ECOLOGICAL SURVEY OF WELBOURN BECK
REPORT OCTOBER 2025

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BACKGROUND

Welbourn Parish Council (PC) is aiming to improve the aesthetic state of the Beck related to concerns around the levels of algae in the pond which can at times lead to an offensive smell. Such condition would likely not be optimal for biodiversity, and the PC would also like to try to manage the Beck in a sustainable way which supports local biodiversity and improves the visual appeal of the pond for people.

Suggested simple goals for the pond are as follows

- Maximise biodiversity potential
- Improve the visual appeal of the Beck
- Improve the ecology of the Beck

The pond receives runoff from several sources coming off the roads and the adjacent Lincoln Cliff which likely contains nutrients from fertilizer used on the land which can encourage algal growth. There is already a regime of regular use of barley straw bales in the Beck to help combat algal growth.

An ecology survey of the Beck has been recommended by the Lincolnshire Wildlife Trust in advance of any site management works. The survey scope has focussed on the likely effects of potential future management actions such as vegetation management alongside gathering data on possible indicators of pond condition such as aquatic macro-invertebrates and macrophytes(plants).

Hedgerow cutting is programmed for the hedgerow and bankside scrub along the eastern pond edge next to the Village Hall.

WILDLIFE LAW

Wildlife law needs to be considered when defining any steps to improve the condition of the Beck and brief details of the potentially relevant wildlife law is detailed below.

Breeding birds

All birds, their nests and eggs are protected by the Wildlife and Countryside Act 1981 (as amended).

Several bird species are UK Biodiversity Action Plan (BAP) priority species.

Bats

All bat species and their roosts and resting places are protected under Schedules 5 & 6 of the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way (CRoW) Act 2000, and the Conservation of Habitats and Species Regulations 2017. The Conservation of Habitats and Species Regulations 2017 implements the European Union's 'Habitats Directive' (Council Directive 92/43/EEC (a) on the Conservation of Natural Habitats and of Wild Fauna and Flora).

Several bat species are UK BAP priority species.

Water vole

The water vole (*Arvicola amphibius*) is fully protected under Section 9 of the Wildlife & Countryside Act 1981 (as amended) through its inclusion in Schedule 5. [1]

Water vole is a UK BAP priority species.

Otter

Otter (*Lutra lutra*) is afforded strict protection under the Wildlife and Countryside Act 1981 (as amended) on Schedule 5 (sections 9(5)(a) (b) and 9 (4)(b)(c) and the Conservation of Habitats and Species Regulations 2017. The Conservation of Habitats and Species Regulations 2017 implements the European Union's 'Habitats Directive' (Council Directive 92/43/EEC (a) on the Conservation of Natural Habitats and of Wild Fauna and Flora) in Great Britain.

Great crested newts

Great crested newt (*Triturus cristatus*) (GCN) is afforded strict protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017.

Reptiles

All native reptile species have some degree of protection in the UK, through section 9(1) and (5) (specified in Schedule 5) of the Wildlife and Countryside Act 1981 (as amended). Common lizard (*Zootoca vivipara*), slow-worm (*Anguis fragilis*), grass snake (*Natrix natrix*) may be relevant to the Beck habitats.

Grass snake, slow-worm and adder are all UK BAP priority species.

Badger

Badgers (Meles meles) are protected under the Protection of Badgers Act 1992 (as amended)

BASELINE SURVEY METHODS AND SURVEY LIMITATIONS

A single site survey visit was undertaken on the 6th of August 2025 to gather data on the plant habitats of the Beck (see Figure 1 below), aquatic plants, water vole, otter, badger and reptiles (incidental records only) and freshwater macro-invertebrates. This is not an optimal time for gathering evidence of water vole and badger activity, but as the survey was assisted by boat access and much of the pond bank was accessible, then the results are considered to give a fair indication of any recent badger and water vole activity.

The scope of studies was defined based on the likely risk to protected species which may arise from future possible management works. GCN surveys have not been included based on the assumption that any pond improvement works would be undertaken in winter when a protected species licence is not required for pond clearance works.

It is an appropriate time of year to undertake a habitat and macrophyte survey

Fresh water macro-invertebrate surveys were undertaken to give an indication of water quality rather than invertebrate conservation value. There were no seasonal constraints on the invertebrate survey.

[1] This report includes a response to the comments provided by the Environment Agency ENQ2025/31742 on the 25.09.25

Fish

No incidental records for juvenile fish or sticklebacks were picked up during the 2025 or historical NRA invertebrate surveys. There is little invertebrate food available for fish in this habitat-poor pond and apart from extensive algae and small amounts of marginal vegetation, there is no other aquatic plant growth.

Oxygen levels in the pond are generally poor which restricts the range of fish species that could occur.

It is not known if any fish introductions have been undertaken as part of the historical Centre for Aquatic Plant Management restoration measures indicated on the Welbourn Village web site or by other individuals.

If fish were introduced, then fish should be considered as part of any restoration measures such as dredging.

Based on the available fish habitats and low oxygen levels in the water it was not considered necessary to factor in a physical fish survey methods such as electrofishing or netting to inform any silt clearance of the Beck. However, as a precautionary measure an eDNA test could be used. An eDNA test involves testing the water for the presence of fish DNA. eDNA testing for fish is now routinely used as a fish survey methodology rather than invasive methods such as netting and electrofishing. If the Parish Council would like this to be undertaken as a precautionary measure, then this could be done at an additional cost.

Survey area

The survey area covers the Beck and immediate adjacent habitats The gardens abutting the Beck, the village hall area and Beck St were not included in the habitat survey area.
Results

Figure 1 Location map

Phase 1 Habitat Survey

A habitat map was compiled for the Beck using the methodology given in the Handbook for Phase 1 Habitat Survey (Joint Nature Conservation Committee (JNCC), 2016). This includes mapping the habitat types according to the JNCC definitions noting dominant species; and providing target notes where appropriate to identify particular features/species. The notes have been used to compile habitat descriptions for the Beck.

All aquatic plant species observed during the survey were also recorded.

Water vole presence/absence survey

This is the standard water vole survey methodology given in the Water Vole Mitigation Handbook (Dean et al., 2016).

This survey methodology involves identification of evidence of water vole activity within suitable habitat at least five metres of the Beck.

In addition to observations of water voles, field signs searched for included:

- Latrine sites – distinct piles of water vole droppings found near burrows, at the ranges of territorial boundaries and where the animals enter and leave the water;
- Feeding stations – areas with distinct neat piles of chewed lengths of vegetation along pathways or haul out platforms along the water's edge;

- Burrows – burrow entrances are typically wider than high with a diameter between 4-8 cm. Burrow entrances are generally located at the water's edge;
- Lawns – short-grazed areas at the entrances to burrows;
- Prints – identifiable prints in soft margins of the watercourse; and
- Runways – low tunnels that are pushed through the vegetation and often leading to burrows or feeding stations.

American mink *Neovison vison* predation is indicated as a major cause of water vole mortality in England and so signs of mink such as mink scats (faeces) and actual sightings were also recorded during all the water vole surveys.

Otter Survey

This survey methodology aims to determine the presence or likely absence of otters on those waterbodies / watercourses surveyed. The methodology is based on guidance in the New Rivers and Wildlife Handbook (RSPB, NRA & RSNC, 1994); the Environment Agency's Fifth Otter Survey of England 2009-2010 (Environment Agency, 2010) and Monitoring the Otter (Chanin, 2003).

In addition to looking for otters, otter field signs to be recorded include:

- Spraints – characteristic sweet-smelling, black tar-like (where fresh/relatively recent i.e. within a few weeks) or grey crumbly (when old) faecal deposits usually containing fish scales, bones and occasionally invertebrate exoskeleton and bird feathers;
- Footprints – in good substrate typically asymmetrical and showing five toes arched around a large pad and depending on substrate, webbing and claw marks. Poorer, generally coarser substrates do not often enable the identification of otter footprints. Additional signs of otter presence may occur, although without additional evidence is not usually conclusive proof of current otter presence;
- Feeding remains – feeding remains may include partially eaten fish, frogs, piles of mussel shells or crayfish remains;
- Slides/ haul-outs – routes into and out of the water, which are usually associated with terrestrial routes such as short cuts around meanders or along traditionally used otter paths/routes;
- Couches/ hovers – above ground resting places. Usually associated with cover such as dense scrub, rushes or reed, flood debris or fallen trees. Many couches are rarely used whilst others more so. Difficult to prove use without radio tracking; and
- Holts – below ground resting site usually associated with sprainting. Sometimes used with greater frequency than couches and can be important for breeding (natal holts) where other signs are usually absent. Notoriously difficult to find or prove without radio tracking.

Bat Roosting Feature Survey

This survey has been removed from the scope. If vegetation clearance works are planned that involve trees, then a separate check of the relevant trees could be undertaken later.

Aquatic Macro-invertebrates

The biological monitoring working party (BMWP) is a simple procedure for measuring water quality using families of macroinvertebrates as biological indicators. The method is based on the principle that different aquatic invertebrates have different tolerances to pollutants. An aquatic macro-invertebrate survey based on a very simplified BMWP was undertaken to identify the main indicator families as a broad indication of water quality. The limitations of this methodology are acknowledged, but it is considered a useful indicator of the general state of the water quality.

Two three-minute samples were collected using a standard pond net. Sample 1 was taken by gathering material from the overhanging vegetation, filamentous algae and substratum from across the pond excluding the area circa five metres from the edge of the chicken run area T2 on the eastern bank. These were then combined and worked through sorting out the invertebrates in shallow white trays of water ready for identification.

Sample 2 was similarly gathered, but this focussed on sampling within five meters of the chicken run T2 including the bank area in front of the run.

Badger

As part of the habitat survey any incidental badger field signs or badger observations within areas of suitable habitat around the Beck were recorded. This only involved easily accessible areas.

The following badger field signs are useful in determining the possible presence of badgers:

- sett entrances, eg entrances that are normally 25 to 35cm in diameter and shaped like a 'D' on its side,
- large spoil heaps outside sett entrances,
- snuffle holes,
- bedding outside sett entrances,
- badger footprints,
- badger paths,
- latrines,
- badger hairs on fences or bushes, or
- scratching posts.

The survey methodology is based on Harris, S., Creswell. P., and Jefferies, D.J. (1989).

RESULTS

Habitats

Figure 2 presents the habitats identified during the habitat survey. Example habitat photographs are given in Appendix 1.

The Beck is an L shaped pond over 50m long running southeast and is circa 20m at its widest point. The northeastern arm is just over 40m long narrowing to less than 5m wide at the culverted northeastern outfall. Apart from an open mown grass section next to a garden on the western edge of the Beck, the margins are largely lined with trees and scrub.

The Beck abuts the grounds of the village hall to the east, mown grass and Beck Street to the north, and private gardens to the west.

There are two obvious culverted, grilled concrete outflows (see Figure 2) although very little water appeared to be flowing through the grid near T2. There was some flow through the most northerly outflow at the time of the survey which is periodically cleared by private residents (see Plate 1).

Five main habitats were recorded during the survey, and they are in decreasing area of spatial area: open water, trees, mown grass, scrub and hedgerows and marginal vegetation.

Descriptions follow below.

Open water
The open water is variously 0.3 to over 1m deep in the centre. Water was turbid and dark in colour and there was no obvious macrophyte[2] community apart from extensive decaying filamentous algal stands especially towards the western centre from T1 (chicken sheds) back southeast wards. A small amount of the pollution-tolerant bryophyte Kneiff's feather moss *Leptodictyon riparium* was picked up during the invertebrate sampling at T1 where it was growing on some bankside logs and stones. Much of the margin is shaded especially the wooded southern end which also has woody debris in the water.

Woody and leaf debris was widespread on the bottom across the open water.

Trees
Two mature Common Alder *Alnus glutinosa* and one mature Sycamore *Acer pseudoplatanus* tree grow within the marginal mown grass verge on Beck Street. There are also several young alder saplings along the edge of the Beck and by the entrance to the Village Hall next to the Beck outfall

Some large Field Maple *Acer campestre* and Bird Cherry *Prunus avium* occur within the hedgerow northwest of the village hall.

Common Alder, some of them mature, dominate the marginal trees at the southern end of the Beck. Ash *Fraxinus excelsior* and Bird Cherry trees also occur over a shrub layer including common hawthorn *Cratageus monogyna*, Elderberry *Sambucus nigra* and bramble *Rubus fruticosus* agg. Much Ivy *Hedera helix* occurred on the banksides along with False oat grass *Arrhenatherum elatius*, stinging nettle *Uritica dioica,* Hogweed *Heracleum sphondyllium and* Cow Parsley *Anthriscus sylvestris.*

Mown grass (Amenity grassland)
Species-poor, mown amenity grass areas abut the Beck adjacent to Beck Street and the village hall. Plant species recorded include Perennial Rye grass *Lolium perenne*, Annual Meadow Grass *Poa annua*, Dandelion *Taraxacum officinale* agg., Ground Elder *Aegopodium podograria* and Greater Plantain *Plantago major.*

Scrub and hedgerows

[2]Macrophytes: Aquatic plants that can be seen with the naked eye

A tall intact hedgerow with trees borders the eastern edge of the Beck and this is dominated by Common Hawthorn with Elderberry, Field Maple and Dog Rose *Rosa canina* agg. At the southern end the hedgerow is overtopped by large Bird Cherry and Common Alder and at the northern end several large Field Maple and Bird Cherry occur. It is circa 3m plus high and wide.

Marginal vegetation
Species-poor marginal vegetation is concentrated in the northern part of the Beck with dominant Pendulous Sedge *Carex pendula* with occasional large stands of Flag Iris *Iris pseudocorus.* A single stand of purple loosestrife *Lythrum salicaria* and Great Willowherb *Epilobium hirsutum* occur in the upper part of the southern bank adjacent to the village hall outfall.

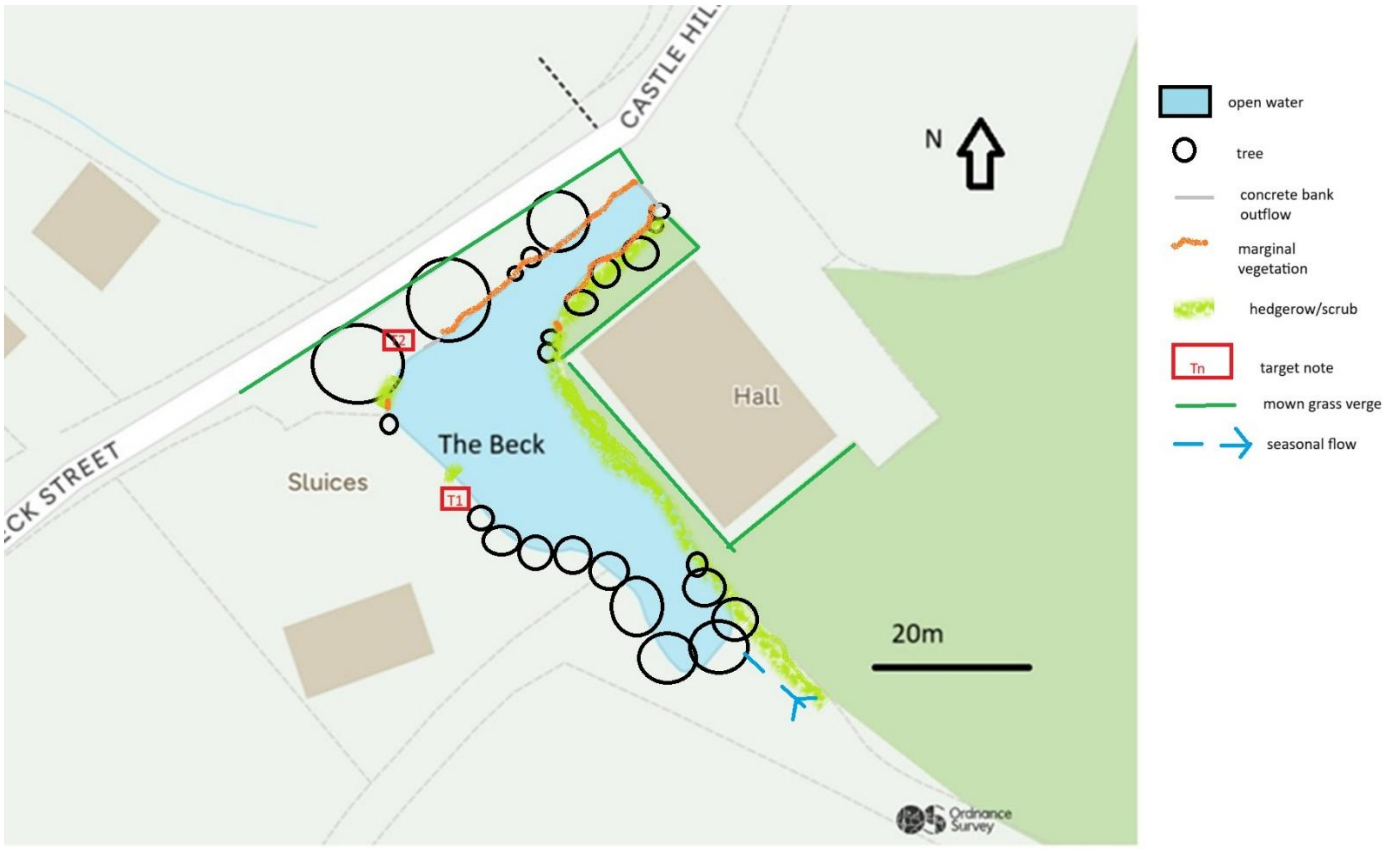

Figure 2 Habitat Map

Results of Faunal Surveys

No signs of otter, water vole or badger were noted. There were possible rat holes (Brown rat *Rattus norvegicus* ?) at water level near the chicken sheds on the western bank (see Figure 2 T1).

Incidental wildlife records included mainly birds:
Moor hen *Gallinula chloropus,*
Mallard *Gallinula chloropus,*
Wren *Troglodytes troglodytes,*
House sparrow *Passer domesticus,* and

Large Red damselfly *Pyrrhosoma nymphula*

2025 Freshwater Macro-invertebrate Survey Results

The results of the two freshwater macro-invertebrate samples are given in Table 1 below. Sample 1 was more varied in the 6 families recorded and Sample 2 comprised quite large numbers of a single family of non-biting midge larvae *Chironimidae*.
The total BMWP score for sample 1 was 31 suggesting that the invertebrate assemblage was adversely affected. Sample 1 with a total BMWP score of just 2 comprising large numbers of *Chironimidae* which is indicative of low oxygen conditions typically associated with pollution.

Table 1 2025 Macro-invertebrate Results and Interpretation

Total BMWP score	Category	Interpretation		
0 to 10	very poor	heavily polluted		
10 to 40	poor	polluted or impacted		
41 to 50	moderate	moderately impacted		
71 to 100	good	clean but slightly impacted		
>100	very good	unpolluted, unimpacted		
sample		taxa family group	BMWP Score	
1	bugs	*Corixidae* Lesser water boatman	5	
	bugs	*Notonectidae* Greater water boatman	5	
	fly larvae	*Chronimidae* non-biting midge larvae	2	
	Mayflies	*Ephemeridae* common burrower mayflies	10	
	Shrimps	*Gammaridae* freshwater shrimps	6	
	water slater	*Asellidae* water hoglouse	3	
		TOTAL BMWP SCORE	**31**	polluted/impacted
2	fly larvae	*Chronimidae* non-biting midge larvae	2	
		TOTAL BMWP SCORE	**2**	heavily polluted

1992 National Rivers Authority (NRA) Beck Survey Results

Results from NRA aquatic macro-invertebrate and water chemistry surveys undertaken in 1992 on the Beck from the Hawley D.E. (1992) concluded " *..the pond has been in its present state for the past ten years and there is no evidence of recent deterioration. The problem appears to be due to a combination of anoxic ground water through the springs in the bed and over-enrichment of the water due to decaying vegetation.*
Anoxic (devoid of oxygen) groundwater is not unusual and is not indicative of pollution….

Table 2 presents an interpretation of the 1992 Macro-invertebrate survey data and it demonstrates that the contemporary macro-invertebrate community continues in a similarly negatively affected manner to that recorded in 1992 which had very poor and poor BMWP grades.

Large amounts of filamentous algae and one stand of Water Starwort *Callitriche* spp. were the only aquatic macrophytes recorded during the 1992 survey.

Table 2 1992 Macro-invertebrate Results and Interpretation

Total BMWP score	Category	Interpretation		
0 to 10	very poor	heavily polluted		
10 to 40	poor	polluted or impacted		
41 to 50	moderate	moderately impacted		
71 to 100	good	clean but slightly impacted		
>100	very good	unpolluted, unimpacted		
sample		taxa family group	BMWP Score	
1	bugs	Corixidae Lesser water boatman	5	
	fly larvae	Chronimidae non-biting midge larvae	2	
	Small Minnow Mayflies	Baetidae	4	
	Shrimps	Gammaridae freshwater shrimps	6	
	water slater	Asellidae water hoglouse	3	
	flatworm	Polycelis sp	5	
	true worms	Oligochaeta	1	
	pond and marsh snails	Lymnaeidae	3	
	crawling water beetle	halipilidae	5	
		TOTAL BMWP SCORE	34	polluted/impacted
2	fly larvae	Chronimidae non-biting midge larvae	2	
	true worms	Oligochaeta	1	
	water mites	Hydracarina	0	
		TOTAL BMWP SCORE	3	heavily polluted

DISCUSSION[3]

Habitats and flora

No species of conservation concern or invasive weeds were identified during the survey.

Based on the survey results the Beck comprises tree and shrub lined open water with limited open areas along the western edge. Much of the margin and the southern end of the Beck is shaded. The banks are largely steep in the northern half, with some more shallow bank areas near the wooded southern end.

Marginal habitat is lacking apart from the species-poor northern margins which largely comprise vigorous stands of Pendulous Sedge with lesser amounts of Yellow Flag Iris. Both species can reproduce vegetatively and from seed and their dense root system and plant mass restricts space for other smaller marginal species. Their sturdy growth can withstand the effects of duck grazing.

There are young Common Alder saplings along the northern margins which will quickly grow and further limit views of the Beck from Beck Street which are already restricted by suckers at the base of the large common alder trees and the sedge beds. The south facing margins would benefit from some vegetation management to enable a more diverse plant community and improved views across the Beck. Additional marginal vegetation can also serve to absorb excess nutrients from the water.

Open water issues

The open water has extensive filamentous algae stands and no other freshwater macrophytes were recorded apart from small amounts of the bryophyte Kneiff's feather moss *Leptodictyon riparium* which tolerates a wide range of nutrient conditions, and its population increases as ammonia increases. This moss species is considered to be tolerant of organic pollution (*Hanson* et al, 2013).

It was found growing on the wetted lower bank by the chicken run where organic rich chicken dung is free to enter the Beck, especially during rain fall events. Invertebrate sample 2 (see Table 1 for results) which comprised solely pollution tolerant midge larvae, also suggests that could be local water quality issues potentially arising from the chicken dung runoff. The midge larvae have high levels of haemoglobin and can survive in low oxygen environments.

Pollution of water bodies by nutrients (e.g. PO4-P, NO3-N from manure, poultry and dairy farm waste, agricultural fertilizer) can cause dangerous cyanobacterial blooms which increase fish mortality, biodiversity loss, water odour and can negatively affect human health (Affan et al., 2015; Cesoniene et al., 2019; EWG, 2019).

Movement of excess amounts of naturally occurring components (e.g. nitrogen, phosphorus), pollutants (e.g. pharmaceuticals, steroid hormones, heavy metals) and pathogens (including bacteria, fungi and viruses) in farm waste can disrupt the balance of water ecosystems and impact plant life as well as invertebrates and vertebrates (*Hu* et al., 2017; *Cao* et al., 2021).

Invertebrate sample 2 was collected across areas over 5m from the edge of the chicken run area and the results were more diverse with six families represented, but the range of families was still limited and indicated that other parts of the Beck could be affected by some sort of negative impact source.

Large red damselflies were recorded laying eggs on the filamentous algae just below the water surface, but no macro-invertebrate life was found in the algal mat.

Table 2 presents an interpretation of the 1992 NRA macro-invertebrate survey data. The data demonstrates that the macro-invertebrate community continues in a similarly negatively affected manner to that recorded in 1992 with very poor and poor BMWP grades for the 2 samples. Photograph 10 in Appendix 1 was taken in 2004 and it shows the Welbourn Wildlife Watch group on a pond dipping meeting at the Beck. Turbid water and extensive filamentous algal growth were very evident on that day, and the trip report comments included " *the water looked and smelt disgusting..*"

Water Starwort and filamentous algae were the only aquatic macrophytes recorded in 1992 reflecting the poor water quality linked to anoxic ground water inflow and decaying vegetation.

The large amount of filamentous algae also suggests that there are high levels of nutrients in the Beck. Filamentous algae is an important part of the ecological food web of a pond, and it is typically the first plant to start growing in spring. However, if there are high levels of nutrients which encourage algal growth and no other macrophyte growing which can contribute oxygen to the pond as the algal depletes the oxygen, then low oxygen levels can disrupt the ecological balance of a pond. This is further exacerbated by the anoxic ground water inflow to the Beck along with the decomposition of high levels of leaf and woody detritus from the marginal shrubs and trees.

During the survey it was noticed that the algal mat was breaking up at the base and producing a black anoxic mass which as it continues to break down will only exacerbate the lack of oxygen in the Beck. This can also lead to an offensive smell.

2025 has been a very dry year and during the survey there was no flow into the Beck (see Appendix 1 Plate 7) and no sign of recent water in the inflow drain. There was negligible flow seen going out of the outflow at T2 and the outflow at the northern end is regularly compromised by plant material which requires manual removal (see Appendix 1 Plates 1 and 2).

The pond is over one metre deep in the centre which limits the range of plant species that can grow there, and much of the bank drop away steeply with little suitable marginal area for macrophytes to grown in. There are also large numbers of Mallards feeding on the Beck and they will disturb the margins looking for food uprooting small plants that may try to establish.

Barley Straw
Barley straw can be an effective algaecide and as barley straw decomposes, fungi develops, and the barley begins to rot. As it is rotting and fungi eat away at the remains of the barley, humic acid is produced, which is the first major step towards algae control. Humic acid reacts with oxygen in the water and sunlight, eventually transforming into hydrogen peroxide.

Hydrogen peroxide is a powerful algaecide which will inhibit the growth of algae and blanketweed. When produced from barley straw bales it's in a low enough concentration to be safe for fish and other established plants.

Barley bales were used in the Beck to try to reduce the algal growth, but this was done relatively late in summer. Ideally these need to be in place in early spring to allow the straw to start breaking down and produce the chemicals to inhibit algal growth. Barley straw works best in well oxygenated water and so by putting the bales in the Beck during early spring it will provide more time for it to work in the low oxygen conditions.

Bread feeding to wildfowl

During the survey it was observed that a local resident threw bread in for the ducks, and it is understood that this is a regular activity. The Canal and Rivers Trust gives good reasons as to why this is not recommended as follows.:

"Five reasons why bread is bad

Ducks need a varied diet to be healthy. Bread doesn't have much nutritional value and fills the duck's stomach so that it doesn't forage for foods it would naturally eat, which can lead to malnutrition.

Uneaten soggy bread can cause a build-up of bad nutrients, which can lead to more algae growing around water, more diseases and more pests. Hannah Booth, our environment manager for Wales & South West, explains: "An excess of any food will encourage rats, which can also carry diseases and may predate eggs and young chicks."

Throwing bread into a pond can create an unnatural overcrowding of bird populations, as the birds will flock to the same location in search of their starchy treat.

Too many ducks or waterfowl in one place can stress the birds and lead to their habitats being damaged.

This also creates excessive amounts of bird droppings, which, along with being smelly and slippery underfoot, can reduce water quality and clog waterways with harmful algae."…

These effects apply equally to a village pond such as the Beck.

MANAGEMENT AND ENHANCEMENT RECOMMENDATIONS

BANK MANAGEMENT
Considering forthcoming hedgerow maintenance works, some initial thoughts on management of the Beck were requested by the PC have been provided by email on the 7th August 2025 and they are given in in summary:

1 The young Common Alder should be removed from the pond margins on the northern bank
2 The suckers at the base of the mature Common Alder on the northern bank should be removed.
3 Cut back the poor looking pondside Elderberry and retain other pondside scrub overhanging the eastern pondside edge.
4 Remove the pondside bramble on western pond edge corner by Beck Street. This will create a pond view from the bench.

Following discussions with Robert Cross on the 21.08.25 it was decided to cut back all the hedgerow by the Village Hall on the eastern bank with a view to invigorate the hedgerow and try to create physical access to the bank top to potentially establish some marginal vegetation along that bank. This work is not likely to be carried out until late September or later to limit the risk of breeding birds being present. Cutting back the hedgerow will also reduce the leaf detritus load of the pond.

The shaded wooded southern end and the northern arm of the Beck will be inputting woody and leaf material, and it would be worth removing any fallen branches before they break down and contribute to the organic load in the pond. If any branches fall in elsewhere around the Beck, then it is also worth removing them. Longterm some consideration could be given to tree and scrub reduction of the wooded Southern end

MARGINAL AND OPEN WATER MANAGEMENT
Water bodies are dynamic systems that will always work towards infilling and eventual long-term scrubbing over to become terrestrial habitats. The buildup of organic material is inevitable unless some sort of management is undertaken.

Professional silt and detritus removal should be considered to try to rebalance the nutrient load in the pond. A large pond such as this could possibly require silt removal every 10 years. The last date of silt removal is circa 1992 (Marianne Overton pers. comm).

The introduction of barley straw bales should be trialled early in the spring, circa early March before algae appear. This will make allowance for the low oxygen levels and give more time for the barely to break down and act on the algae before it starts to take hold.

Regular clearance of the main northeastern outfall grid should also be done to maintain flow and remove organic material that can otherwise buildup in the pond. This may need to be down more often in autumn/winter following leaf fall and after large rainfall/storm events. Any arisings should be left on the bank for 48 hours to allow any aquatic fauna to move back into the Beck. The arisings should then be disposed of in piles potentially along the margins of

the playing field or ideally set back along the edges of the inflow drain where they could be used for nesting by species such as grass snakes.

The northern outfall at T2 should be investigated as to why it is not functioning efficiently.

Steps should be taken to prevent the nutrient-rich runoff from the chicken run entering the Beck by relocating the run to another part of the garden or putting up some sort of waterproof barrier to funnel the runoff away from the Beck. The landowner could also be encouraged to carry out regular dung removal from the run and incorporate the chicken muck into compost or offer it to residents to use on their gardens away from the Beck.

It is recommended that the Pendulous Sedge tussocks are partially removed from the Beck margins along Beck St to make room for a more varied marginal flora. This a vigorous species that has out competed the previous marginal vegetation likely because it is perennial and can withstand the physical effects of duck grazing (see Plate 6 and 2). The margins along the narrow eastern outfall are very shaded and so removal efforts should focus on the better lit south-western half to support the diversification of the margins by planting new species. Some of the tussock near the northeastern outfall should be removed to provide improved access to clear debris from the grill and maintain good outflow.

The Yellow Iris stands should be reduced in size by removing pieces and relocating them to the shaded, species-poor, wooded margin at the Southern end where their roots will help to store nutrients and provide marginal habitat.

Reprofiling of the northwestern bank margin and pond with low nutrient soil could be done to provide shallow areas to help establish vegetation to lessen the nutrient burden and oxygenate the water. This could take the form of a gently sloping bank and potentially a submerged island planted up with a range of emergent macrophytes could also be considered.

Any vegetation planting would need to be protected from ducks with wire netting until it gets established. Pre-planted coir rolls could also be considered to provide additional marginal habitat possibly along the eastern edge which would be more difficult to reprofile with the adjacent hedgerow.

Recommendations for macrophyte planting for the margins and open water are given below in Table 3 and Figure 3 summarises recommendations for vegetation works in the short term (next two to three years). The landowners with the garden on the western bank may be agreeable to some macrophyte planting on their margin.

Planting of some aquatic oxygenating plants in the open water could be trialled, but the presence of dabbling ducks may limit the success of this.

DUCK FEEDING

If residents stop feeding the ducks, then this will encourage the ducks to spend more time looking for natural and healthy food such as vegetation and seeds.

However, as an alternative and less confrontational method; an amnesty on bread feeding could be trialled with suitable duck food provided from some central point in place of the bread. This would offer an opportunity to engage with the local community on this issue. This approach has been trialled at parks and nature reserves and can help encourage behavioural change. Gradually, people may reduce feeding altogether.

If residents would like to be involved in wildlife support for the Beck, then there are better ways that this could be done. They could be encouraged to look for other wildlife on the

Beck and record it using one of the citizen science forums. They could contribute money towards bird and bat boxes to be erected in suitable locations around the village hall area or donate towards a new community fund raising effort “restoration of the Beck”.

Figure 3 Proposed Vegetation Mitigation Measures

Table 2 Recommendations for macrophyte planting for the margins and open water

Marginal/ damp bank	Amphibious Bistort	*Polygonum amphibium*
Marginal/ damp bank	Water Mint	*Mentha aquatica*
Marginal/ damp bank	Water Forget me not	*Myosotis scorpioides*
Marginal/ damp bank	Marsh Marigold	*Caltha palustris*
Marginal/ damp bank	Purple Loosestrife	*Lythrum salicaria*
Marginal/ damp bank	Soft Rush	*Juncus effusus*
Marginal/ damp bank	Gypsywort	*Lycopaeus europaeus*
Marginal/ damp bank	Meadowsweet,	*Filipendula ulmaria*
Marginal/ damp bank	Water figwort	*Scrophularia auriculata*
Marginal/ damp bank	Common Valerian	*Valerian officinalis*
Marginal/ damp bank	Brooklime	*Veronica beccabunga*
Marginal/ damp bank	Hemp Agrimony,	*Eupatorium cannabinum*
Marginal/ damp bank	Cuckoo flower	*Cardamine pratensis*
Aquatic oxygenator	Spiked water Milfoil	*Myriophyllum spicatum*
Aquatic oxygenator	Curled pondweed	*Potamogeton crispus*
Aquatic oxygenator	Rigid Hornwort	*Ceratophyllum demersum*

Aquatic oxygenator	Pond Water Crowfoot	*Ranunculus aquatilis*

Appendix 1 Plates

1 Arisings from drain outfall clearance	

2 Shaded and turbid eastern arm of the Beck showing marginal pendulous Sedge and young Common Alder	
3 Wooded and shaded southern end showing large beds of filamentous algae through turbid water	

4 Bank top chicken run on western bank (see T1 on Figure 2 for location) Potential rat holes were visible at the water line close to the run.	
5 View across the pond from the near T2 the bench on Beck St, showing the bramble obscuring the view across the Beck. The gap in the vegetation is due to the outfall's presence. The hedgerow along the edge of the eastern bank is visible in the background.	

6 Foreground shows Pendulous Sedge which dominates the bank margins. Young Common Alder on the corner of the western edge recommended for removal along with saplings on northwest bank by Beck St.	
7 Dry inflow from the south	

8 Common Alder on Northwestern edge showing basal suckers. These could be removed along with small lower branches to let more light into the Beck margins.	
9 Tall Common Alder over hedgerow at the southern end of the Beck	

10 May 2004 Wildlife Watch Group members pond dipping at the Beck. Note turbid water and extensive filamentous algal growth. There is also a pond vista from the bench. Soft Rush much evident in the Beck margins (Photograph Source Marianne Overton)	

References

Affan, A, Khomavis, H.S, Al-Harbi S.M., Haque, M, Khan, S (2015) Effect of environmental factors on cyanobacterial abundance and cyanotoxins production in natural and drinking water, Bangladesh
Pak. J. Biol. Sci., 18 (2015), pp. 50-58

Cesoniene, Dapkiene, L M, Sileikiene D, (2019) The impact of livestock farming activity on the quality of surface water. Environ. Sci. Pollut. Res., 26 (2019), pp. 32678-32686

Collins, J (ed) (2024) Bat surveys for Professional Ecologists– Good practice guidelines. Bat Conservation Trust, London

EWG, (2019) EWG Investigation: manure from unregulated factory farms fuels Lake Erie's toxic algae blooms. EWG

Harris, S., Creswell. P., and Jefferies, D.J. (1989) Surveying badgers. Mammal Society, London.

Hawley DE (1992) Welbourn Village Pond Ref DEH/.583/65/30/02 Unpublished letter reporting pond survey results from National Rivers Authority (NRA)

Hu,Y, Cheng, H, Tao, S,(2017) Environmental and human health challenges of industrial livestock and poultry farming in China and their mitigation
Environ. Int., 107 (2017), pp. 111-130

Dean, M., Strachan, R, Gow, D. and Andrews, R. (2016) The Water Vole Mitigation Handbook (Mammal Society Guidance Series).ed Fiona Mathews and Paul Chanin; The Mammal Society, London.

Dean, M., Strachan, R, Gow, D. and Andrews, R. (2016) The Water Vole Mitigation Handbook (Mammal Society Guidance Series) ed Fiona Mathews and Paul Chanin. The Mammal Society, London.

Environment Agency, (1999). Otters and River Habitat Management, Environment Agency.
Environment Agency, (2010). Fifth Otter Survey of England 2009-2010. Technical Report. Environment Agency.

David T. Hanson, Steven K. Rice ed (2013) Photosynthesis in Bryophytes and Early Land Plants Springer Science & Business Media 2013

Joint Nature Conservation Committee (2016) Handbook for Phase 1 habitat survey. A technique for environmental audit. 2nd Edition. JNCC, Peterborough
RSPB, NRA and RSNC (1994) The New Rivers & Wildlife Handbook. RSPB.