# APPENDIX B – ENVIRONMENTAL RECEPTORS

# B1 INTRODUCTION

This appendix assesses the potential impacts on the environmental receptors of the River Ouse during the period of implementation of associated drought option.

Details regarding the approaches/methodologies used for assessing susceptibility and sensitivity to drought management actions and the assessment of the impacts associated with drought management actions are presented in Sections 3.6 and 3.7 of YWSL's Drought Plan 2027 Environmental Assessment Methodology[1].

The environmental preferences within which a species can successfully exist and the relationship between populations in stressed river conditions remains subject to debate. The prediction of impacts of hydrological and water quality changes on aquatic ecology remains subject to significant uncertainty and this may be exacerbated where data is limited. This assessment has, therefore, adopted a precautionary approach, with potential impacts highlighted where doubt exists.

The assessment of environmental receptors is informed by the assessment of the physical environment (which includes hydrology and hydrodynamics; geomorphology; and water quality), this is summarised in Section 5 presented in full in **Appendix A**.

Points of interest referred to throughout the text are indicated in **Figure B1-1**.

This appendix is set out in the following sections:

Section B.2 Baseline and sensitivity– this includes for each reach:

1. Statutory designated sites
2. NERC and local wildlife sites
3. NERC and other protected species
4. WFD receptors
5. Invasive non-native species (INNS)
6. Landscape, navigation, recreation and heritage.

Section B.3 Environmental receptors screening.

Section B.4 Receptors assessment, monitoring and mitigation – this includes for each reach:

1. Receptors assessment
2. Summary of impacts.

Section B.5 Cumulative impacts receptors assessment.

Section B.6 Monitoring and mitigation

[1] Ricardo (2025). Yorkshire Water Drought Plan 2027 Environmental Assessment Methodology. Report for Yorkshire Water Services Ltd. February 2025.

## Figure B1-1 Environmental Receptors – Points of Interest

[Insert Figure B1-1]

# B2 BASELINE & SENSITIVITY

Details regarding the approaches/methodologies used for assessing susceptibility and sensitivity to drought option implementation are presented in Section 3.6 YWSL's Drought Plan 2022 Environmental Assessment Methodology**Error! Bookmark not defined.**.

## B2.1 RIVER OUSE AT MOOR MONKTON

### B2.1.1 Statutory designated sites

**Table B2-1** summarises the sites of international/national importance (SSSI, SAC, SPA, Ramsar, Marine Conservation Zone, NNR, LNR) which are in hydrological connectivity with the impacted reach.

Five statutory designated sites that are sensitive or susceptible to drought order impacts have been identified for detailed assessment (see **Table B2-1**).

Table B2-1 Statutory designated sites

| **Site/Receptor and designation** | **Hydrological Impact at Location** *(Major, Moderate, Minor, Negligible)* | **Susceptibility to flow and level impacts** | **Sensitivity** *(Uncertain, High, Medium, Low, Not sensitive)* | **Further Consideration Required** *(Y/N)* |
|---|---|---|---|---|
| Naburn Marsh SSSI | Moderate (Summer only) | The site comprises a mosaic of species-rich flood meadow grassland with swamp and inundation communities. This type of flood meadow grassland is now nationally rare. The lower lying central area is covered in water for longer periods during winter floods and remains damper during the summer months. | Low | Yes |
| Clifton Ings and Rawcliffe Meadows SSSI | Moderate (Summer only) | The site comprises species rich neutral grassland, predominantly of the rare National Vegetation Classification (NVC) types MG4 meadow foxtail and MG8 crested dogs-tail which form part of NERCs lowland meadow habitats. Additionally, the Tansy beetle (*Chrysolina graminis)* which is of principle importance for the conservation of biodiversity under NERC. The site extends across two alluvial floodplain fields to the east of the River Ouse, which are subject to seasonal flooding. | Low | Yes |
| Church Ings SSSI | Moderate (Summer only) | Church Ings comprises two unimproved alluvial flood meadows, adjacent to the River Ouse at Acaster Malbis in the Vale of York. These meadows are of particular importance for their neutral grassland plant community which is an increasingly rare habitat type, threatened nationally as a result of drainage and agricultural improvement. The nature conservation interest is dependent upon the maintenance of a high water-table. | Low | Yes |
| Acaster South Ings SSSI | Moderate (Summer only) | Acaster South Ings consist of two large alluvial flood meadows adjacent to the River Ouse, near Acaster Malbis and | Low | Yes |

| **Site/Receptor and designation** | **Hydrological Impact at Location** *(Major, Moderate, Minor, Negligible)* | **Susceptibility to flow and level impacts** | **Sensitivity** *(Uncertain, High, Medium, Low, Not sensitive)* | **Further Consideration Required** *(Y/N)* |
|---|---|---|---|---|
| | | approximately four miles to the south of the City of York. These grasslands represent an increasingly rare habitat type which is threatened nationally as a result of drainage. | | |
| Fulford Ings SSSI | Moderate (Summer only) | Fulford Ings is an important example of flood plain mire located on low lying land between the River Ouse and Fulford village. It supports a sequence of plant communities which reflect the topography and hydrology, with alluvial grassland on higher ground, adjacent to the flood bank, a transitional zone of rich fen meadow and swamp in the most low-lying areas furthest from the river. This sequence of plant communities is now uncommon as such Fulford Ings is of particular importance. | Low | Yes |

### B2.1.2 **NERC and local wildlife sites**

**Table B2-2** summaries the NERC Act Section 41 and other notable and/or protected habitats (e.g. LWS) which are located on or within 100m of the impacted reach.

Eight NERC Act Section 41 or other notable and/or protected habitats that are sensitive or susceptible to drought order impacts have been identified for detailed assessment (see **Table B2-2**).

Table B2-2 NERC habitats and local wildlife sites

| ***Site/Receptor and designation*** | ***Hydrological Impact at Location*** *(Major, Moderate, Minor, Negligible)* | ***Susceptibility to flow and level impacts*** | ***Sensitivity*** *(Uncertain, High, Medium, Low, Not sensitive)* | ***Further Consideration Required*** *(Y/N)* |
|---|---|---|---|---|
| River Ouse LWS | Moderate (Summer only) | This substrate is predominantly sandy silt. There is little submerged, and limited emergent vegetation. Riparian vegetation is dominated by willow shrub and ash trees. Migratory species such Atlantic Salmon, Sea Lamprey, River Lamprey and Eel use the river. Otter and bats are present throughout and around the river, and the river provides a critical foraging ground for both. The riparian zone is nationally important for Tansy Beetle. | Medium | Yes |
| Rawcliffe Ings Dyke LWS | Moderate (Summer only) | The site is predominantly floodplain hay meadow. A series of pools are present in the flood basin, hosting different communities depending on time of creation. Scrub is present on the slopes of the flood basin, but neutral grassland is dominant. Tansy and tansy beetle are present. Rawcliffe Ings Drain is an extension of the Ings Dyke. | Medium | Yes |

| ***Site/Receptor and designation*** | ***Hydrological Impact at Location*** *(Major, Moderate, Minor, Negligible)* | ***Susceptibility to flow and level impacts*** | ***Sensitivity*** *(Uncertain, High, Medium, Low, Not sensitive)* | ***Further Consideration Required*** *(Y/N)* |
|---|---|---|---|---|
| | | Predominantly agriculturally-improved pasture land. Shallow mudded areas and reedbeds are present. | | |
| Archbishops Palace Grounds LWS | Moderate (Summer only) | Lowland acid grassland. Mosaic of semi-natural habitats including grassland and wetland. Parkland landscape with exotic specimen and veteran trees. Acid grassland and open water are present. Flora indicates the woodland is long-established. The woodlands are of interest to bats and birds. | Not sensitive | No |
| Bishopthorpe Ings LWS | Moderate (Summer only) | Predominantly flood meadow grassland grading to wet grassland and swamp. Areas of inundation grassland are present. The bankside area of the site hosts tansy and small populations of Tansy Beetle | Low | Yes |
| Church Ings LWS | Moderate (Summer only) | Predominantly unmanaged tall herb fen and wet meadows. Tansy plants are abundant and host a large tansy beetle population. | Low | Yes |
| Clifton Bridge LWS | Moderate (Summer only) | The cavities between pillars and the underside of the bridge is a nursery for bats. | Not sensitive | No |
| Clifton Ings LWS | Moderate (Summer only) | An occasional storage reservoir, the site is an ancient unenclosed flood meadow. A broad drain runs through the centre of the site and is important for wetland flora Tansy Beetle is locally abundant on the riverbank and banks of the central drain. | Low | Yes |
| Fulford Ings Village Green LWS | Moderate (Summer only) | Small area of riverbank and bank top with extensive Tansy and a very good a long-established population of Tansy Beetle. | Not sensitive | No |
| Gollie Ponds LWS | Moderate (Summer only) | Complex of small ponds surround by scrub, including wet woodland. The land around the ponds was once pasture and has been reverted back to grassland with several flood meadow species regenerating, due to increased summer flooding. | Low | Yes |
| Middlethorpe Crematorium LWS (4-3) | Moderate (Summer only) | Middlethorpe Crematorium is comprised of an upper field with herb rich neutral grassland and a lower section of swamp. There are a number of nationally rare species present. | Low | Yes |
| Middlethorpe Ings LWS (4-1) | Moderate (Summer only) | An area of relict area of flood meadow grassland improved by low levels of reseeding and herbicide treatment. A third of the site retains reasonably rich sward derived from the original flood meadow grassland. Tansy and Tansy beetle is frequent | Not sensitive | No |
| Naburn Hall Meadow / Ings LWS | Moderate (Summer only) | Naburn Hall Ings/Meadow is a flood meadow reverting to grassland from arable land. Flood meadow species and meadow species are recorded in the grassland. Tansy is frequent. | Low | Yes |

| ***Site/Receptor and designation*** | ***Hydrological Impact at Location*** *(Major, Moderate, Minor, Negligible)* | ***Susceptibility to flow and level impacts*** | ***Sensitivity*** *(Uncertain, High, Medium, Low, Not sensitive)* | ***Further Consideration Required*** *(Y/N)* |
|---|---|---|---|---|
| Poppleton Ings South – Ditch LWS | Moderate (Summer only) | The site is a relict flood meadow grassland that has been damaged by herbicide. Tansy beetles have been recorded on site. | Not sensitive | No |
| NERC Priority Habitats - 68975 | Moderate (Summer only) | *Alopecurus pratensis–Sanguisorba officinalis* grassland. Unlikely to be in connectivity with impacted reach or support aquatic receptors | Not sensitive | No |
| NERC Priority Habitats - 455959, 455960, 455965, 455963, 455964 | Moderate (Summer only) | *Alopecurus pratensis–Sanguisorba officinalis* grassland. Unlikely to be in connectivity with impacted reach or support aquatic receptors | Not sensitive | No |
| NERC Priority Habitats - 148697, 149455, 149307, 149337 | Moderate (Summer only) | Coastal and floodplain grazing marsh. Unlikely to be in connectivity with impacted reach | Not sensitive | No |
| NERC Priority Habitats - 458364 | Moderate (Summer only) | Coastal and floodplain grazing marsh. Unlikely to be in connectivity with impacted reach | Not sensitive | No |
| NERC Priority Habitats - 458812 | Moderate (Summer only) | Coastal and floodplain grazing marsh, Lowland fens. Unlikely to be in connectivity with impacted reach or support aquatic receptors | Not sensitive | No |
| NERC Priority Habitats - 444940, 455363 | Moderate (Summer only) | Fens. Unlikely to be in connectivity with impacted reach. | Not sensitive | No |
| NERC Priority Habitats - 39054, 39390 | Moderate (Summer only) | *Lolium perenne–Cynosurus cristatus* grassland. Unlikely to be in connectivity with impacted reach or support aquatic receptors | Not sensitive | No |
| NERC Priority Habitats -434625, 434694 | Moderate (Summer only) | Lowland fens. Unlikely to be in connectivity with impacted reach | Not sensitive | No |
| NERC Priority Habitats - 69601 | Moderate (Summer only) | Lowland meadows and pastures. Unlikely to be in connectivity with impacted reach or support aquatic receptors | Not sensitive | No |
| NERC Priority Habitats -438829,439392 | Moderate (Summer only) | Lowland meadows and pastures. Unlikely to be in connectivity with impacted reach or support aquatic receptors | Not sensitive | No |
| NERC Priority Habitats - 421743 | Moderate (Summer only) | Lowland meadows and pastures, Lowland neutral grassland, Lowland hay meadows, Maintenance of species-rich, semi-natural grassland, Coastal and Floodplain Grazing Marsh. Unlikely to be in connectivity with impacted reach | Not sensitive | No |

| ***Site/Receptor and designation*** | ***Hydrological Impact at Location*** *(Major, Moderate, Minor, Negligible)* | ***Susceptibility to flow and level impacts*** | ***Sensitivity*** *(Uncertain, High, Medium, Low, Not sensitive)* | ***Further Consideration Required*** *(Y/N)* |
|---|---|---|---|---|
| NERC Priority Habitats<br>- 358262 | Moderate (Summer only) | Maintenance of grassland for target receptors. Unlikely to be in connectivity with impacted reach or support aquatic receptors | Not sensitive | No |
| NERC Priority Habitats<br>- 359365 | Moderate (Summer only) | Restoration of grassland for target receptors. Unlikely to be in connectivity with impacted reach or support aquatic receptors | Not sensitive | No |
| NERC Priority Habitats<br>- 45120, 45123, 45130, 45132, 45133, 45215, 45299, 45325, 45331, 45580, 45585, 45586, 52737, 52986, 53006, 53487, 53585, 61014, 61105, 61225, 68550, 68746, 68889, 69287, 69293, 69474, 69533 | Moderate (Summer only) | Coastal and floodplain grazing marsh. Unlikely to be in connectivity with impacted reach | Not sensitive | No |

### B2.1.3 NERC and other protected species

**Table B2-4** summaries the NERC Act Section 41 and other protected species which are located on or within 500m of the impacted reach.

Data obtained from the Environment Agency, YWSL and a review of available data from NBN gateway was used inform the assessment of otter in the impacted reach. Review of Environment Agency records indicate the presence of otter within impacted reach. The data identifies that suitable habitat is present in the impacted reach. The distribution of information and survey data for the species was considered to be limited, Therefore, absence cannot be confirmed. It was considered appropriate, following the precautionary principle, to consider otters likely to be present in the reach at the time of the implementation of a drought order. Based on the limited available information otters considered to be susceptible to drought order impacts and have a **low** sensitivity to the physical environment impacts identified in **Appendix A.**

Data obtained from the Environment Agency and a review of available data from NBN gateway was used inform the assessment of water vole in the impacted reach. The data showed no surveys or records have been recorded in the impacted reach. Therefore, absence cannot be confirmed. It was considered appropriate, following the precautionary principle, to consider water vole likely to be present in the reach at the time of the implementation of a drought option. Based on the limited available information water vole are considered to be susceptible to drought option impacts and have an **uncertain** sensitivity to the physical environment impacts identified in **Appendix A.**

NERC act section 41 and notable fish species have been identified as present in the impacted reach, including seven NERC Act Section 41 fish species (Atlantic salmon, brown trout[2] and European eel,

[2] The National Fish Populations Database (NFPD) does not differentiate between brown trout (*Salmo trutta*) and sea trout (*Salmo trutta morpha trutta).* For consistency, the term ‘ brown trout’ will be used throughout this report to refer to all individuals of *Salmo trutta*, unless specifically referring to brown trout or sea trout.

Twaite shad, Allis shad, river and sea lamprey) and four notable fish species (bullhead, brook lamprey, barbel and grayling).

Five nationally scarce macroinvertebrate species (see **Table B2-3**) were observed in sampling carried out by the EA and additional YWSL commissioned surveys between 2010 and 2024. Additionally, a review of NBN identified the nationally scarce species of tansy beetle, *Chrysolina graminis,* as being present in Ouse 1. The species is known to be present along the River Ouse, as its range is currently restricted to about 45 km of the banks of the River Ouse centred on York, North Yorkshire[3]. Based on the available information these receptors are considered to be susceptible to drought order impacts and have a **medium** sensitivity to the physical environment impacts identified in **Appendix A.**

Table B2-3 Notable Macroinvertebrate Species Designations

| Species name | Conservation status | Reporting category | Conservation status - designation description |
|---|---|---|---|
| *Potamophylax rotundipennis* | Nationally Scarce | Rare and scarce species (not based on IUCN criteria) | Occurring in 16-100 hectares in Great Britain. |
| Oreodytes davisii | | | |
| *Rhyacophila septentrioni* | | | |
| *Sialis nigripes* | | | |
| *Nigrobaetis niger* | | | |

Several NERC act section 41 and notable bird species have been identified as present in water dependent habitats which rely on the impacted reach. Based on the available information these species are considered not to be susceptible to drought order impacts and **not sensitive** to the physical environment impacts identified in **Appendix A.**

[3] Chapman, D.S.; Sivell, D.; Oxford, G.S.; Dytham, C. (2006). "Ecology of the tansy beetle (Chrysolina graminis) in Britain". The Naturalist. 131: 41–54.

Table B2-4 NERC Act Section 41 and other protected species

| **Site/Receptor and designation** | **Hydrological Impact at Location** *(Major, Moderate, Minor, Negligible)* | **Susceptibility to flow and level impacts** | **Sensitivity** *(Uncertain, High, Medium, Low, Not sensitive)* | **Further Consideration Required** *(Y/N)* |
|---|---|---|---|---|
| **NERC Species – mammals**<br>Otter<br>*(Lutra lutra)* | Moderate (Summer only) | Otters are known to use the impacted reaches. Further consideration would be necessary to determine to what extent or how they may be impacted by reduced flows caused by the drought option. | Low | Yes |
| **NERC Species – mammals**<br>Water vole<br>(*Arvicola amphibious)* | Moderate (Summer only) | Limited data is available for the impacted reach. Changes in water level are the most important factor influencing water vole populations, with species readily inhabiting areas of slow flowing and standing water. As such hydrological and associated impacts as a result of this drought option may reduce habitat availability and alter the species food supply. | Uncertain | Yes |
| **NERC Species – Fish**<br>-Atlantic salmon (*Salmo salar*)<br>- Brown trout *(Salmo trutta)*<br>-European Eel *(Anguilla anguilla)*<br>-Sea lamprey (*Petromyzon marinus*)<br>-River lamprey *(Lampetra fluviatilis)*<br>-*Twaite shad* (Alosa fallax)<br>-Allis shad *(A. alosa)* | Moderate (Summer only) | Potentially susceptible as duration of impacts could include all seasons, and thus could impact spawning, migration, provision of cover etc.<br>The potential impacts on migrations, freshwater attractant flows in tidal reach, elevated temperatures in the non-tidal reach where little flow would be present could cause thermo-barrier to migration of fish and reduction in dissolved oxygen. | High | Yes |
| **Notable Species – Fish**<br>Grayling (*Thymallus thymallus)*<br>Bullhead *(Cottus gobio)*<br>Brook lamprey *(Lampetra planeri)*<br>Barbel (*Barbus barbus)* [4] | Moderate (Summer only) | Potentially susceptible as duration of impacts could include all seasons, and thus could impact spawning, migration, provision of cover etc.<br>The potential impacts on migrations, freshwater attractant flows in tidal reach, elevated temperatures in the non-tidal reach where little flow would be present could cause thermo- | Medium | Yes |

[4] Barbel is listed in Annex V of the Habitats Directive as a species of Community interest whose taking in the wild and exploitation may be the subject of management measures.

| **Site/Receptor and designation** | **Hydrological Impact at Location** *(Major, Moderate, Minor, Negligible)* | **Susceptibility to flow and level impacts** | **Sensitivity** *(Uncertain, High, Medium, Low, Not sensitive)* | **Further Consideration Required** *(Y/N)* |
|---|---|---|---|---|
| | | barrier to migration of fish and reduction in dissolved oxygen. | | |
| **Notable Species - Invertebrate**<br>-Diving beetle (Oreodytes davisii)<br><br>-Caddisflies *(Potamophylax rotundipennis) (Rhyacophila septentrioni)*<br><br>-Mayfly *(Nigrobaetis niger)*<br><br>-Alderfly *(Sialis nigripes)* | Moderate (Summer only) | Species associated with fast-flowing water, therefore potentially susceptible to drought option impacts. However, they are relatively tolerant of short-term fluctuations in water levels or flow, as their preferred habitats are naturally dynamic. Low flow impacts of drought option implementation would occur against a baseline of drought conditions (i.e. compensation flow only) and may therefore not markedly detract from the quality of the supporting environment. | Low | Yes |
| **Notable Species – Terrestrial Invertebrates**<br>-Tansy beetle *(Chrysolina graminis)* | Moderate (Summer only) | Species associated with dampened riparian habitat and reliant on tansy plant (*Tanacetum vulgare*) for food and reproduction. Low flow impacts of drought option implementation would occur against a baseline of drought conditions (i.e. compensation flow only) and may therefore not markedly detract from the quality of the supporting environment. | Low | Yes |
| **NERC Species – Birds**<br>There are many birds species present across the region | Moderate (Summer only) | The following bird species to varying extents rely on water dependent habitats. However, they are not expected to be severely impacted by implementation of the drought option against a baseline of reduced flows characteristic of drought:<br>- Eurasian Curlew (*Numenius arqauta*)<br>-Reed Bunting (*Emberiza schoeniclus)* | Not sensitive | No |
| **Notable Species – Birds**<br>There are many birds species present across the region | Moderate (Summer only) | The following bird species to varying extents rely on water dependent habitats. However they are not expected to be severely impacted by implementation of the drought | Not sensitive | No |

| Site/Receptor and designation | Hydrological Impact at Location *(Major, Moderate, Minor, Negligible)* | Susceptibility to flow and level impacts | Sensitivity *(Uncertain, High, Medium, Low, Not sensitive)* | Further Consideration Required *(Y/N)* |
|---|---|---|---|---|
| | | option against a baseline of reduced flows characteristic of drought:<br>- House Martin (*Delichon urbica*)<br>- Swallow (*Hirundo rustica*)<br>- Grey Wagtail (*Motacilla cinerea*)<br>- Redshank (*Tringa tetanus*)<br>- Mute Swan (*Cygnus solor*)<br>- Dipper (*Cinclus cinclus*) | | |

### B2.1.4 WFD receptors

The sensitivity analysis has considered the relationship between macroinvertebrate and/or fish communities and the supporting environmental variables over the baseline period. Table B2 10 below summarises the RBMP Cycle 3 Status/ Potential of the WFD waterbody, including WFD receptors for fish and macroinvertebrates. The purpose of the analysis is to establish whether biological metrics/indices respond inter-annually to changes in flow and associated environmental variables including habitat quality and availability.

#### *B2.1.4.1 Macroinvertebrates*

The WFD waterbody GB104027069593 Ouse from River Nidd to Stillingfleet Beck is classified as 'High' for macroinvertebrates in 2022, Cycle 3. Baseline macroinvertebrate data is provided by five Environment Agency monitoring sites, Ouse (Dales) (ID 236, 237, 77323, 77326, and 77327). Ouse (Dales) had baseline survey data for seasonal samples from 2017 to 2024.

The flow series used in each macroinvertebrate figure is described for each individual reach in **Appendix A.**

The indicative WFD classification for these sites is based on the worst classification between $WHPT_{ASPT}$ and $WHPT_{NTAXA}$, these ranged between 'Moderate' on three occurrences to 'High' on seven occurrences. See **Table B2-5** for guidance in interpreting EQR scores for WHPT WFD classification.

Table B2-5 Macroinvertebrate EQR classification boundaries

| WHPT Classification | $WHPT_{ASPT}$ EQR | $WHPT_{NTAXA}$ EQR | LIFE EQR (Non-WFD) | PSI EQR (Non-WFD) |
|---|---|---|---|---|
| High | >0.97 | >0.8 | 0.94 | 0.7 |
| Good | 0.86 - 0.97 | 0.68 - 0.8 | | |
| Moderate | 0.72 - 0.86 | 0.56 - 0.68 | | |
| Poor | 0.59 - 0.72 | 0.47 - 0.56 | | |
| Bad | <0.59 | <0.47 | | |

$WHPT_{ASPT}$ scores ranged between 4.18 - 5.78 (4.76) with the lowest $WHPT_{ASPT}$ score of 4.18 at Site 236 in Spring 2023, and the highest score of 5.78 at Site 237 in Spring 2017. The $WHPT_{ASPT}$ expected scores for ranged between 4.38 to 4.66 across the sites, with all samples above the 'Good/Moderate boundary'. $WHPT_{ASPT}$ EQR scores ranged between 0.9 - 1.25 (1.05) with the lowest $WHPT_{ASPT}$ EQR of 0.9 at Site 236 in Spring 2023, and the highest EQR of 1.25 at Site 237 in Spring 2017.

Data from the monitoring site shows variation in $WHPT_{NTAXA}$ scores over the period 2010 to 2024. These scores generally align with the standards required to achieve 'High' WFD status throughout the monitoring period, indicating relatively stable ecological conditions. $WHPT_{NTAXA}$ scores ranged between 17 - 31 (23.06) with the lowest $WHPT_{NTAXA}$ score of 17 at Site 236 in Autumn 2017, and the highest score of 31 at Site 236 in Autumn 2019. The $WHPT_{NTAXA}$ expected scores ranged between 26.75 to 28.05 across the sites, with 3 of the 17 samples below the 'Good/Moderate boundary'. $WHPT_{NTAXA}$ EQR scores ranged between 0.63 - 1.15 (0.85) with the lowest $WHPT_{NTAXA}$ EQR of 0.63 at Site 236 in Autumn 2017, and the highest EQR of 1.15 at Site 236 in Autumn 2019.

$LIFE_{FAMILY}$ EQRs are not used to determine WFD classification but provides an indication of the flow preferences of the macroinvertebrate communities at the sites. See **Table B2-6** for guidance in interpreting raw LIFE scores.

Table B2-6 LIFE score sensitivities

| LIFE score | Invertebrate community flow sensitivity |
|---|---|
| 7.26 and above | High sensitivity to reduced flows |
| 6.51 – 7.25 | Medium sensitivity to reduced flows |
| 6.5 and below | Low sensitivity to reduce flows |

$LIFE_{FAMILY}$ EQRs are not used to determine WFD classification but provides an indication of the flow preferences of the macroinvertebrate communities at the sites. $LIFE_{FAMILY}$ scores ranged between 5.84 - 6.86 (6.23) with the lowest $LIFE_{FAMILY}$ score of 5.84 at Site 77327 in Spring 2017, and the highest score of 6.86 at Site 77326 in Autumn 2019. The LIFE(family) expected scores ranged between 6.03 to 6.26 across the sites, with 1 of the 17 samples below the 'Good/Moderate' boundary. $LIFE_{FAMILY}$ EQR scores ranged between 0.94 - 1.14 (1.01) with the lowest $LIFE_{FAMILY}$ EQR of 0.94 at Site 236 in Spring 2017, and the highest EQR of 1.14 at Site 77326 in Autumn 2019.

Similarly, $PSI_{FAMILY}$ EQRs are not used to determine WFD classification but provides an indication of the level of sedimentation and eutrophication at the sites. $PSI_{FAMILY}$ scores ranged between 2.86 - 40 (17.99) with the lowest $PSI_{FAMILY}$ score of 2.86 at Site 236 in Autumn 2023, and the highest score of 40 at Site 237 in Spring 2017. The $PSI_{FAMILY}$ expected scores ranged between 15.8 to 23.41 across the sites, with 11 of the 17 above the expected $PSI_{FAMILY}$ score for their respective season. $PSI_{FAMILY}$ EQR scores ranged between 0.13 - 2.39 (0.92) with the lowest $PSI_{FAMILY}$ EQR of 0.13 at Site 236 in Spring 2024, and the highest EQR of 2.39 at Site 77326 in Autumn 2019.

A total of two INNS species, including *Crangonyx pseudogracilis/floridanus* and *Potamopyrgus antipodarum* were recorded as present at two sites between 2010 to 2023.

A total of five designated species, including *Oreodytes davisii, Potamophylax rotundipennis, Nigrobaetis niger, Rhyacophila septentrionis* and *Sialis nigripes* were recorded as present at two sites between 2015 to 2021.

### Summary

The WFD status of the macroinvertebrate community in Ouse 1 may be impacted by the implementation of the Ouse at Monkton drought option. However, low flow impacts of drought option implementation would occur against a baseline of drought conditions (i.e. compensation flow only), and therefore impacts of the drought option must be considered in the context of environmental drought.

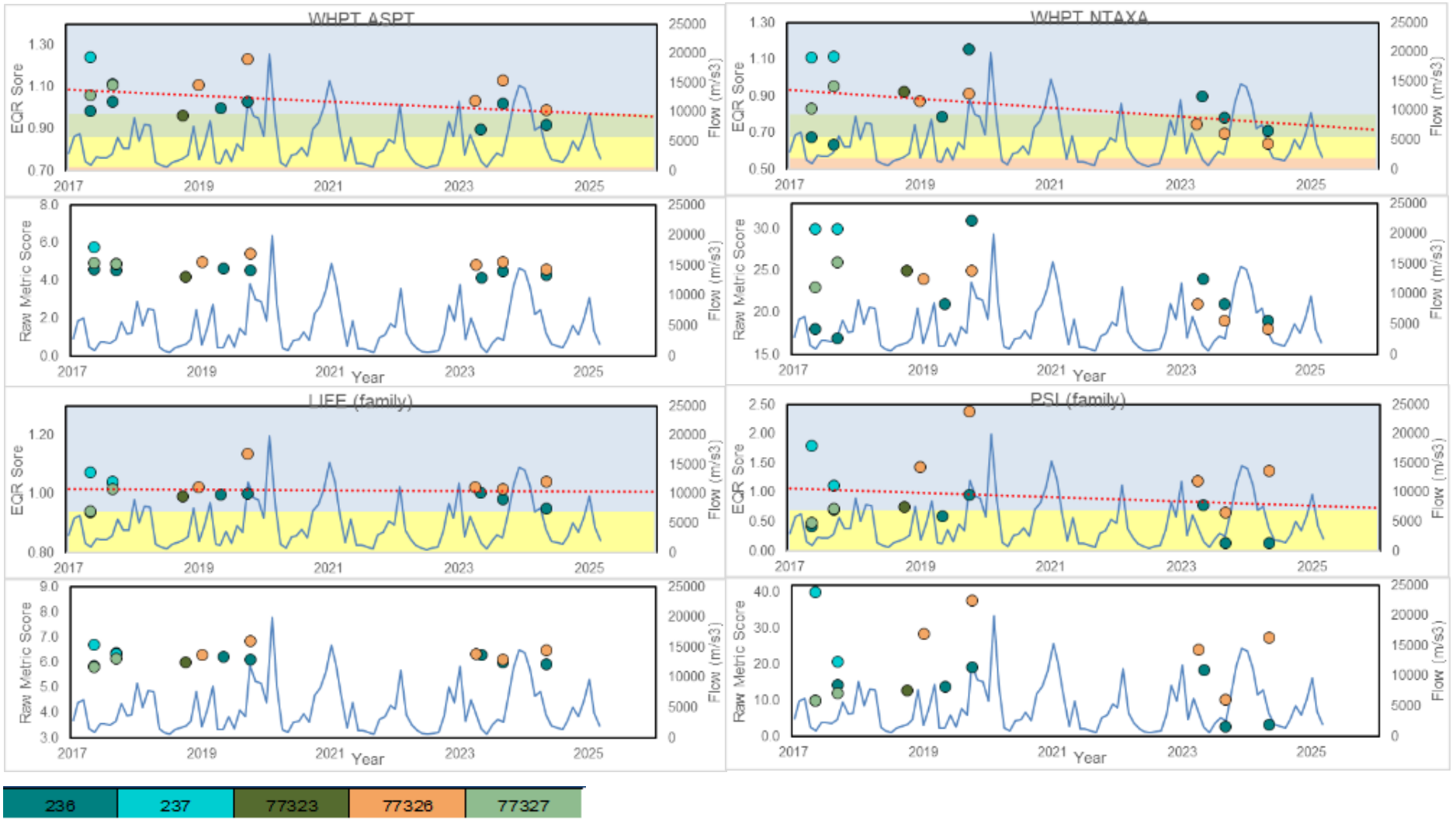
Baseline data indicates that under present conditions, the macroinvertebrate community in Ouse 1 is moderately sensitivity to reduced flows (**Figure B2-1**).

A summary of the above data is presented within **Table B2-7.** Based on the available information the macroinvertebrate community is considered to be susceptible to drought order impacts and has a **medium** sensitivity to the physical environment impacts identified in **Appendix A.**

Table B2-7 LIFE score sensitivities, EQR values for $WHPT_{NTAXA}$, $WHPT_{ASPT}$ and PSI score

| Site ID | Site NGR | Survey count | Survey Range | LIFE EQR Score Min - Max (AVG.) | LIFE (Family) Score Min - Max (AVG.) | PSI (Family) EQR Score Min - Max (AVG.) | PSI (Family) Score Min - Max (AVG.) | WHPT ASPT EQR Score Min - Max (AVG.) | WHPT ASPT EQR Class Min - Max (AVG.) *B/P/M/G/H* | WHPT ASPT Score Min - Max (AVG.) | WHPT NTAXA EQR Score Min - Max (AVG.) | WHPT NTAXA EQR Class Min - Max (AVG.) *B/P/M/G/H* | WHPT NTAXA Score Min - Max (AVG.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 236 | SE5914445488 | 7 | 2017 to 2024 | 0.94 - 1.04 (0.99) | 5.86 - 6.36 (6.11) | 0.13 - 0.96 (0.54) | 2.86 - 19.23 (11.69) | 0.9 - 1.03 (0.98) | G - H (H) | 4.18 - 4.65 (4.48) | 0.63 - 1.15 (0.81) | M - H (H) | 17 - 31 (22) |
| 237 | SE5600255094 | 2 | 2017 | 1.04 - 1.07 (1.06) | 6.33 - 6.69 (6.51) | 1.11 - 1.8 (1.46) | 20.83 - 40 (30.42) | 1.11 - 1.25 (1.18) | H - H (H) | 4.89 - 5.78 (5.34) | 1.11 - 1.12 (1.11) | H - H (H) | 30 |
| 77323 | SE5975246168 | 1 | 2018 | 0.99 | 6 | 0.75 | 12.82 | 0.96 | G | 4.22 | 0.92 | H | 25 |
| 77326 | SE5722154412 | 5 | 2019 to 2024 | 1.02 - 1.14 (1.05) | 6.13 - 6.86 (6.42) | 0.65 - 2.39 (1.41) | 10.34 - 37.78 (25.68) | 0.99 - 1.23 (1.1) | H - H (H) | 4.61 - 5.41 (4.96) | 0.64 - 0.91 (0.77) | M - H (G) | 18 - 25 (21) |
| 77327 | SE6025948309 | 2 | 2017 | 0.94 - 1.02 (0.98) | 5.84 - 6.14 (5.99) | 0.49 - 0.72 (0.6) | 10 - 11.9 (10.95) | 1.06 - 1.11 (1.09) | H - H (H) | 4.87 - 4.94 (4.91) | 0.83 - 0.96 (0.89) | H - H (H) | 23 - 26 (25) |

Figure B2-1 Macroinvertebrate EQR scores (Top) and observed scores (Bottom) for $WHPT_{NTAXA}$, $WHPT_{ASPT}$, $LIFE_{FAMILY}$ and $PSI_{FAMILY}$ scores



#### *B2.1.4.2 Fish*

Waterbody GB104027069593 Ouse from River Nidd to Stillingfleet Beck is not classified under Cycle 3 (2022). Baseline fisheries data within the impacted reach is informed by five Environment Agency monitoring sites: Linton-on-Ouse u/s weir (ID 3746), Beningborough Village (ID 3748), Acaster Malbis (ID 3750), Naburn Weir (ID 3751) and Overton Ings Fyke nets (36632). Fry surveys were also conducted at Acaster (ID 42066), Beningborough (ID 42070) and Naburn (ID 42099). Data from at least one of these sites has been recorded every year from 2010 to 2024. **Table B2-8**Table B2-7 sets out the available fish survey data from these sites.

The fish community in the Ouse from the River Nidd to Stillingfleet Beck may be impacted by the implementation of a drought order. However, since fish are not included as an element within the WFD classification for this waterbody, there is no risk of WFD status deterioration. Additionally, any low flow impacts resulting from the drought order implementation would occur within the existing context of drought conditions (i.e., abstraction increase only), and must therefore be assessed as part of the broader environmental drought scenario.

Fry surveys at Acaster (ID 42066) and Naburn (ID 42099) observed a high abundance and diversity of coarse fish across all sites, with species such as bleak, chub, dace, gudgeon, perch and roach recorded in varying numbers each year. A low abundance of flounder were recorded at Naburn - Fry Survey, with the exception of the 2013, 2016 and 2020 surveys. A low abundance of minnow and a single sliver bream were only observed at one fry survey site (Naburn - Fry Survey) in 2013. Additionally, a single bullhead was only observed at one fry survey site (Naburn - Fry Survey) in 2017. No Atlantic salmon, trout, European eel, grayling or lamprey *Spp*.[5] were observed during any of the fry surveys, noting that this method of survey is not the optimal method for recording these species.

Beningbrough Village is the most upstream site in the impacted reach and was surveyed annually 10 times between 2010 and 2024. A low to moderate abundance of bleak, chub, minnow, dace, gudgeon, perch, pike, ruffe and roach were recorded during most of the surveys at the site. A single barbel was observed at the site during the 2019 surveys. Rudd, sliver bream and stone loach were also recorded at single survey at a low abundance in varied years. A single bullhead was observed at the site in 2011, with an estimated 1 to 9 individuals recorded in 2012. Similarly, a single European eel was observed at the site in 2010 and 2024, with an estimated 1 to 9 individuals recorded in 2012. No Atlantic salmon, trout, grayling or lamprey *Spp*. were observed during any of the surveys at the site.

Acaster Malbis and Naburn Weir are located at the southern extend of the impacted reach. Naburn Weir was surveyed each year from 2010 to 2019 with the exception of 2012, while Acaster Malbis was surveyed in 2009 to 2011, 2013, 2016, 2019 and 2022.

Acaster Malbis observed a low to moderate abundance of bleak, chub, gudgeon, perch, pike, and roach during the surveys. Brown trout, grayling and salmon were not observed to be present at the site, although these species are present further downstream at Naburn Weir. Two European eel were observed at the site in 2010 and 2019, a low abundance is therefore likely present at the site. It is noted that some single catch surveys were only part width surveys.

While Naburn Weir observed slightly more coarse fish species with a low to moderate abundance of bleak, chub, dace, perch, pike, and roach. Gudgeon were intermittently recorded at Naburn Weir with a high estimated number of individuals in 2010, and only 5 individuals in both 2011 and 2018.Other species intermittently recorded in an abundance at Naburn Weir included grayling, bullhead, roach x common bream hybrid, rudd, ruffe, sea lamprey, lamprey *Spp.*, silver bream, stone loach, minnow and three spined- stickleback. European eel were observed at the site intermittently in 2012, 2013, 2015 and 2018, with a low abundance expected to present at the site. A low abundance of Atlantic salmon were recorded at Naburn weir, with the exception of the 2013 survey. Two trout were observed in both 2015 and 2016 with only single individual recorded in 2017, a low abundance is therefore likely present at the site.

[5] Lamprey ammocetes recorded during surveys were not always identified to species level due to the inherent difficulty of distinguishing between river and brook lamprey in the field. Therefore, unless additional information on barriers or habitat suitability is available to indicate otherwise, it is assumed that both river (*Lampetra fluviatilis)* and brook lamprey (*Lampetra planeri*) are present.

Historical datasets for pre-2009 include monitoring undertaken by the EA between 1997 and 2002 to inform the environmental impacts of drought and the Time Limited Licences (TLL[6]) at the Moor Monkton abstraction. Overall, the results of the surveys (from 1997-2002) showed a similar community as represented in the EA data from surveys undertaken between 2009 – 2019 and highlighted in . It is noted that the EA data presented represents mostly semi-quantitative fisheries data for EA monitoring sites. Additionally, two shad have been recorded, one in 2000 and another in 2008, at the Naburn Weir site. Though shad are known to utilise lowland rivers for spawning in the summer, the JNCC identifies that there is no established population of shad in the River Ouse[7]. As such shad are likely vagrant in the study area so have not been considered for further assessment.

Supplementary data were also available through the TLL investigations by the EA which used a multi-method sampling technique to understand the trends in the fish communities at a number of sites. This methodology considered the result of standardised survey techniques (multi anode boom boat electric fishing, seine netting and gill netting) in conjunction with angler catch data. These data were also supplemented with hydroacoustic surveys to examine the seasonal distribution and abundance of fish in the non-tidal River Ouse. The fish community demonstrates a high spatial variability, although some elevated densities are associated with either enrichment (e.g. WwTW outfalls) and/or preferable habitat.

The fish community of the River Ouse reflects typical lowland river characteristics, with a gradient of species composition from upstream to downstream, where both salmonid and coarse fish are present, as presented in **Table B 2-9**Table B2-8. Migratory species such as Atlantic salmon, European eel, river lamprey, and sea lamprey are present in the upper section of the reach, primarily using the area as a migration pathway rather than a permanent habitat. The dominant species are schooling cyprinids like roach, bleak, and dace, with fast-flow-associated species (brown trout, grayling, and barbel) present but in low abundances. As the river progresses downstream, coarse fish become increasingly dominant, consistent with the deeper, slower-flowing nature of the lowland sections. The fish community is primarily composed of coarse species, with cyprinids such as roach, bleak, chub, and gudgeon being the most frequently recorded. Further downstream (at Acaster Malbis), the community remains dominated by coarse fish, with the inclusion of with occasional records of European eel and flounder.

Overall, the River Ouse fish community exhibits a predominantly coarse fish composition with migratory species present, reflecting the typical ecological gradient of a lowland river system, where migration corridors support transient populations of salmonids, eels, and lamprey while the resident community is dominated by coarse fish species. Based on the available information the fish community is considered to be susceptible to drought order impacts and have a **medium** sensitivity to the physical environment impacts identified in **Appendix A**.

Table B2-8 Ouse 1 Fish Survey Results

| Site ID | Site Name | Survey NGR | Survey Method | Survey Count | Min Survey Year | Max Survey Year |
|---|---|---|---|---|---|---|
| 3746 | Linton-on-Ouse u/s weir (single anode) | SE4940060000 | Electric Fishing (AC, PDC and DC) | 4 | 2010 | 2019 |
| 3748 | Beningbrough Village (single anode) | SE5280057800 | Electric Fishing (AC, PDC and DC) | 10 | 2010 | 2024 |
| 3750 | Acaster Malbis (single anode) | SE5930044700 | Electric Fishing (AC, PDC and DC) | 6 | 2010 | 2022 |
| 3751 | Naburn Weir (single anode) | SE5941344435 | Electric Fishing (AC, PDC and DC) | 9 | 2010 | 2019 |
| 36632 | Overton Ings Fyke nets | SE5336857106 | Netting (including Seine and Fyke) | 6 | 2010 | 2024 |
| 42066 | Acaster - Fry Survey | SE5930044700 | Netting (including Seine and Fyke) | 10 | 2012 | 2024 |
| 42099 | Naburn - Fry Survey | SE5940044500 | Netting (including Seine and Fyke) | 9 | 2013 | 2024 |

[6] Environment Agency (2002). Environmental effects of Drought and Abstraction on the River Ouse Fisheries. Dale Area Fisheries. Fisheries Science Report 23/2002
[7] https://sac.jncc.gov.uk/species/S1103/, accessed on 15/05/2025

## Table B 2-9 Ouse 1 Fish Survey Site Information

| Tolerance Category[8] | Species Name | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| High tolerance | European eel | X | X | | X | | X | X | | X | X | | | | X |
| | Perch | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Roach | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Rudd | | | | | | | X | | | | | | | |
| | Barbel | X | | | X | X | X | X | | X | X | | | | |
| | Flounder | X | X | | X | X | X | X | X | X | | | | X | X |
| | 3-spined stickleback | X | X | | X | | X | | | X | | | | | |
| | Roach x common bream hybrid | | | | | X | | | | | | | | | |
| Medium tolerance | Stone loach | | | | | X | | X | | | | | | | |
| | Bleak | X | X | | X | X | X | X | X | X | X | X | X | X | X |
| | Common bream | X | | | X | | | X | | | X | X | X | | |
| | Dace | X | X | | X | X | X | X | X | X | X | X | X | X | X |
| | Silver bream | X | | | X | X | X | | | X | | | | | X |
| | Pike | X | X | | X | X | X | X | X | | X | | X | | X |
| | Gudgeon | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Chub | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Minnow | X | X | X | X | X | X | X | X | | X | X | X | | X |
| | Ruffe | | | | X | X | | X | X | X | X | | X | | X |
| Low tolerance | Brown trout | | | | | | X | X | X | | | | | | |
| | Bullhead | | X | | X | | | | X | | X | | | | |
| | Atlantic salmon | X | | | X | X | X | X | X | X | X | | | | |
| | Lamprey sp. | | | | | | | | | X | | | | | |
| | Sea lamprey | X | | | | X | | | | | | | | | |

[8] Cowx, I.G., Noble, R.A.A., Nunn, A.D., Harvey, J.P., Welcomme, R.L., & Halls, A.S. (2004). Flow and Level Criteria for Coarse Fish and Conservation Species (Science Report SC020112/SR). Bristol, UK: Environment Agency.

#### *B2.1.4.3 WFD waterbody status*

**Table B 2-10** summarises the WFD classification of waterbody which contain the impacted reach. **Table B 2-10** also displays the objective status for 2022 (Cycle 3) or the predicted status in 2027 where objective to meet good status is in 2027. This is displayed for overall, fish and macroinvertebrate elements and provides comparison with 2012 status, the table also displays the measures which have been assigned to the waterbody in order to reach their objective.

Table B 2-10 WFD classifications

| **Waterbody ID & Name** | | **GB104027069593 Ouse from River Nidd to Stillingfleet Beck** | **Sensitivity** *(Uncertain, High, Medium, Low, Not sensitive)* |
|---|---|---|---|
| Physical Environment Impact at Location *(Major, Moderate, Minor, Negligible)* | | Moderate (Summer only) | |
| RBMP Cycle 3 Status/ Potential | Overall | Moderate | |
| | Fish | - | Low |
| | Macroinvertebrates | High | Medium |
| Hydro-morph designation | | Heavily modified | |
| RBMP3 Waterbody Objective | Overall | Moderate | |
| | Fish | - | |
| | Macroinvertebrates | High | |
| Waterbody Measures | | None | |

### B2.1.5 Invasive non-native species (INNS)

**Table B2-11** summarises the wider receptors which should be taken into account in determining the potential impacts of drought option implementation.

No INNS receptors that are sensitive or susceptible to drought order impacts have been identified, as per the UKTAG INNS Alarm List[9] (see **Table B2-11**).

Table B2-11 INNS Receptors

| **Site/Receptor and designation** | **Hydrological Impact at Location** *(Major, Moderate, Minor, Negligible)* | **Susceptibility to flow and level impacts** | **Sensitivity** *(Uncertain, High, Medium, Low, Not sensitive)* | **Further Consideration Required** *(Y/N)* |
|---|---|---|---|---|
| **INNS – macroinvertebrates**<br>New Zealand Mud Snail<br>*(Potamopyrgus antipodarum)*<br>Demon shrimp (*Dikerogammarus haemobaphes*)<br>Zebra mussel<br>(*Dreissena polymorpha*)<br>Northern Crangonyctid (*Crangonyx pseudogracilis/ floridanus*) | Moderate (Summer only) | The implementation of this drought order is not anticipated to increase the spread of Invasive non-native species. | Not sensitive | No |
| **INNS – Terrestrial plants**<br>Giant Hogweed | Moderate (Summer only) | The implementation of this drought order is not | Not sensitive | No |

[9] Water Framework Directive UK Technical Advisory Group (2015), UKTAG INNS Alarm List v1.2.pdf

| Site/Receptor and designation | Hydrological Impact at Location *(Major, Moderate, Minor, Negligible)* | Susceptibility to flow and level impacts | Sensitivity *(Uncertain, High, Medium, Low, Not sensitive)* | Further Consideration Required *(Y/N)* |
|---|---|---|---|---|
| *(Heracleum mantegazzianum)* Himalayan balsam *(Impatiens glandulifera)* Japanese knotweed *(Fallopia japonica)* Canadian waterweed (*Elodea canadensis*) New Zealand pigmyweed (*Crassula helmsii*) Nuttall's waterweed (*Elodea nuttallii*) Spanish bluebell (*Hyacinthoides hispanica*) | | anticipated to increase the spread of Invasive non-native species. | | |

### B2.1.6 Landscape, navigation, recreation and heritage

**Table B2-12** summarises the wider receptors which should be taken into account in determining the potential impacts of drought option implementation.

No receptors that are sensitive or susceptible to drought order impacts have been identified (see **Table B2-12**).

Table B2-12 Landscape, navigation, recreation and heritage receptors

| Site/Receptor and designation | Hydrological Impact at Location *(Major, Moderate, Minor, Negligible)* | Susceptibility to flow and level impacts | Sensitivity *(Uncertain, High, Medium, Low, Not sensitive)* | Further Consideration Required *(Y/N)* |
|---|---|---|---|---|
| Ebor Way – National Trail | Moderate (Summer only) | The route of the trail runs alongside the River Ouse. The river forms part the landscape setting of the trail. | Not sensitive | No |
| Trans Pennine Trail – National Trail | Moderate (Summer only) | The route of the trail runs alongside the River Ouse. The river forms part the landscape setting of the trail. | Not sensitive | No |
| Nether Poppleton medieval moated site, fishponds and earthworks around and associated with St Everilda's church – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| St Mary's Abbey – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| City Walls, gates, posterns (not including the section from | Moderate (Summer only) | Unlikely to be impacted over the duration of the | Not sensitive | No |

| **Site/Receptor and designation** | **Hydrological Impact at Location** *(Major, Moderate, Minor, Negligible)* | **Susceptibility to flow and level impacts** | **Sensitivity** *(Uncertain, High, Medium, Low, Not sensitive)* | **Further Consideration Required** *(Y/N)* |
|---|---|---|---|---|
| Bootham Bar to Monk Bar, N of the Minster, now part of SM 13280), moats, mounds, Bayle (or Baile) Hill, St Leonard's Hospital and Merchant Taylor's Hall, Aldwark – Scheduled Ancient Monument | | drought options implementation | | |
| York Minster Cathedral precinct – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| Moated site, 50m north west of Red House – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| South Angle Tower of Roman Fortress – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| Merchants Hall, Fossgate – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| York Castle – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| St. George's Medieval Chapel, 120m south of York Castle – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| Fulford Cross | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| St. Peter's Hospital, part of the undercroft beneath Theatre Royal – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| Medieval Stone Town House known as Norman House – Scheduled Ancient Monument | Moderate (Summer only) | Unlikely to be impacted over the duration of the drought options implementation | Not sensitive | No |
| Angling in River Ouse | Moderate (Summer only) | Angling is unlikely to be impacted by the flow reduction | Low | No |

# B3 ENVIRONMENTAL RECEPTORS SCREENING SUMMARY

Table B3-1 Environmental receptors summary of the River Ouse

| Reach | Ouse 1 |
|---|---|
| **Associated Drought Options** | **River Ouse at Moor Monkton** |
| **WFD Waterbody** | **GB104027069593** |
| **Statutory designated sites** | |
| Naburn Marsh SSSI | ✓ |
| Clifton Ings and Rawcliffe Meadows SSSI | ✓ |
| Church Ings SSSI | ✓ |
| Acaster South Ings SSSI | ✓ |
| Fulford Ings SSSI | ✓ |
| **NERC Habitat and Local Wildlife Sites** | |
| Church Ings LWS | ✓ |
| Clifton Ings LWS | ✓ |
| Rawcliffe Ings Dyke LWS | ✓ |
| River Ouse LWS | ✓ |
| Bishopthorpe Ings LWS | ✓ |
| Gollie Ponds LWS | ✓ |
| Middlethorpe Crematorium LWS (4-3) | ✓ |
| Naburn Hall Meadow / Ings LWS | ✓ |
| **NERC and Notable Species Receptors** | |
| Otter | ✓ |
| Water vole | ✓ |
| Notable Macroinvertebrates | ✓ |
| Atlantic salmon | ✓ |
| Brown trout | ✓ |
| River Lamprey | ✓ |
| European eel | ✓ |
| Sea lamprey | ✓ |
| Allis shad | *x* |
| Twaite shad | *x* |
| Barbel | ✓ |
| Bullhead | ✓ |
| Grayling | ✓ |
| **WFD Waterbody WFD Status Receptors** | |
| Fish | ✓ |
| Invertebrates | ✓ |

Further assessment required = ✓ No further assessment required = *x*

# B4 RECEPTORS ASSESSMENT

Details regarding the approaches/methodologies used for the assessment of the impacts associated with drought option implementation are presented in Section 3.7 of YWSL's Drought Plan 2027 Environmental Assessment Methodology[10]. The potential changes to the physical environment as a result of drought option implementation are described in **Appendix A**.

## B4.1 OUSE 1

### B4.1.1 Receptor assessment

#### *B4.1.1.1 Statutory designated sites*

##### Naburn Marsh SSSI

Main habitat is neutral grassland (lowland). The flood meadows at Naburn marsh are contained within a bend of the River Ouse about 4 km south of the centre of the City of York. The site comprises a mosaic of species-rich flood meadow grassland with swamp and inundation communities. This type of flood meadow grassland is nationally rare and further threatened by conversion to arable land or more intensive grassland. The special interest of the site is augmented by the presence of a sequence of grassland and inundation communities which reflect the variations in topography and hydrology of the site. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems.

The site is identified by Natural England as in unfavourable recovering condition. The site and its habitats are dependent on flooding from the Ouse. However, the drought option will not significantly affect the flooding regime of the sites, which occurs at flows in the order of 1000s of Ml/d. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Naburn Marsh SSSI is deemed to be **negligible**.

##### Clifton Ings and Rawcliffe Meadows SSSI

The floodplain covers 25 acres of the Clifton Ings and Rawcliffe Meadows SSSI, this area of the Ings are flood banks/barrier banks built up in the late 20th century to try to contain and control the Ouse when it floods. The 25.13ha of MG4 grassland in Clifton Ings and Rawcliffe Meadows SSSI is 1.67% of the National resource. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems. Wetlands are ecosystems characterised by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Clifton Ings and Rawcliffe Meadows SSSI/ Clifton Ings LWS and Rawcliffe Ings Dyke LWS is deemed to be **negligible**.

##### Church Ings SSSI

The main habitats of the SSSI are listed in the Citation as neutral grassland (lowland). The site is identified by Natural England as in favourable condition. Church Ings comprises two unimproved alluvial flood meadows, adjacent to the River Ouse at Acaster Malbis in the Vale of York. These meadows are of particular importance for their neutral grassland plant community which is an increasingly rare habitat type, threatened nationally as a result of drainage and agricultural improvement. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems. Wetlands are ecosystems characterised

[10] Ricardo (2025). Yorkshire Water Drought Plan 2027 Environmental Assessment Methodology. Report for Yorkshire Water Services Ltd. February 2025.

by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Church Ings SSSI and Church Ings LWS is deemed to be **negligible.**

#### Acaster South Ings SSSI

Acaster South Ings consist of two large alluvial flood meadows adjacent to the River Ouse. Grasslands represent an increasingly rare habitat type which is threatened nationally as a result of drainage. The meadows are characterised by two main receptors; regular flooding in spring and the impact of mowing, whether discontinued or still ongoing. Flood sediments form the substrate for the vegetation, and silt transported by river water is the main nutrient source. The site is dependent on flooding from the Ouse. Alluvial soils beneath meadows tend to be rich in carbon so carbon sequestration is a valuable benefit provided by the habitat. Alluvial soils are naturally very well-structured, providing plenty of pore space for air and water to move through the soil. However, such soils are susceptible to compaction when wet. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Acaster South Ings SSSI is deemed to be **negligible**.

#### Fulford Ings SSSI

The main habitats of the SSSI are listed in the Citation[18] as neutral grassland (lowland) with fen, marshes and swamps. The site is identified by Natural England as in unfavourable (75% recovering and 25% declining) recovering condition. Fulford Ings is an important example of flood plain mire located on low lying land between the River Ouse and Fulford village. Mires occur typically on deep peat (over 0.5 m thick) with the water table at or just below the surface. The site is dependent on flooding from the Ouse. The implementation of the drought option will not significantly affect the hydrological functioning of the floodplain mire habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Fulford Ings SSSI is deemed to be **negligible**.

B4.1.1.2 *NERC and local wildlife sites*

#### Naburn Hall Meadow/ Ings LWS

An area of local significance including biodiverse floodplain habitats and nationally rare meadow grassland threatened by land conversion. The special interest of the site is augmented by the presence of a sequence of grassland and inundation communities which reflect the variations in topography and hydrology of the site.

The site is identified by Natural England as in unfavourable recovering condition. The site and its habitats are dependent on flooding from the Ouse. However, the drought option will not significantly affect the flooding regime of the sites, which occurs at flows in the order of 1000s of Ml/d. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Naburn Hall Meadow/ Ings LWS is deemed to be **negligible**.

#### Clifton Ings LWS

Church Ings comprises two unimproved alluvial flood meadows, adjacent to the River Ouse at Acaster Malbis in the Vale of York. These meadows are of particular importance for their neutral grassland plant community which is an increasingly rare habitat type, threatened nationally as a result of drainage and agricultural improvement. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems. Wetlands are ecosystems characterised by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Clifton Ings LWS is deemed to be **negligible**.

### Rawcliffe Ings Dyke LWS

The site is predominantly floodplain hay meadow. A series of pools are present in the flood basin, hosting different communities depending on time of creation. Scrub is present on the slopes of the flood basin, but neutral grassland is dominant with shallow mudded areas and reedbeds present. Wetlands are ecosystems characterised by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Rawcliffe Ings Dyke LWS is deemed to be **negligible**.

### Church Ings LWS

Church Ings comprises two unimproved alluvial flood meadows, adjacent to the River Ouse at Acaster Malbis in the Vale of York. These meadows are of particular importance for their neutral grassland plant community which is an increasingly rare habitat type, threatened nationally as a result of drainage and agricultural improvement. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems. Wetlands are ecosystems characterised by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Church Ings LWS is deemed to be **negligible.**

### River Ouse LWS

The site encompasses the river and its banks and immediate area. The banks contain areas of semi-natural woodland with ancient woodland indicator species, tall herbs. Sections of the river are canalised with access to the banks in various locations. The River Ouse flows through the River Ouse LWS, with potential changes to the physical environment presented in **Appendix A. Appendix A** highlights the potential for a potential minor risk of reduction in total wetted aquatic habitat in the reach, and minor risk of changes in available habitat for different species requirements – noting that dominant flow types will be retained. As such, the risk from the implementation of the drought option to River Ouse LWS is deemed to be **minor**.

### Bishopthorpe Ings LWS

Bishopthorpe Ings LWS includes bank of the River Ouse, with the site predominantly flood meadow grassland grading to wet grassland and swamp. The bankside area of the site hosts tansy and small populations of Tansy Beetle. Tansy can tolerate a little shade and once established it can cope with drought too. Because they are not all constantly wet, the species occurring in flood meadows are adapted to periods of dryness. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Bishopthorpe Ings LWS is deemed to be **negligible**.

### Gollie Ponds LWS

Based on the available information the pond may be hydrologically connected to the River Ouse. A reduction in flows within the River Ouse may result in a disconnection of the ponds with the impacted reach, however satellite imagery of the pond during summer periods shows limited aquatic habitat to be present. Therefor the risk from the implementation of the drought option to Gollie Ponds LWS is deemed to be **minor**, based on a precautionary approach where connectivity to the main river is thought to be lost during natural drought conditions**.**

### Middlethorpe Crematorium LWS (4-3)

Middlethorpe Crematorium LWS (4-3) is predominantly old, established semi-natural neutral grassland. The site is separated from the River Ouse by a public footpath and does not encompass the river bank. Middlethorpe Crematorium is also comprised of an upper field with herb rich neutral grassland and a lower section of swamp, which is likely to rely on periodic flooding on the River Ouse to replenish water levels within the swamp areas. Swamp, wetland ecosystem characterised by mineral soils with poor drainage and by plant life dominated by trees. The implementation of the drought option will not significantly affect the hydrological

functioning of the predominant habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Middlethorpe Crematorium LWS is deemed to be **negligible**.

*B4.1.1.3 NERC and other protected species*

Notable Macroinvertebrates

The likely impacts arising from the hydrological changes as a result of the implementation of the drought option are identified in **Table B4-1**. These impacts are evaluated using species' LIFE score categories, which classify invertebrates based on their reliance on specific flow conditions and their ability to tolerate changes in flow regimes. The potential drought impacts on the River Ouse 1 reach are assessed as minor, with negligible effects on longitudinal connectivity, coarse sediment dynamics, and overall habitat structure.

However, the tansy beetle is a terrestrial species dependent on riparian (riverside) habitats and therefore is not assigned a LIFE score. The tansy beetle was historically widespread across the UK but now has a significantly restricted and declining distribution. This reduction is primarily attributed to habitat loss and degradation, particularly within wetland areas. One of the primary threats to the species is the reduction of its key food plant, tansy, which thrives in damp, riverine environments.

Given these factors, the risk to the tansy beetle, which relies on suitable wetland habitats and the presence of its food plant, tansy, is also considered negligible. The primary reason for this assessment is the limited impact on the riparian zones where tansy typically grows. Minor reductions in wetted width or flow velocity are unlikely to significantly affect these marginal areas. Additionally, potential changes in sediment deposition are expected to be limited to fine sediments, while tansy plants, which prefer stable ground, are not directly affected by such changes. Moreover, the overall habitat structure within the reach remains stable, maintaining the existing riparian vegetation that supports the tansy beetle. The minimal changes in water flow and sediment dynamics ensure that the essential conditions for tansy growth are preserved. The presence of scattered riparian trees, which contribute organic matter and provide some shelter, also remains unaffected, indirectly supporting the beetle's habitat.

The overall confidence in the macroinvertebrate data and the subsequent assessment is classed as high. This is based on a comprehensive understanding of the species' presence within the reach and the potential impact pathways identified.

Table B4-1 Impacts on Notable Macroinvertebrates in Ouse 1

| Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| *Chrysolina graminis* | • The beetle is threatened by the reduction in suitable wetland habitat and the availability of its host plant (*Tanacetum vulgare*, tansy).<br>• The species is restricted to tansy stands along the banks of the River Ouse. Tansy is drought tolerant and is not expected to be severely impacted by the drought option.<br>• The species is vulnerable to environmental, and habitat change. | Regional | Negligible | Negligible |
| *Oreodytes davisii* | • Species associated with clean, cool, well-oxygenated streams with moderate to fast flow.<br>• Temporary reductions in flow may reduce suitable habitat availability, but changes will occur against a drought baseline.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |
| *Potamophylax rotundipennis* | • Temporary flow reductions may slightly affect larval habitat but are unlikely to have long-term effects.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |

| Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| *Nigrobaetis niger* | • Temporary flow reductions may locally reduce habitat suitability.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |
| *Rhyacophila septentrionis* | • Temporary flow reductions may locally reduce habitat suitability.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |
| *Sialis nigripes* | • Typically found in slow to moderate flow rivers with vegetated margins or detritus.<br>• Habitat availability is unlikely to be significantly affected by temporary reductions in flow.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |

### Water vole

In the absence of quantitative data on water vole (*Arvicola amphibius*) populations within the Ouse 1 reach, it is not feasible to conduct a detailed assessment of the potential impact resulting from the implementation of the drought option. However, it is important to recognise that suitable habitat is present within the reach, particularly in the form of vegetated banks that support burrowing activity.

One of the primary concerns associated with reduced water levels is the potential exposure of water vole burrows. During drought conditions, as water levels recede, burrow entrances located along the banks may become more exposed. This increased visibility can heighten the vulnerability of water voles to predation, particularly from terrestrial predators such as stoats and weasels. Given that water voles are known to rely on dense vegetation and proximity to water as a refuge from predators, any loss of cover can significantly increase their susceptibility.

The likely impacts arising from the hydrological changes as a result of the implementation of the drought option are identified in **Table B4-2**. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are considered to be short-term and reversible.

Table B4-2 Impacts on water vole in Ouse 1

| Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| Water vole | • Risk of deterioration in water quality has been identified as minor and will not impact on this receptor<br>• Species has a preference for waterbodies that do not have extreme fluctuations in water level[11]. Water levels will be mostly retained for navigation<br>• Increased predation as a result of decreased water width and exposure of burrows.<br>• The reduction in wetted width could result in an increased distance between water vole food source and the burrows, but this is likely to be limited to the reaches upstream of Acomb where the banks have not been altered.<br>• Impacts could occur throughout the breeding season for this species.<br>• Alteration to food supply could occur although the species has been known to feed upon crayfish at | National | Negligible | Negligible |

[11] English Nature, the Environment Agency and the 1998 Wildlife Conservation Research Unit Water vole Conservation Handbook. George Street Press Ltd.

| Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| | times[12] and the potentially increased density of this species could lead to increased predation efficiency<br>• Although the impacts are restricted to the reach, the effects of increased predation upon the species could have long-term impacts.<br>• There are uncertainties relating to the presence of this species with the impacted reach. | | | |

### Otter

The drought option proposed for the River Ouse is expected to result in short-term and reversible changes to the river's physical environment as detailed in **Appendix A**. The potential impacts include minor reductions in flow velocity and wetted width, but crucially, these changes are expected to be negligible in terms of their overall impact on otter habitat utilisation.

Compared to the natural drought scenario, the drought option is predicted to have a limited additional impact. The moderate reduction in flow (up to 14% in summer) is not expected to significantly alter habitat connectivity or the availability of foraging sites. Moreover, the overall habitat structure within the Ouse reach remains relatively stable despite the proposed flow reductions. The drought option does not significantly affect bank-side vegetation or resting sites, ensuring that key riparian corridors remain intact. As a result, the primary habitat receptors utilised by otters, such as foraging areas, resting sites, and safe passage along the river corridor, are not expected to experience significant disruption.

The predicted changes in flow are minor and short-lived, and the structure of riparian habitats is expected to remain largely intact. Given otters' adaptability and mobility, the overall risk to their habitat utilisation within the River Ouse under the drought option is considered **negligible**. The likely impacts arising from the hydrological changes as a result of the implementation of the drought option are identified in **Table B4-3.**

Table B4-3 Impacts on otter in Ouse 1

| Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| Otter | • Increased efficiency in predation as a result of higher densities of prey species (fish and crayfish) as species are forced into smaller areas[13].<br>• Species could remain within the reach for longer.<br>• Otter likely to move to unaffected reaches[14]. | International | Negligible | Negligible |

### Fish

The fish community within the River Ouse reach comprises several NERC Act Section 41 species and other notable fish species**,** including both resident and migratory species. The implementation of the drought option may potentially result in short-term and reversible changes to the river's physical environment, as detailed in **Appendix A**. These changes primarily involve minor reductions in flow velocity and wetted width. However, the dominant flow types (smooth and rippled) will be maintained, preserving the typical habitat structure of the reach. Additionally, longitudinal connectivity will not be compromised due to the level-controlled nature of the river**,** ensuring that migration corridors remain intact.

Most resident species, including brown trout, barbel, bullhead, and grayling, are predicted to experience negligible impacts. These species are relatively localised in their movement and are typically resilient to minor

[12] Strachan, R. and Moorhouse, T. (2006) Water Vole Conservation Handbook. 2nd Edition. Wildlife Conservation Research Unit, Oxford.

[13] Ruiz-Olmo, J., & Jiménez, J. (2009). *Diet of the otter (Lutra lutra) in a Mediterranean reservoir during a severe autumn drought.* Journal of Mammalogy, 101(1), 211-218.

[14] Barbosa, A. M., & Real, R. (2022). *Landscape connectivity analysis for the Eurasian otter (Lutra lutra) in European river systems.* Biodiversity and Conservation, 31(3), 785-798.

flow variations, particularly within the regulated and stable lowland river environment[15]. The presence of deep, slow-flowing sections downstream provides suitable habitats that are unlikely to be significantly affected by the proposed changes.

Migratory species, such as Atlantic salmon and European eel, are also expected to experience negligible impacts as the drought period is likely to occur outside their key migration windows. Additionally, the stable flow regime helps maintain conditions suitable for their passage through the reach.

However, lamprey species, particularly river and sea lamprey, may be more vulnerable due to their reliance on consistent flow for downstream movement, especially during the juvenile stage. Reduced flow velocities could potentially impact migration to spawning and nursery habitats, leading to a moderate impact. In contrast, brook lamprey, which are more resident in nature and less reliant on long-distance migration, are expected to experience minor impacts.

The likely impacts arising from the hydrological changes as a result of the implementation of the drought option are identified in **Table B4-4**.

Table B4-4 Impacts on NERC and notable fish species in Ouse 1

| NERC/ notable Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| Atlantic salmon | • The River Ouse is level controlled for navigation for much of the impacted reach and reduced flows are unlikely to result in exposure/loss of important habitats (spawning gravels, nursery habitat, resting pools)<br>• Migratory species are unlikely to be impacted by flows (in terms of velocity), as the impacts are likely to occur outside the main migration periods for Atlantic salmon (adults and smolt), European eel (elvers and adults).<br>• The risk to siltation of spawning gravels is considered minor<br>• Stranding of individuals is unlikely as longitudinal connectivity will not be impacted and level controlled for navigation for much of the impacted reach.<br>• It is noted that depth of water is not critical to bullhead[16] and the species is also widespread within the catchment<br>• Juvenile lamprey are known to be poor swimmer and require flows for downstream movements to find suitable habitat for burrowing and feeding. Reduced flow velocity could impact the movement on individuals to spawning and nursery grounds in the upstream sections of the impacted reach. | National | Negligible | Negligible |
| Brown trout | | Regional | Negligible | Negligible |
| River Lamprey | | National | Medium | Moderate |
| European eel | | National | Negligible | Negligible |
| Sea lamprey | | National | Medium | Moderate |
| Barbel | | County | Negligible | Negligible |
| Brook Lamprey | | National | Low | Minor |
| Bullhead | | National | Negligible | Negligible |
| Grayling | | Regional | Negligible | Negligible |

*B4.1.1.4 WFD receptors*

Invertebrates

The macroinvertebrate community within Ouse 1 has been classified as 'high' for the WFD since the first classification in 2014. This assessment focuses on evaluating the risk of deterioration of the macroinvertebrate element as a result of the implementation of the drought option, considering the potential impacts beyond those expected from natural drought conditions. The assessment is based on the drought option being in place for up to six months from the date on which the order is granted.

The drought option may result in flow reductions of up to 14.9% during summer and dry autumn conditions, while impacts during winter are considered negligible, as detailed in Appendix A. The primary impact on the macroinvertebrate community relates to the moderate reduction in river flow during summer and autumn, which may lead to a moderate decrease in wetted width and depth. However, this reduction is not expected to

[15] Lucas, M.C. (2000). *The influence of environmental factors on movements of lowland-river fish in the Yorkshire Ouse system.* Science of The Total Environment, 251–252, 223–232

[16] Tomlinson, M. L. and Perrow, M. R. (2003) Ecology of the Bullhead. Conserving Natura 2000 Rivers Ecology Series No. 4. English Nature, Peterborough.

significantly change habitat availability, as the dominant flow types (smooth and rippled) will be retained, preserving the overall habitat structure.

The macroinvertebrate community within Ouse 1 exhibits varying levels of diversity, indicated by $WHPT_{NTAXA}$ EQRs ranging from poor to high. This variation reflects the presence of diverse habitats and the influence of local flow conditions. The LIFE scores within the reach range from low to medium, indicating that the macroinvertebrate community is generally tolerant of slower flow conditions or capable of adapting to moderate flow reductions. While some species that prefer higher flow velocities may experience localized habitat constraints, the retention of dominant flow types ensures that the overall community structure is not significantly altered. Therefore, the anticipated flow reductions from the drought option are unlikely to cause a marked shift in community composition when compared to natural drought conditions.

Water quality poses a moderate risk primarily due to short-term, acute, and infrequent pressures from combined sewer overflow (CSO) discharges during rainfall events. These pressures are expected locally downstream of 14 CSOs. Reduced dilution capacity during low flow periods may temporarily increase the risk of water quality deterioration, particularly affecting dissolved oxygen and nutrient concentrations.

The $WHPT_{ASPT}$ EQRs within the reach indicate low to medium sensitivity to water quality pressures. These scores reflect the moderate resilience of the macroinvertebrate community to water quality changes. However, localized deterioration, particularly where soluble reactive phosphorus (SRP) levels are already not attaining 'Good' status, could pose a risk of temporary eutrophication. In such areas, species with higher $WHPT_{ASPT}$ scores may be more vulnerable, leading to short-term reductions in community diversity.

The combined changes in river flows, river habitat, and water quality resulting from the implementation of the drought option are predicted to present a moderate risk to the macroinvertebrate component of the WFD GB104027069593 Ouse from River Nidd to Stillingfleet Beck. The impacts could last up to six months and occur at any time of the year, affecting all seasons. However, the macroinvertebrate community is expected to recover relatively quickly due to effective re-colonisation strategies[17] [18]. Therefore, the risk of deterioration to the WFD status of the waterbody is considered **minor**.

### Fish

The River Ouse from River Nidd to Stillingfleet Beck (WFD GB104027069593) is not currently classified for fish under the WFD, so there is no risk of deterioration in classification as a result of the drought option. Instead, this assessment focuses on the potential for changes to the fish community as a whole within the reach.

The combined physical environment changes resulting from the implementation of the drought option, including alterations to river flows, river habitat, and water quality, are predicted to present a minor risk to the fish community within the Ouse reach. The drought option may result in reductions in flow of 10.3% and 14.2% during the summer Q95 and Q99 periods, respectively, while the year-round reductions at Q95 and Q50 are expected to be 9.2% and 2.8%.

The summer reductions in flow are anticipated to occur after the spawning period for key coarse fish species, minimizing the potential impact on reproduction. Additionally, the impacted reach is level-controlled for navigation, which means the reductions are likely to primarily affect flow velocity rather than overall water levels. As a result, the reduction in velocity alone is not expected to significantly impact the coarse fish community.

Supplementary data available through the TLL investigations[6] by the Environment Agency, using multi-method sampling techniques, indicated that fish community trends in the Ouse are influenced by seasonal conditions. The results showed a clear long-term trend where good recruitment of coarse fish correlated positively with hot, dry summers and negatively with cooler, wetter summers. This suggests that the reduced flows expected during the drought option may not adversely affect coarse fish populations and may even support recruitment under certain conditions.

Given the expected minor changes in velocity and the positive recruitment trends associated with dry summers, the overall risk to the fish community within the Ouse reach is considered minor. The stability of the level-controlled waterbody and the absence of a WFD classification for fish further support the conclusion that the

[17] Williams, D. D. (1977) Movements of benthos during the re-colonisation of temporary streams. *Oikos* 29, pp 306 – 312.

[18] Mackay, R. J. (1992) Colonisation by lotic macroinvertebrates: a review of process and patterns. *Canadian Journal of Fisheries and Aquatic Science* 49, pp 617 – 628.

drought option is unlikely to result in significant changes to the fish community as a whole. Therefore, the risk to the fish community is considered to be **minor**.

### B4.1.2 Summary of impacts

**Table B4-5** summarises the outcomes of the environmental receptors assessment and includes deterioration to fish and invertebrate receptors within WFD waterbodies and significance of impacts to statutory designated sites, NERC Act Section 41 receptors and other significant receptors.

Table B4-5 Summary of impacts identified in Ouse 1 environmental receptors assessment

| Reach | Ouse 1 | |
|---|---|---|
| | Significance of Impact[19] | Mitigation Required *(Y/N)* |
| **Designated Sites** | | |
| Naburn Marsh SSSI | Negligible | No |
| Clifton Ings and Rawcliffe Meadows SSSI | Negligible | No |
| Church Ings SSSI | Negligible | No |
| Acaster South Ings SSSI | Negligible | No |
| Fulford Ings SSSI | Negligible | No |
| **NERC and local wildlife sites** | | |
| River Ouse LWS | Minor | No |
| Bishopthorpe Ings LWS | Negligible | No |
| Gollie Ponds LWS | Minor | No |
| Middlethorpe Crematorium LWS (4-3) | Negligible | No |
| Naburn Hall Meadow / Ings LWS | Negligible | No |
| Clifton Ings LWS | Negligible | No |
| Rawcliffe Ings Dyke LWS | Negligible | No |
| **NERC and Notable Species Receptors** | | |
| *Chrysolina graminis* | Negligible | No |
| *Oreodytes davisii* | Minor | No |
| *Potamophylax rotundipennis* | Minor | No |
| *Nigrobaetis niger* | Minor | No |
| *Rhyacophila septentrionis* | Minor | No |
| *Sialis nigripes* | Minor | No |
| Water vole | Negligible | No |
| Otter | Negligible | No |
| Atlantic salmon | Negligible | No |
| Brown trout | Negligible | No |
| Brook lamprey | Minor | No |
| European eel | Negligible | No |
| Sea lamprey | Moderate | Yes |
| Barbel | Negligible | No |
| River lamprey | Moderate | Yes |
| Bullhead | Negligible | No |
| Grayling | Negligible | No |
| **WFD Status Receptors - GB104027069593 Ouse from River Nidd to Stillingfleet Beck** | | |
| Fish | Minor | No |
| Invertebrates | Minor | No |

[19] Risk of Deterioration for WFD receptors

# B5 CUMULATIVE IMPACTS

Desk-based assessments have been completed for each of the sensitive receptors where applicable in order to determine the magnitude of impact in Ouse 1 as a result of simultaneous deployment of the drought option at the River Ouse at Moor Monkton and three reservoirs of the North reservoir group (Leighton, Lumley Moor and Beaver Dyke), and the River Ure at Kilgram Bridge drought option could, if simultaneously deployed, impact flows downstream of the Moor Monkton abstraction until the tidal limit at Naburn. These impacts are however expected to be **minor** in winter and **moderate** in summer, which will require further assessments in summer. This level of impact is considered below. Each receptor assessment comprises a background to the assessment, the methodology applied, reporting of the analyses carried out and a statement of the assessed impact.

Details regarding the approaches/methodologies used for the assessment of the impacts associated with drought option implementation are presented in Section 3.7 of YWSL's Drought Plan 2027 Environmental Assessment Methodology[20]. The potential changes to the physical environment as a result of drought option implementation are described in **Appendix A**.

## B5.1 OUSE 1 CUMULATIVE

### B5.1.1 Receptor assessment

#### *B5.1.1.1 Statutory designated sites*

##### Naburn Marsh SSSI

Main habitat is neutral grassland (lowland). The flood meadows at Naburn marsh are contained within a bend of the River Ouse about 4 km south of the centre of the City of York. The site comprises a mosaic of species-rich flood meadow grassland with swamp and inundation communities. This type of flood meadow grassland is nationally rare and further threatened by conversion to arable land or more intensive grassland. The special interest of the site is augmented by the presence of a sequence of grassland and inundation communities which reflect the variations in topography and hydrology of the site. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems.

The site is identified by Natural England as in unfavourable recovering condition. The site and its habitats are dependent on flooding from the Ouse. However, the drought option will not significantly affect the flooding regime of the sites, which occurs at flows in the order of 1000s of Ml/d. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Naburn Marsh SSSI is deemed to be **negligible**.

##### Clifton Ings and Rawcliffe Meadows SSSI

The floodplain covers 25 acres of the Clifton Ings and Rawcliffe Meadows SSSI, this area of the Ings are flood banks/barrier banks built up in the late 20th century to try to contain and control the Ouse when it floods. The 25.13ha of MG4 grassland in Clifton Ings and Rawcliffe Meadows SSSI is 1.67% of the National resource. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems. Wetlands are ecosystems characterised by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Clifton Ings and Rawcliffe Meadows SSSI/ Clifton Ings LWS and Rawcliffe Ings Dyke LWS is deemed to be **negligible**.

[20] Ricardo (2025). Yorkshire Water Drought Plan 2027. Environmental Assessment Methodology. Report for Yorkshire Water Services Ltd. February 2025.

### Church Ings SSSI

The main habitats of the SSSI are listed in the Citation as neutral grassland (lowland). The site is identified by Natural England as in favourable condition. Church Ings comprises two unimproved alluvial flood meadows, adjacent to the River Ouse at Acaster Malbis in the Vale of York. These meadows are of particular importance for their neutral grassland plant community which is an increasingly rare habitat type, threatened nationally as a result of drainage and agricultural improvement. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems. Wetlands are ecosystems characterised by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Church Ings SSSI and Church Ings LWS is deemed to be **negligible.**

### Acaster South Ings SSSI

Acaster South Ings consist of two large alluvial flood meadows adjacent to the River Ouse. Grasslands represent an increasingly rare habitat type which is threatened nationally as a result of drainage. The meadows are characterised by two main receptors; regular flooding in spring and the impact of mowing, whether discontinued or still ongoing. Flood sediments form the substrate for the vegetation, and silt transported by river water is the main nutrient source. The site is dependent on flooding from the Ouse. Alluvial soils beneath meadows tend to be rich in carbon so carbon sequestration is a valuable benefit provided by the habitat. Alluvial soils are naturally very well-structured, providing plenty of pore space for air and water to move through the soil. However, such soils are susceptible to compaction when wet. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Acaster South Ings SSSI is deemed to be **negligible**.

### Fulford Ings SSSI

The main habitats of the SSSI are listed in the Citation[18] as neutral grassland (lowland) with fen, marshes and swamps. The site is identified by Natural England as in unfavourable (75% recovering and 25% declining) recovering condition. Fulford Ings is an important example of flood plain mire located on low lying land between the River Ouse and Fulford village. Mires occur typically on deep peat (over 0.5 m thick) with the water table at or just below the surface. The site is dependent on flooding from the Ouse. The implementation of the drought option will not significantly affect the hydrological functioning of the floodplain mire habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Fulford Ings SSSI is deemed to be **negligible**.

#### B5.1.1.2 *NERC and local wildlife sites*

### Naburn Hall Meadow/ Ings LWS

An area of local significance including biodiverse floodplain habitats and nationally rare meadow grassland threatened by land conversion. The special interest of the site is augmented by the presence of a sequence of grassland and inundation communities which reflect the variations in topography and hydrology of the site.

The site is identified by Natural England as in unfavourable recovering condition. The site and its habitats are dependent on flooding from the Ouse. However, the drought option will not significantly affect the flooding regime of the sites, which occurs at flows in the order of 1000s of Ml/d. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Naburn Hall Meadow/ Ings LWS is deemed to be **negligible**.

### Clifton Ings LWS

Church Ings comprises two unimproved alluvial flood meadows, adjacent to the River Ouse at Acaster Malbis in the Vale of York. These meadows are of particular importance for their neutral grassland plant community which is an increasingly rare habitat type, threatened nationally as a result of drainage and agricultural improvement. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence

on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems. Wetlands are ecosystems characterised by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Clifton Ings LWS is deemed to be **negligible**.

### Rawcliffe Ings Dyke LWS

The site is predominantly floodplain hay meadow. A series of pools are present in the flood basin, hosting different communities depending on time of creation. Scrub is present on the slopes of the flood basin, but neutral grassland is dominant with shallow mudded areas and reedbeds present. Wetlands are ecosystems characterised by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Rawcliffe Ings Dyke LWS is deemed to be **negligible**.

### Church Ings LWS

Church Ings comprises two unimproved alluvial flood meadows, adjacent to the River Ouse at Acaster Malbis in the Vale of York. These meadows are of particular importance for their neutral grassland plant community which is an increasingly rare habitat type, threatened nationally as a result of drainage and agricultural improvement. The site serves as a natural floodplain for the River Ouse as the site periodically floods with increased flows in the river. The variation in flows during flood and drought conditions exerts a strong influence on river and riparian ecosystem function, with floodplain habitats and the sustainability of the high biodiversity observed along river systems. Wetlands are ecosystems characterised by periods of saturation or inundation. Because they are not all constantly wet, the species occurring in wetlands are adapted to periods of dryness. River-fed wetland ecosystems are more resilient to drought than rain-fed wetlands. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Church Ings LWS is deemed to be **negligible.**

### River Ouse LWS

The site encompasses the river and its banks and immediate area. The banks contain areas of semi-natural woodland with ancient woodland indicator species, tall herbs. Sections of the river are canalised with access to the banks in various locations. The River Ouse flows through the River Ouse LWS, with potential changes to the physical environment presented in **Appendix A. Appendix A** highlights the potential for a potential minor risk of reduction in total wetted aquatic habitat in the reach, and minor risk of changes in available habitat for different species requirements – noting that dominant flow types will be retained. As such, the risk from the implementation of the drought option to River Ouse LWS is deemed to be **minor**.

### Bishopthorpe Ings LWS

Bishopthorpe Ings LWS includes bank of the River Ouse, with the site predominantly flood meadow grassland grading to wet grassland and swamp. The bankside area of the site hosts tansy and small populations of Tansy Beetle. Tansy can tolerate a little shade and once established it can cope with drought too. Because they are not all constantly wet, the species occurring in flood meadows are adapted to periods of dryness. The implementation of the drought option will not significantly affect the hydrological functioning of the meadow habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Bishopthorpe Ings LWS is deemed to be **negligible**.

### Gollie Ponds LWS

Based on the available information the pond may be hydrologically connected to the River Ouse. A reduction in flows within the River Ouse may result in a disconnection of the ponds with the impacted reach, however satellite imagery of the pond during summer periods shows limited aquatic habitat to be present. Therefor the risk from the implementation of the drought option to Gollie Ponds LWS is deemed to be **minor**, based on a precautionary approach where connectivity to the main river is thought to be lost during natural drought conditions**.**

### Middlethorpe Crematorium LWS (4-3)

Middlethorpe Crematorium LWS (4-3) is predominantly old, established semi-natural neutral grassland. The site is separated from the River Ouse by a public footpath and does not encompass the river bank. Middlethorpe Crematorium is also comprised of an upper field with herb rich neutral grassland and a lower section of swamp, which is likely to relay on periodic flooding on the River Ouse to replenish water levels within the swamp areas. Swamp, wetland ecosystem characterised by mineral soils with poor drainage and by plant life dominated by trees. The implementation of the drought option will not significantly affect the hydrological functioning of the predominant habitat, against a baseline of reduced flows characteristic of drought. As such, the risk from the implementation of the drought option to Middlethorpe Crematorium LWS is deemed to be **negligible**.

#### *B5.1.1.3 NERC and other protected species*

### Notable Macroinvertebrates

The implementation of the drought option may lead to several hydrological changes within the River Ouse 1 reach. These impacts are evaluated using species' LIFE score categories, which classify invertebrates based on their dependence on specific flow conditions and tolerance to changes in flow regimes. The likely impacts arising from the hydrological changes as a result of the implementation of the drought option are identified in **Table B5-1.** These impacts are evaluated using species' LIFE score categories, which classify invertebrates based on their reliance on specific flow conditions and their ability to tolerate changes in flow regimes. The potential drought impacts on the River Ouse 1 reach are assessed as minor, with negligible effects on longitudinal connectivity, coarse sediment dynamics, and overall habitat structure.

However, the tansy beetle (*Chrysolina graminis*) is a terrestrial species dependent on riparian (riverside) habitats and therefore is not assigned a LIFE score. The tansy beetle was historically widespread across the UK but now has a significantly restricted and declining distribution. This reduction is primarily attributed to habitat loss and degradation, particularly within wetland areas. One of the primary threats to the species is the reduction of its key food plant, tansy (*Tanacetum vulgare*), which thrives in damp, riverine environments.

Given these factors, the risk to the tansy beetle, which relies on suitable wetland habitats and the presence of its food plant, tansy, is also considered negligible. The primary reason for this assessment is the limited impact on the riparian zones where tansy typically grows. Minor reductions in wetted width or flow velocity are unlikely to significantly affect these marginal areas. Additionally, potential changes in sediment deposition are expected to be limited to fine sediments, while tansy plants, which prefer stable ground, are not directly affected by such changes. Moreover, the overall habitat structure within the reach remains stable, maintaining the existing riparian vegetation that supports the tansy beetle. The minimal changes in water flow and sediment dynamics ensure that the essential conditions for tansy growth are preserved. The presence of scattered riparian trees, which contribute organic matter and provide some shelter, also remains unaffected, indirectly supporting the beetle's habitat.

The overall confidence in the macroinvertebrate data and the subsequent assessment is classed as high. This is based on a comprehensive understanding of the species' presence within the reach and the potential impact pathways identified.

Table B5-1 Impacts on Notable Species in Ouse 1

| Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| *Chrysolina graminis* | • The beetle is threatened by the reduction in suitable wetland habitat and the availability of its host plant (Tanacetum vulgare, tansy).<br>• The species is restricted to tansy stands along the banks of the River Ouse. Tansy is drought tolerant and is not expected to be severely impacted by the drought option.<br>• The species is vulnerable to environmental and habitat change. | Regional | Negligible | Negligible |

| Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| *Oreodytes davisii* | • Species associated with clean, cool, well-oxygenated streams with moderate to fast flow.<br>• Temporary reductions in flow may reduce suitable habitat availability, but changes will occur against a drought baseline.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |
| *Potamophylax rotundipennis* | • Temporary flow reductions may slightly affect larval habitat but are unlikely to have long-term effects.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |
| *Nigrobaetis niger* | • Temporary flow reductions may locally reduce habitat suitability.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |
| *Rhyacophila septentrionis* | • Temporary flow reductions may locally reduce habitat suitability.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |
| *Sialis nigripes* | • Typically found in slow to moderate flow rivers with vegetated margins or detritus.<br>• Habitat availability is unlikely to be significantly affected by temporary reductions in flow.<br>• No likely impacts expected from water quality pressures. | County | Low | Minor |

### Water vole

In the absence of quantitative data on water vole (*Arvicola amphibius*) populations within the Ouse 1 reach, it is not feasible to conduct a detailed assessment of the potential impact resulting from the implementation of the drought option. However, it is important to recognise that suitable habitat is present within the reach, particularly in the form of vegetated banks that support burrowing activity.

One of the primary concerns associated with reduced water levels is the potential exposure of water vole burrows. During drought conditions, as water levels recede, burrow entrances located along the banks may become more exposed. This increased visibility can heighten the vulnerability of water voles to predation, particularly from terrestrial predators such as stoats and weasels. Given that water voles are known to rely on dense vegetation and proximity to water as a refuge from predators, any loss of cover can significantly increase their susceptibility.

The likely impacts arising from the hydrological changes as a result of the implementation of the drought option are identified in **Table B5.2**. The combined physical environment changes (river flows, river habitat and water quality) as a result of the implementation of the drought option are considered to be short-term and reversible. The overall confidence in the water vole data and the subsequent assessment is classed as low, though the assessment is based on an assumed presence following a precautionary approach.

Table B5-2 Impacts on water vole in Ouse 1

| Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| Water vole | • Risk of deterioration in water quality has been identified as minor and will not impact on this receptor<br>• Species has a preference for waterbodies that do not have extreme fluctuations in water level[11]. Water levels will be mostly retained for navigation<br>• Increased predation as a result of decreased water width and exposure of burrows.<br>• The reduction in wetted width could result in an increased distance between water vole food source and the burrows, but this is likely to be limited to the reaches upstream of Acomb where the banks have not been altered.<br>• Impacts could occur throughout the breeding season for this species.<br>• Alteration to food supply could occur although the species has been known to feed upon crayfish at times[12] and the potentially increased density of this species could lead to increased predation efficiency<br>• Although the impacts are restricted to the reach, the effects of increased predation upon the species could have long-term impacts.<br>• There are uncertainties relating to the presence of this species with the impacted reach. | National | Negligible | Negligible |

### Otter

The drought option proposed for the River Ouse is expected to result in short-term and reversible changes to the river's physical environment as detailed in **Appendix A**. The potential impacts include minor reductions in flow velocity and wetted width, but crucially, these changes are expected to be negligible in terms of their overall impact on otter habitat utilisation.

Compared to the natural drought scenario, the drought option is predicted to have a limited additional impact. The moderate reduction in flow (up to 14% in summer) is not expected to significantly alter habitat connectivity or the availability of foraging sites. Moreover, the overall habitat structure within the Ouse reach remains relatively stable despite the proposed flow reductions. The drought option does not significantly affect bank-side vegetation or resting sites, ensuring that key riparian corridors remain intact. As a result, the primary habitat receptors utilised by otters, such as foraging areas, resting sites, and safe passage along the river corridor, are not expected to experience significant disruption.

The predicted changes in flow are minor and short-lived, and the structure of riparian habitats is expected to remain largely intact. Given otters' adaptability and mobility, the overall risk to their habitat utilisation within the River Ouse under the drought option is considered **negligible**. The likely impacts arising from the hydrological changes as a result of the implementation of the drought option are identified in **Table B5-3.**The overall confidence in the otter data and the subsequent assessment is classed as low, though the assessment is based on an assumed presence following a precautionary approach.

Table B5-3 Impacts on otter in Ouse 1

| Receptor | Impact | Ecological Value of Receptor | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| Otter | • Increased efficiency in predation as a result of higher densities of prey species (fish and crayfish) as species are forced into smaller areas[13].<br>• Species could remain within the reach for longer.<br>• Otter likely to move to unaffected reaches[14]. | International | Negligible | Negligible |

### Fish

The fish community within the River Ouse reach comprises several NERC Act Section 41 species and other notable fish species**,** including both resident and migratory species. The implementation of the drought option may potentially result in short-term and reversible changes to the river's physical environment, as detailed in **Appendix A**. These changes primarily involve minor reductions in flow velocity and wetted width. However, the dominant flow types (smooth and rippled) will be maintained, preserving the typical habitat structure of the reach. Additionally, longitudinal connectivity will not be compromised due to the level-controlled nature of the river**,** ensuring that migration corridors remain intact.

Most resident species, including brown trout, barbel, bullhead, and grayling, are predicted to experience negligible impacts. These species are relatively localised in their movement and are typically resilient to minor flow variations, particularly within the regulated and stable lowland river environment[15]. The presence of deep, slow-flowing sections downstream provides suitable habitats that are unlikely to be significantly affected by the proposed changes.

Migratory species, such as Atlantic salmon and European eel, are also expected to experience negligible impacts as the drought period is likely to occur outside their key migration windows. Additionally, the stable flow regime helps maintain conditions suitable for their passage through the reach.

However, lamprey species, particularly river and sea lamprey, may be more vulnerable due to their reliance on consistent flow for downstream movement, especially during the juvenile stage. Reduced flow velocities could potentially impact migration to spawning and nursery habitats, leading to a moderate impact. In contrast, brook lamprey, which are more resident in nature and less reliant on long-distance migration, are expected to experience minor impacts.

The likely impacts arising from the hydrological changes as a result of the implementation of the drought option are identified in **Table B5-4**.

Table B5-4 Impacts on NERC and notable fish species in Ouse 1

| NERC/ notable Receptor | Impact | Ecological Value of v | Impact Magnitude | Significance of Impact |
|---|---|---|---|---|
| Atlantic salmon | • The River Ouse is level controlled for navigation for much of the impacted reach and reduced flows are unlikely to result in exposure/loss of important habitats (spawning gravels, nursery habitat, resting pools)<br>• Migratory species are unlikely to be impacted by flows (in terms of velocity), as the impacts are likely to occur outside the main migration periods for Atlantic salmon (adults and smolt), European eel (elvers and adults).<br>• The risk to siltation of spawning gravels is considered minor<br>• Stranding of individuals is unlikely as longitudinal connectivity will not be impacted and level controlled for navigation for much of the impacted reach.<br>• It is noted that depth of water is not critical to bullhead[16] and the species is also widespread within the catchment<br>• Juvenile lamprey are know to be poor swimmer and require flows for downstream movements to find suitable habitat for burrowing and feeding. Reduced flow velocity could impacted the movement on individuals to spawning and nursery grounds in the upstream sections of the impacted reach. | National | Negligible | Negligible |
| Brown trout | | Regional | Negligible | Negligible |
| River Lamprey | | National | Medium | Moderate |
| European eel | | National | Negligible | Negligible |
| Sea lamprey | | National | Medium | Moderate |
| Barbel | | County | Negligible | Negligible |
| Brook Lamprey | | National | Low | Minor |
| Bullhead | | National | Negligible | Negligible |
| Grayling | | Regional | Negligible | Negligible |

*B5.1.1.4 WFD receptors*

### Invertebrates

The macroinvertebrate community within Ouse 1 has been classified as 'high' for the WFD since the first classification in 2014. This assessment focuses on evaluating the risk of deterioration of the macroinvertebrate element as a result of the implementation of the drought option, considering the potential impacts beyond

those expected from natural drought conditions. The assessment is based on the drought option being in place for up to six months from the date on which the order is granted.

The drought option may result in flow reductions of up to 17.2% (**moderate**) during summer and dry autumn conditions, while impacts during winter are considered **minor**, as detailed in Appendix A. The primary impact on the macroinvertebrate community relates to the moderate reduction in river flow during summer and autumn, which may lead to a moderate decrease in wetted width and depth. However, this reduction is not expected to significantly change habitat availability, as the dominant flow types (smooth and rippled) will be retained, preserving the overall habitat structure.

The macroinvertebrate community within Ouse 1 exhibits varying levels of diversity, indicated by $WHPT_{NTAXA}$ EQRs ranging from poor to high. This variation reflects the presence of diverse habitats and the influence of local flow conditions. The LIFE scores within the reach range from low to medium, indicating that the macroinvertebrate community is generally tolerant of slower flow conditions or capable of adapting to moderate flow reductions. While some species that prefer higher flow velocities may experience localized habitat constraints, the retention of dominant flow types ensures that the overall community structure is not significantly altered. Therefore, the anticipated flow reductions from the drought option are unlikely to cause a marked shift in community composition when compared to natural drought conditions.

Water quality poses a moderate risk primarily due to short-term, acute, and infrequent pressures from combined sewer overflow (CSO) discharges during rainfall events. These pressures are expected locally downstream of fourteen listed CSOs. Reduced dilution capacity during low flow periods may temporarily increase the risk of water quality deterioration, particularly affecting dissolved oxygen and nutrient concentrations.

The $WHPT_{ASPT}$ EQRs within the reach indicate low to medium sensitivity to water quality pressures. These scores reflect the moderate resilience of the macroinvertebrate community to water quality changes. However, localized deterioration, particularly where soluble reactive phosphorus (SRP) levels are already not attaining 'Good' status, could pose a risk of temporary eutrophication. In such areas, species with higher $WHPT_{ASPT}$ scores may be more vulnerable, leading to short-term reductions in community diversity.

The combined changes in river flows, river habitat, and water quality resulting from the implementation of the drought option are predicted to present a moderate risk to the macroinvertebrate component of the WFD GB104027069593 Ouse from River Nidd to Stillingfleet Beck. The impacts could last up to six months and occur at any time of the year, affecting all seasons. However, the macroinvertebrate community is expected to recover relatively quickly due to effective re-colonisation strategies[17/18]. Therefore, the risk of deterioration to the WFD status of the waterbody is considered **minor**.

### Fish

The River Ouse from River Nidd to Stillingfleet Beck (WFD GB104027069593) is not currently classified for fish under the WFD, so there is no risk of deterioration in classification as a result of the drought option. Instead, this assessment focuses on the potential for changes to the fish community as a whole within the reach.

The combined physical environment changes resulting from the implementation of the drought option, including alterations to river flows, river habitat, and water quality, are predicted to present a minor risk to the fish community within the Ouse reach. The drought option may result in reductions in flow of 12.3% and 17.2% during the summer Q95 and Q99 periods, respectively, while the year-round reductions at Q95 and Q50 are expected to be 11.0% and 2.9%

The summer reductions in flow are anticipated to occur after the spawning period for key coarse fish species, minimizing the potential impact on reproduction. Additionally, the impacted reach is level-controlled for navigation, which means the reductions are likely to primarily affect flow velocity rather than overall water levels. As a result, the reduction in velocity alone is not expected to significantly impact the coarse fish community.

Supplementary data available through the TLL investigations[18] by the Environment Agency, using multi-method sampling techniques, indicated that fish community trends in the Ouse are influenced by seasonal conditions. The results showed a clear long-term trend where good recruitment of coarse fish correlated positively with hot, dry summers and negatively with cooler, wetter summers. This suggests that the reduced flows expected during the drought option may not adversely affect coarse fish populations and may even support recruitment under certain conditions.

Given the expected minor changes in velocity and the positive recruitment trends associated with dry summers, the overall risk to the fish community within the Ouse reach is considered minor.

### B5.1.2 Summary of impacts

**Table B5-5** summarises the outcomes of the environmental receptors assessment and includes deterioration to fish and invertebrate receptors within WFD waterbodies and significance of impacts to statutory designated sites, NERC Act Section 41 receptors and other significant receptors.

Table B5-5 Summary of impacts identified in Ouse 1 environmental receptors assessment

| Reach | Ouse 1 Cumulative | |
|---|---|---|
| | **Significance of Impact**[19] | **Mitigation Required** *(Y/N)* |
| **Designated Sites** | | |
| Naburn Marsh SSSI | Negligible | No |
| Clifton Ings and Rawcliffe Meadows SSSI | Negligible | No |
| Church Ings SSSI / LWS | Negligible | No |
| Acaster South Ings SSSI | Negligible | No |
| Fulford Ings SSSI | Negligible | No |
| **NERC and local wildlife sites** | | |
| River Ouse LWS | Minor | No |
| Bishopthorpe Ings LWS | Negligible | No |
| Gollie Ponds LWS | Minor | No |
| Middlethorpe Crematorium LWS (4-3) | Negligible | No |
| Naburn Hall Meadow / Ings LWS | Negligible | No |
| Clifton Ings LWS | Negligible | No |
| Rawcliffe Ings Dyke LWS | Negligible | No |
| **NERC and Notable Species Receptors** | | |
| *Chrysolina graminis* | Negligible | No |
| *Oreodytes davisii* | Minor | No |
| *Potamophylax rotundipennis* | Minor | No |
| *Nigrobaetis niger* | Minor | No |
| *Rhyacophila septentrionis* | Minor | No |
| *Sialis nigripes* | Minor | No |
| Water vole | Negligible | No |
| Otter | Negligible | No |
| Atlantic salmon | Negligible | No |
| Brown trout | Negligible | No |
| Brook lamprey | Minor | No |
| European eel | Negligible | No |
| Sea lamprey | Moderate | Yes |
| Barbel | Negligible | No |
| River lamprey | Moderate | Yes |
| Bullhead | Negligible | No |
| Grayling | Negligible | No |
| **WFD Status Receptors - GB104027069593 Ouse from River Nidd to Stillingfleet Beck** | | |
| Fish | Minor | No |
| Invertebrates | Minor | No |

# B6 MONITORING AND MITIGATION

Onset of drought, in-drought and post-drought monitoring and mitigation has been specified for all impacted reaches following identification of environmental receptors within in the reaches susceptible to the drought option(s) implementation. The baseline monitoring programme to inform the susceptibility, sensitivity and assessment of environmental receptors has also been reviewed; On the assumption that otter and water vole can be potentially be present in all impact reaches, no further baseline monitoring surveys have been included for these species. Mitigation measures and protection for sensitive species such as Brown trout which are screened in should provide adequate protection where required of water levels and flows to ensure that riparian species such as water vole and otter are adequately protected for the duration of the drought orders in the impacted reaches.

Walkover surveys and non-invasive techniques are the preferred method to establish the impacts of drought options and to target mitigation. Where appropriate this would be supplemented by quantitative survey during the on-set of drought and post-drought; but in the interests of avoiding further distress to the riverine ecology, not in-drought. Existing long-term monitoring of the physical environment would continue (flow gauging and water quality monitoring).

The onset of drought, in-drought and post-drought monitoring would establish the need for and appropriate type of mitigation for drought option impacts.

Full details of monitoring and mitigation requirements for all impacted reaches can be found in Appendix A.2 of YWSL's Drought Plan EMP and a summary is provided in the main EAR Section 6.2.

YWSL have identified that for the period of implementation of the drought option, sewage treatment can be enhanced, reducing the water quality pressure on the impacted receptors from ammonia, and oxygen balance. Further information can be found in the YWSL WwTW optimisation plan[21] which provides details on enhancement for WwTW that discharge into rivers where compensation flows may be reduced under drought order implementation.

During any future on-set of drought periods (14 weeks before drought control lines are crossed) YWSL will consult with the Environment Agency regarding any WwTWs not identified as significant water quality pressures at the time of the writing of this EAR, but which may be a cause for concern. Additional sites will be added to the priority list of sites for optimisation as required.

A 'Combined Sewer Overflows Optimisation and Maintenance for Drought Plan' has also been developed by YWSL, which identifies all significant intermittent water quality pressures identified in this EAR. During any future drought onset period YWSL will also consult with the Environment Agency and additional sites could be identified as required.

[21] YWSL (2025) Wastewater Treatment Works Optimisation & Maintenance for Drought Plan 2027.

# ANNEX 1 FULL FISH SURVEY COUNTS

| | | | | | | Low tolerance | | | | | | Medium tolerance | | | | | | | | | | High tolerance | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site ID** | **Site Name** | **Survey NGR** | **Year** | **Survey Method** | **Survey Strategy** | Brown trout | Bullhead | Atlantic salmon | Lamprey sp. | Sea lamprey | Grayling | Stone loach | Bleak | Common bream | Dace | Silver bream | Pike | Gudgeon | Chub | Minnow | Ruffe | European eel | Perch | Roach | Rudd | Barbel | Flounder | 3-spined sticklebac k | Roach x common |
| 3746 | Linton-on-Ouse u/s weir (single anode) | SE4940060000 | 2010 | Electric Fishing (AC, PDC and DC) | Single Catch Sample (Part Width) | | | | | | | | 3 | 1 | 2 | 3 | 5 | 1 | | | | | 4 | 192 | | | | | |
| | | | 2013 | | | | | | | | | | | | | | 3 | | | | | | 7 | 85 | | | | | |
| | | | 2016 | | | | | | | | | | 10 | 7 | 10 | | 2 | | 17 | 28 | | | 2 | 140 | 1 | | | | |
| | | | 2019 | | | | | | | | | | 2 | | 2 | | 1 | | 2 | 2 | | | 6 | 17 | | | | | |
| 3748 | Beningbrough Village (single anode) | SE5280057800 | 2010 | Electric Fishing (AC, PDC and DC) | Single Catch Sample (Part Width) | | | | | | | | 26 | | 14 | | 18 | 52 | 10 | 100 to 999 † | | 1 | 7 | 183 | | | | | |
| | | | 2011 | | | | 1 | | | | | | 12 | | 71 | | 11 | 111 | 15 | 1 to 9 * | | | 12 | 191 | | | | | |
| | | | 2013 | | | | 1 to 9 * | | | | | | | | 5 | | 10 | 41 | 10 | 1 to 9 * | | 1 to 9 * | 9 | 105 | | | | | |
| | | | 2014 | | | | | | | | | | 12 | | 26 | | 5 | 10 | 11 | | 2 | | 13 | 79 | | | | | |
| | | | 2015 | | | | | | | | | | 94 | | 22 | 1 | 4 | 36 | 41 | 1 | | | 4 | 82 | | | | | |
| | | | 2016 | | | | | | | | | 1 | 32 | | 8 | | 2 | 32 | 14 | 3 | 2 | | 5 | 402 | 3 | | | | 1 |
| | | | 2017 | | | | | | | | | | 16 | | 6 | | 5 | 39 | 8 | 4 | 2 | | 8 | 59 | | | | | |
| | | | 2019 | | | | | | | | | | 8 | | | | 2 | 3 | 3 | 1 | 3 | | 7 | 16 | | 1 | | | |
| | | | 2022 | | | | | | | | | | 32 | 1 | 16 | | | 17 | 2 | 20 | 4 | | 4 | 46 | | | | | |
| | | | 2024 | | Single Catch Sample | | | | | | | | 49 | | 15 | 2 | 6 | 27 | 13 | 99 | 1 | 1 | 7 | 83 | | | | | |
| 3750 | Acaster Malbis (single anode) | SE5930044700 | 2010 | Electric Fishing (AC, PDC and DC) | Single Catch Sample (Part Width) | | | | | | | | 1 | | | | 3 | 14 | 2 | | | 2 | 2 | 84 | | | | | |
| | | | 2011 | | | | | | | | | | 15 | | | | 1 | 5 | 2 | | | | 12 | 150 | | | | | |
| | | | 2013 | | | | | | | | | | | | | | 4 | | 2 | | 2 | | 4 | 31 | | | 1 | | |
| | | | 2016 | | | | | | | | | | 35 | 2 | | | 2 | 23 | 1 | | | | 3 | 38 | | | | | |
| | | | 2019 | | | | | | | | | | 9 | | 1 | | 1 | | | | | 2 | 4 | 48 | | | | | |
| | | | 2022 | | Single Catch Sample | | | | | | | | 6 | | 4 | | 2 | | 1 | | 1 | | 6 | 58 | | | | | |
| 3751 | Naburn Weir (single anode) | SE5941344435 | 2010 | Electric Fishing (AC, PDC and DC) | Single Catch Sample (Part Width) | | | 7 | | 1 to 9 † | | | 24 | | 44 | | 1 | 100 to 999 † | 7 | | | | 6 | 92 | | 3 | 1 | 2 | |
| | | | 2011 | | | | | | | | | | 1 | | 3 | | 9 | 5 | 10 | 2 | | 2 | 28 | 60 | | | 20 | 6 | |
| | | | 2013 | | | | | 6 | | | | | 8 | | 12 | | 2 | | | 10 to 99 * | | 1 to 9 * | 4 | 15 | | 5 | | 1 to 9 * | |
| | | | 2014 | | | | | 4 | | 1 | 1 | 1 | 56 | | 7 | 1 | 8 | | 16 | 1 to 9 * | | | 2 | 169 | | 1 | 3 | | 1 |
| | | | 2015 | | | 2 | | 9 | | | | | 243 | | 18 | | 4 | | 4 | | | 3 | 4 | 108 | | 3 | 1 | | |
| | | | 2016 | | | 2 | | 13 | | | | | 507 | | 8 | | 6 | | 1 | | 1 | | 6 | 469 | | 3 | 3 | | |
| | | | 2017 | | | 1 | | 9 | | | | | 9 | | 1 | | | | | | | | 4 | 26 | | | 6 | | |
| | | | 2018 | | | | | 6 | 4 | | | | 45 | | 6 | 2 | | 5 | 4 | | 1 | 9 | 13 | 99 | | | 5 | | |
| | | | 2019 | | | | 3 | 4 | | | | | 120 | | 7 | | 3 | | 2 | | | | 5 | 91 | | 1 | | | |
| 36632 | Overton Ings Fyke nets | SE5336857106 | 2014 | Netting (including Seine or Fyke) | Catch Depletion Sample | | | | | 1 | | | | | | 17 | | | | | 8 | | 2 | | | | | | |
| | | | 2016 | | | | | | | | | | | | | | | 7 | | | 32 | 2 | 2 | | | | | | |
| | | | 2018 | | | | | | | | | | | | | | | 4 | | | 4 | | | | | | | | |
| | | | 2022 | | | | | | | | | | | | | | | 1 | 2 | | 6 | | 2 | | | | | | |
| | | | 2024 | | | | | | | | | | | | | | | 48 | | | 8 | 2 | 1 | | | | | | |
| 42066 | Acaster - Fry Survey | SE5930044700 | 2012 | Netting (including Seine or Fyke) | Single Catch Sample | | | | | | | | | | | | | 4 | 4 | 2 | | | 7 | 65 | | | | | |
| | | | 2013 | | | | | | | | | | 435 | 2 | 30 | | | 5 | 452 | 7 | | | 5 | 1485 | | | | | |
| | | | 2014 | | | | | | | | | | 438 | | 123 | | | 231 | 528 | 123 | | | 5 | 126 | | | | | |
| | | | 2015 | | | | | | | | | | 8 | | 32 | | | 252 | 32 | 4 | | | | 526 | | 4 | | | |
| | | | 2016 | | | | | | | | | | 9 | | | | | 41 | 148 | | 1 | | 2 | 137 | | | | | |
| | | | 2017 | | | | | | | | | | | | 18 | | | 38 | 94 | 6 | | | 1 | 176 | | | | | |
| | | | 2018 | | | | | | | | | | 681 | | 96 | | | 407 | 1518 | | | | 4 | 1968 | | 8 | | 12 | |
| | | | 2019 | | | | | | | | | | 34 | 5 | 15 | | | 95 | | | 8 | | 8 | 117 | | | | | |
| | | | 2023 | | | | | | | | | | 48 | | 54 | | | 48 | 630 | | | | 6 | 534 | | | | | |
| | | | 2024 | | | | | | | | | | | | 22 | | | 14 | 99 | 14 | | | 3 | 86 | | | | | |
| 42099 | Naburn - Fry Survey | SE5940044500 | 2013 | Netting (including Seine or Fyke) | Single Catch Sample | | | | | | | | 185 | | 135 | 1 | | 5 | 705 | 10 | | | 10 | 1930 | | | | 5 | |
| | | | 2014 | | | | | | | | | | | | | | | | 1 | | | | | | | | 4 | | |
| | | | 2015 | | | | | | | | | | 2 | | 6 | | | 5 | | | | | 1 | 132 | | | 1 | 4 | |
| | | | 2016 | | | | | | | | | | 1 | | | | | | 3 | | | | | 6 | | | | | |
| | | | 2017 | | | | 1 | | | | | | | | | | | 7 | 5 | | | | | 81 | | | 10 | | |
| | | | 2018 | | | | | | | | | | 1 | | 186 | | | 10 | 6 | | | | 1 | 24 | | | 4 | 6 | |
| | | | 2020 | | CPUE | | | | | | | | 2509 | 3 | 66 | | | 2 | 83 | 9 | | | 3 | 6 | | | | | |
| | | | 2023 | | Single Catch Sample | | | | | | | | 6 | | 13 | | | 6 | 14 | | | | 4 | 828 | | | 3 | | |
| | | | 2024 | | | | | | | | | | 21 | | 173 | | | 3 | 21 | | 1 | | | 81 | | | 2 | | |

† Values represents the estimated observed abundance for the completed survey ranging from 0-9,10-99,100-999, 1000+

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