fish pass effectiveness only)
  - Site 4: Locally at Lady's Bridge Weir fish pass SK 35714 87797 (fish pass effectiveness only)
  - Site 5: Locally at Walk Mill Weir fish pass SK 36208 88114 (fish pass effectiveness only)
  - Site 6: Locally at Burton's Weir fish pass SK 36767 88219 (fish pass effectiveness only)
  - Site 7: Locally at Sanderson's Weir fish pass SK 37240 88920 (fish pass effectiveness only)
  - Site 8: Locally at Brightside Weir fish pass SK 38680 90140 (fish pass effectiveness only)
  - Site 9: Locally at Hadfield's Weir fish pass SK 39015 91004 (fish pass effectiveness only)
  - Site 10: Locally at Jordan's Weir fish pass SK 40272 92031 (fish pass effectiveness only)
  - Site 11: Locally at Ickles Weir fish pass SK 41792 91871 (fish pass effectiveness only)
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows:
  - Site 12: Blackburn Meadows WwTW, 10m upstream and at least 100m downstream of the outfall at SK 40220 91890
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - Vickers Road CSO: SK 36777 91072

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_1 - Negotiation with the licence holder of a temporary reduction of third party abstractions presenting ‘significant’ impacts to sensitive features, including financial compensation by Yorkshire Water.
- IDMIT_3 - Improving the effluent quality from Yorkshire Water WwTWs presenting ‘significant’ impacts to sensitive features, thereby reducing the water quality pressure (ammonia and oxygen balance) on the impacted features.
- IDMIT_4 - Artificial freshet release to dilute/displace water quality reduction
- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)
- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)
- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)

- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_13 - Provision of piscivorous “visual” bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_23 - For CSOs identified as significant water quality prioritise planned maintenance work on and reactive pollution prevention work, including visits by operators.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- PDMON_1 - White-clawed crayfish sampling to monitor recovery of their distribution and abundance

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)

- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_6 - Restocking using juvenile lamprey ammocoetes within the catchment where monitoring indicates loss of fish abundance or recruitment (fish)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)
- PDMIT_8 - Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Scout Dyke 1

WFD Waterbody:

Scout Dyke from Source to River Don (GB104027057530)

Relevant Drought Option(s):

Scout Dyke Reservoir

Sensitive Features and Impact Assessment:

- Otter (Negligible)
- Nether Mill Fishery (Negligible)
- Water vole (Moderate)
- Brown trout (Moderate)
- Bullhead (Minor)
- European eel (Moderate)
- Fish (Moderate)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Scout Dyke WwTW discharge outfall SE2370004600

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional unionised ammonia threshold of 40µg/l further to WFD requirements

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.
- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.
- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- None

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SE 23819 04555 to SE 24144 04368
  - Site 2: 500m located within SE 24501 04010 to SE 24600 03838

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SE 23819 04555 to SE 24144 04368
  - Site 2: 500m located within SE 24501 04010 to SE 24600 03838
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows:
  - Site 3: Scout Dyke WwTW, 10m upstream and at least 100m downstream of the outfall at SE 23700 04600
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - None

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_3 - Improving the effluent quality from Yorkshire Water WwTWs presenting 'significant' impacts to sensitive features, thereby reducing the water quality pressure (ammonia and oxygen balance) on the impacted features.
- IDMIT_4 - Artificial freshet release to dilute/displace water quality reduction
- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)
- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)

- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)
- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_12 - Artificial channel narrowing to provide functional refuges and support habitat requirement for species, enabling a quick natural recolonisation of the reach post-drought (fish, macroinvertebrates, white-clawed crayfish, fine-lined pea mussel, otter, water vole)
- IDMIT_13 - Provision of piscivorous “visual” bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- PDMON_1 - White-clawed crayfish sampling to monitor recovery of their distribution and abundance

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)

- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)
- PDMIT_8 - Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Little Don 1

WFD Waterbody:

Little Don from Source to River Don (GB104027057460)

Relevant Drought Option(s):

Underbank Reservoir

Sensitive Features and Impact Assessment:

- Upper River Don: Deepcar to Hillsborough LWS (Moderate)
- Lower Little Don, Stocksbridge LWS (Minor)
- White-clawed crayfish (Moderate)
- Otter (Negligible)
- Water vole (Moderate)
- Barbel (Minor)
- Brown trout (Moderate)
- Bullhead (Minor)
- Grayling (Moderate)
- Fish (Moderate)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Manchester Road Weir CSO: SK2848398153

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional unionised ammonia threshold of 40µg/l further to WFD requirements

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.
- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- BMON_5 - White-clawed crayfish surveys to determine distribution and abundance in reaches under serious (i.e. moderate or major) hydrological stress

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SK 25314 99132 to SK 25727 99038
  - Site 2 500m located within SK 28497 98162 to SK 28918 98075

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SK 25314 99132 to SK 25727 99038
  - Site 2 500m located within SK 28497 98162 to SK 28918 98075
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows:
  - None
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - Manchester Road Weir CSO: SK2848398153

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_1 - Negotiation with the licence holder of a temporary reduction of third party abstractions presenting 'significant' impacts to sensitive features, including financial compensation by Yorkshire Water.
- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)

- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)
- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)
- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_12 - Artificial channel narrowing to provide functional refuges and support habitat requirement for species, enabling a quick natural recolonisation of the reach post-drought (fish, macroinvertebrates, white-clawed crayfish, fine-lined pea mussel, otter, water vole)
- IDMIT_13 - Provision of piscivorous “visual” bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_23 - For CSOs identified as significant water quality prioritise planned maintenance work on and reactive pollution prevention work, including visits by operators.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- PDMON_1 - White-clawed crayfish sampling to monitor recovery of their distribution and abundance

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Ewden Beck 1

WFD Waterbody:

Ewden Beck from Source to River Don (GB104027057400)

Relevant Drought Option(s):

Morehall Reservoir

Sensitive Features and Impact Assessment:

- Lower Ewden Beck LWS (Moderate)
- Upper River Don: Deepcar to Hillsborough LWS (Minor)
- White-clawed crayfish (Moderate)
- Riolus subviolaceus (Minor)
- Otter (Negligible)
- Water vole (Moderate)
- Brown trout (Major)
- Bullhead (Moderate)
- Fish (Moderate)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Ewden Village WwTW discharge outfall SK2735095920

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional unionised ammonia threshold of 40µg/l further to WFD requirements

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.
- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- BMON_5 - White-clawed crayfish surveys to determine distribution and abundance in reaches under serious (i.e. moderate or major) hydrological stress

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SK 29499 95517 to SK 29802 95526 incorporating Lower Ewden Beck LWS

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SK 29499 95517 to SK29802 95526
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows:
  - Site 3: Ewden Village WwTW, 10m upstream and at least 100m downstream of the outfall at SK 27350 95920
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - None

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_3 - Improving the effluent quality from Yorkshire Water WwTWs presenting 'significant' impacts to sensitive features, thereby reducing the water quality pressure (ammonia and oxygen balance) on the impacted features.
- IDMIT_4 - Artificial freshet release to dilute/displace water quality reduction
- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)

- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)
- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)
- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_12 - Artificial channel narrowing to provide functional refuges and support habitat requirement for species, enabling a quick natural recolonisation of the reach post-drought (fish, macroinvertebrates, white-clawed crayfish, fine-lined pea mussel, otter, water vole)
- IDMIT_13 - Provision of piscivorous “visual” bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- PDMON_1 - White-clawed crayfish sampling to monitor recovery of their distribution and abundance

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)
- PDMIT_8 - Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Loxley 1

WFD Waterbody:

Loxley from Strines Dyke to River Don (GB104027057370)

Relevant Drought Option(s):

Damflask Reservoir

Sensitive Features and Impact Assessment:

- Dam Flask to Rowel Bridge LWS (Minor)
- Acorn Hill and Little Matlock Wood LWS (Moderate)
- Lower Rivelin Valley (Negligible)
- Broadhead Dam to Malin Bridge (Minor)
- White-clawed crayfish (Major)
- Otter (Negligible)
- Water vole (Moderate)
- Brown trout (Major)
- Bullhead (Moderate)
- Fish (Major)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Local to abandonded minewater discharges in the vicinity of Myers Grove and Loxely Bottom

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional dissolved iron threshold of 1mg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge
- Additional bioavailable manganese threshold of 123µg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge
- Additional bioavailable copper threshold of 1µg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge
- Additional bioavailable zinc threshold of 10.9µg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge
- Additional dissolved arsenic threshold of 50µg/l (WFD mean standard for fresh waters) at locations associated with minewater discharge

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.
- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.
- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- BMON_5 - White-clawed crayfish surveys to determine distribution and abundance in reaches under serious (i.e. moderate or major) hydrological stress

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SK 31340 89557 to SK 31782 89612
  - Site 2: 500m located within SK 29605 89812 to SK 29901 89515

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SK 31340 89557 to SK 31782 89612 (also reviewing potential for depleted reach until the return from the offline dam (pond))
  - Site 2: 500m located within SK 29605 89812 to SK 29901 89515
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows (analysis suite to include dissolved iron, bioavailable manganese, bioavailable copper, bioavailable zinc, and dissolved arsenic):
  - Site 3: Minewater discharges in the vicinity of Myers Grove, 10m upstream and at least 100m downstream of SK 32544 89337
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - None

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_1 - Negotiation with the licence holder of a temporary reduction of third party abstractions presenting 'significant' impacts to sensitive features, including financial compensation by Yorkshire Water.
- IDMIT_4 - Artificial freshet release to dilute/displace water quality reduction
- IDMIT_5 - Aeration of discharge from third party facility identified as a 'significant' water quality pressure
- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)
- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)
- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)
- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_12 - Artificial channel narrowing to provide functional refuges and support habitat requirement for species, enabling a quick natural recolonisation of the reach post-drought (fish, macroinvertebrates, white-clawed crayfish, fine-lined pea mussel, otter, water vole)
- IDMIT_13 - Provision of piscivorous "visual" bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.

- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- PDMON_1 - White-clawed crayfish sampling to monitor recovery of their distribution and abundance

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)
- PDMIT_8 - Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Loxley 2

WFD Waterbody:

Loxley from Strines Dyke to River Don (GB104027057370)

Relevant Drought Option(s):

Damflask Reservoir / Rivelin Reservoir

Sensitive Features and Impact Assessment:

- Malin Bridge to River Don LWS (Moderate)
- White-clawed crayfish (Moderate)
- Otter (Negligible)
- Water vole (Moderate)
- Brown trout (Major)
- Bullhead (Moderate)
- European eel (Major)
- Grayling (Moderate)
- Fish (Moderate)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- None

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional unionised ammonia threshold of 40µg/l further to WFD requirements

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.
- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- BMON_5 - White-clawed crayfish surveys to determine distribution and abundance in reaches under serious (i.e. moderate or major) hydrological stress

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SK 32776 89321 to SK 32954 89413 incorporating Malin Bridge to River Don LWS

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SK 32776 89321 to SK 32954 89413
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows:
  - None
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - None

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)
- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)
- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)

- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_12 - Artificial channel narrowing to provide functional refuges and support habitat requirement for species, enabling a quick natural recolonisation of the reach post-drought (fish, macroinvertebrates, white-clawed crayfish, fine-lined pea mussel, otter, water vole)
- IDMIT_13 - Provision of piscivorous “visual” bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- PDMON_1 - White-clawed crayfish sampling to monitor recovery of their distribution and abundance

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)

- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)
- PDMIT_8 - Restocking of coarse fish from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)

Reach Overview Sheet

Rivelin 1

WFD Waterbody:

Rivelin from Source to River Loxley (GB104027057340)

Relevant Drought Option(s):

Rivelin Reservoir

Sensitive Features and Impact Assessment:

- Middle Rivelin Valley LWS (Moderate)
- Lower Rivelin Valley LWS (Moderate)
- Fox Hagg LWS (Moderate)
- Roscoe Plantation LWS (Moderate)
- White-clawed crayfish (Major)
- *Sisyra terminalis* (Minor)
- Otter (Negligible)
- Water vole (Moderate)
- Brown trout (Major)
- Brook lamprey (Major)
- Bullhead (Moderate)
- European eel (Major)
- Fish (Major)
- Invertebrates (Moderate)

Significant Water Quality Pressures:

- Rivelin Valley No 3 CSO: SK3143087987

Mitigation Triggers – Relevant Water Quality Thresholds:

Water quality thresholds appropriate to WFD river type:

- Moderate-Poor status thresholds for upland and low alkalinity rivers (less than 64% dissolved oxygen saturation; in excess of 0.75mg/l total ammonia)
- Additional unionised ammonia threshold of 40µg/l further to WFD requirements

Baseline Monitoring

Baseline monitoring proposed to ensure an adequate baseline dataset exists to describe non-drought conditions for those receptors likely to be impacted by drought permit implementation and to fill any data gaps *and reduce uncertainty* ***identified during the environmental assessment****.*

Routine Baseline Monitoring:

- BMON_1 - EA/YWSL to continue monitor river flows and levels/reservoir levels and spill at key monitoring sites
- BMON_2 - EA to continue routine water quality monitoring at existing network of sites on current monthly programme, which includes those on un-impacted reaches suitable as control sites.

- BMON_3 - Macroinvertebrate monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.
- BMON_4 - Fish monitoring at a number of locations, including rivers potentially affected by drought measures; to continue in low flow/drought years pending agreement with the EA regarding aquatic species welfare.

Targeted Baseline Monitoring:

- BMON_5 - White-clawed crayfish surveys to determine distribution and abundance in reaches under serious (i.e. moderate or major) hydrological stress

On-set of Environmental Drought- Monitoring

Subject to the availability of relevant data, the following walkover survey should be carried out prior to drought permit implementation

- ODMON_1 – Walkover surveys of habitat quality and identification of drought sensitive habitats such as areas of riffle, pools and artificial features such as weirs and sluices that may be isolated or impassable during low flows. Results to be captured by annotated walkover maps, fixed point photography and completion of a '*River Conditions Observation Form - Low Flows*' form.
  - Site 1: 500m located within SK 28694 86923 to SK 29099 87223
  - Site 2: 500m located within SK 29900 87312 to SK 30294 87511

In-Drought (During drought option implementation) – Monitoring

In order to establish impacts and target mitigation the following surveillance walkover surveys should be completed during the drought option implementation (including on the day of the flow change, the day after and then weekly thereafter until no further changes are noted):

- IDMON_1 - Surveillance walkover surveys of habitat quality and ecological stress, recording signs of environmental problems (reaches to match those in ODMON_1):
  - Site 1: 500m located within SK 28694 86923 to SK 29099 87223
  - Site 2: 500m located within SK 29900 87312 to SK 30294 87511
- IDMON_2 - Targeted surveillance walkover surveys of water quality and ecological stress local to 'significant' water quality pressures', to include water quality spot sampling in priority areas such as pools and weirs where aquatic species may become isolated during low flows:
  - None
- IDMON_3 - Storm intensity forecasting to predict likely CSO spill events and the need for pre-emptive mitigation:
  - Rivelin Valley No 3 CSO: SK3143087987

In-Drought (During drought option implementation) – Mitigation

Mitigation which may be required during the drought option implementation.

- IDMIT_6 - Gradual phase-in of reduction in water volume/flow to avoid stranding of individuals (fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_7 - Gradual phase-in of compensation release increases to avoid stranding or displacement of individuals (macroinvertebrates, fish, white-clawed crayfish, fine-lined pea mussel)
- IDMIT_8 - Temporary reduction in volume of abstraction or increase in compensation release (fish)
- IDMIT_9 - Artificial freshet release to provide temporary variation in the flow regime (fish, white-clawed crayfish, fine-lined pea mussel, water vole, otter)

- IDMIT_10 - Creation of alternative refuges in deeper water where walkover surveys identify the loss of important deep water habitat or high densities of fauna in refuges (fish, white-clawed crayfish, water vole)
- IDMIT_11 - Provision of in-stream structures and flow baffles to create functional refuges to support flow sensitive species where walkover surveys identify a projected loss of habitat inundation (macroinvertebrates, fish, white-clawed crayfish, water vole, otter)
- IDMIT_12 - Artificial channel narrowing to provide functional refuges and support habitat requirement for species, enabling a quick natural recolonisation of the reach post-drought (fish, macroinvertebrates, white-clawed crayfish, fine-lined pea mussel, otter, water vole)
- IDMIT_13 - Provision of piscivorous “visual” bird scaring measures (e.g. using streamers in riparian trees) to control predation upon species using refuges (fish). These visual measures would only be implemented following consultation with the EA, Natural England and bird specialists, particularly taking account of protected species under the Wildlife and Countryside Act. Implementation would follow best practice guidance.
- IDMIT_14 - Gravel washing of spawning habitats where walkover surveys and routine monitoring identifies likely habitat degradation as a result of sedimentations (fish)
- IDMIT_15 - Aeration of watercourse where significant mortality or change in species abundances are likely to be attributed to water quality deterioration
- IDMIT_16 - Modification of flow structure across barriers to retain favourable conditions to facilitate the movement/migration of species (fish)
- IDMIT_17 - Provision of freshet releases to enable migration of fish across significant obstacles (fish)
- IDMIT_19 - Capture and relocate individuals across significant barriers, taking into account migratory periods (immigration and emigration) (fish) and ensuring biosecurity measures are in place at all times.
- IDMIT_20 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and relocation to suitable habitat where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_21 - Rescue of individuals or groups, in consultation with the EA or NE as appropriate, and retention for later release where they are seen to be in distress or where artificially high densities are likely to result in significant impacts (fish, white-clawed crayfish). Measures will be taken to ensure biosecurity at all times. It should be noted that movement of crayfish requires licensing which can take up to 8 weeks. Movement of crayfish would only take place after consultation agreeing that this was the best course of action.
- IDMIT_23 - For CSOs identified as significant water quality prioritise planned maintenance work on and reactive pollution prevention work, including visits by operators.

Post-Drought (Drought option removed) – Monitoring

Supplementary monitoring which may be required after drought option implementation:

- PDMON_1 - White-clawed crayfish sampling to monitor recovery of their distribution and abundance

Post-Drought (Drought option removed) – Mitigation

Mitigation which may be required after the drought option is removed:

- PDMIT_1 - Enhancement of habitat beyond the impacted reach (macroinvertebrates, fish, fine-lined pea mussel, white-clawed crayfish, water vole)
- PDMIT_2 - Provision of artificial freshets to ensure fish are capable of migrating where survey identifies insufficient water depth or volume across structures to facilitate migration (fish)
- PDMIT_3 - Modification to barriers and/or flows to improve passage where walkover survey identifies insufficient water depth or volume at obstacles (fish)
- PDMIT_4 - Capture and relocate across barrier (taking migratory period into account) where significant numbers of migratory fish congregate at obstacles (fish)
- PDMIT_5 - Relocation of juveniles where walkover surveys identify the likely desiccation of marginal habitats or loss of water depth at important habitats (fish, fine-lined pea mussel)
- PDMIT_7 - Restocking using offspring from broodstock from the catchment where monitoring indicates loss of fish abundance or recruitment (fish)