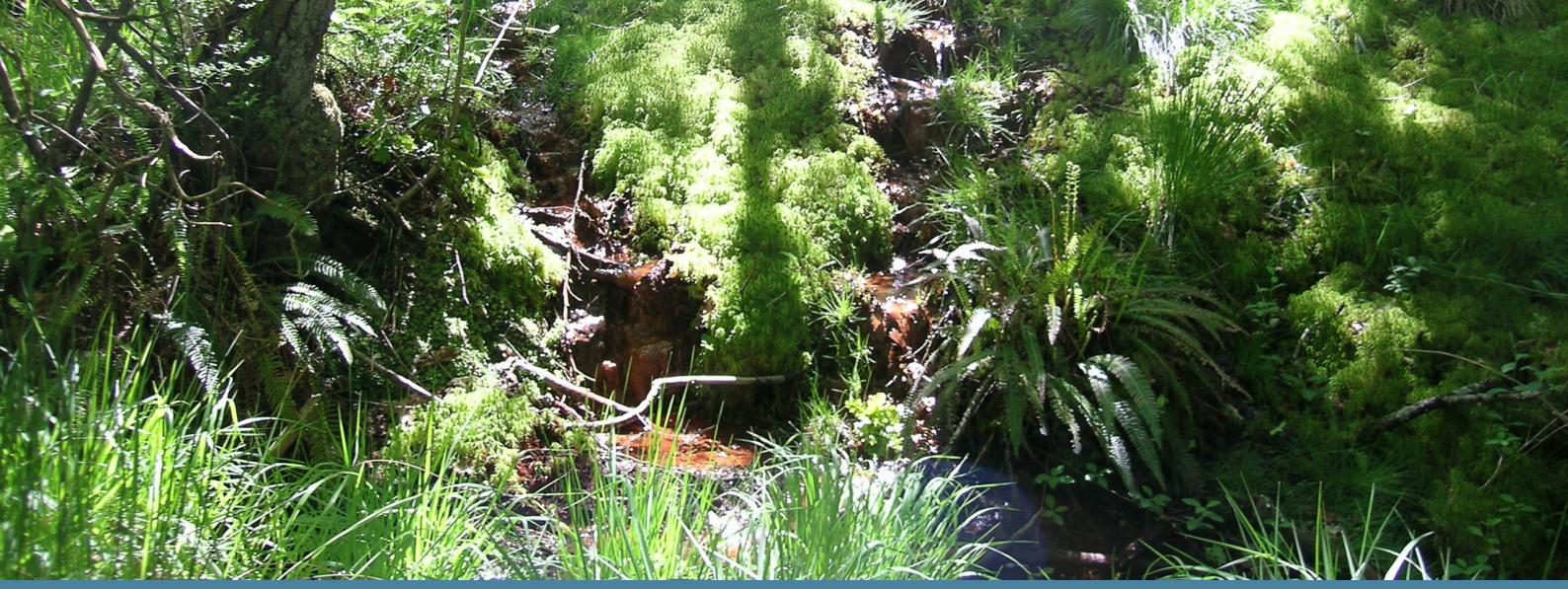


Priority Habitats

What are Priority Habitats?

'Priority' river and lake habitats are freshwater habitats where **action to protect and restore biodiversity** is a priority. The aim of mapping priority river and lake habitats is to protect our most natural remaining examples of freshwater habitats, as well as support work to restore the rest of England's freshwater habitats by highlighting areas of concern.

Surveying your local freshwaters

Much of what we know about our freshwater habitat resource relates to larger rivers and lakes, where the focus of water management activities has historically been. We know much less about our **streams and small lakes**, but we do know there are hidden gems in the landscape – natural habitats full of our native wildlife are out there waiting to be put on a map to confirm their importance.

No one knows about these hidden gems better than those who live and work beside them, which is why we are asking our citizen scientists to survey their local freshwater habitats and tell us what condition they are in. Habitats that are in their most 'natural' state (i.e. virtually unimpacted by humans) will be put forward to be included on future updates the Priority River and Lake Habitats maps. But we also want to know about habitats that are not in the best condition, so that we can help to direct future restoration work.

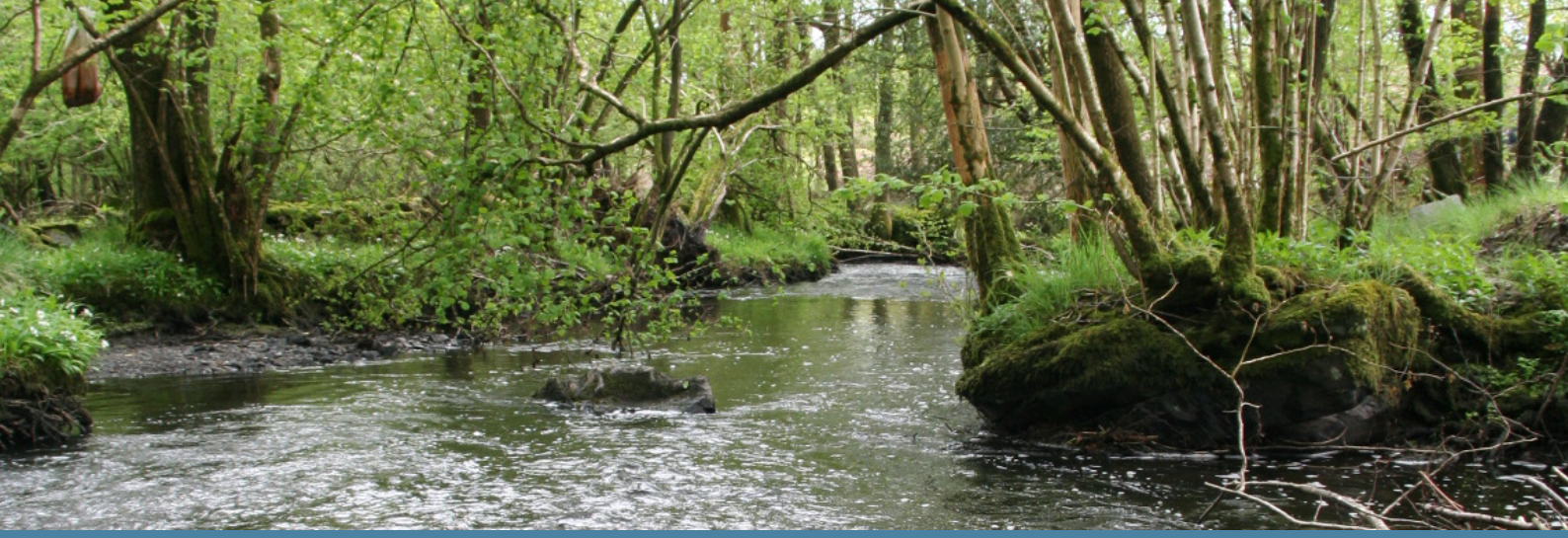
Using this material

This training is split into two parts - Assessing River and Stream Naturalness, and Assessing Lakes Naturalness. You don't need to read through it all at once! Use whichever applies best to your local area, and expand your knowledge only if you want to.

For further resources, please visit:
https://priorityhabitats.org/

FRESHWATER BIOLOGICAL ASSOCIATION

NATURAL ENGLAND



Assessing River and Stream Naturalness

To assess the naturalness of your local river or stream habitat, you will be using a simple entry-level method to quickly evaluate the level of human modifications on your river. Here we will explain step by step how you can go through this assessment yourself.

Getting started

We suggest that before you go out to your chosen site(s), you look through all the training material we have provided here. This will help you to feel more confident in your assessment. It is also very handy to print out copies of the **'Naturalness Forms'** or copy down the information that the forms ask you to collect in your own notebook. This will help you to remember what you are looking for when you go out to your river stretch. Remember, you can access a comprehensive version of the guidance online.

We do not have any specific 'rules' on what time of the day, month or year that you choose to do your assessment. Just keep in mind that **the state of the river or stream will be different at different times of the year,** and after different weather events – for this reason, we really do encourage you to visit a site and assess it more than once! Additionally, we do not ask you to assess a set length of the watercourse, but to get a better idea of the state of the site it is best to walk a good distance of it before making your final assessment. You don't have to do it all at once, you could come back and do different parts of the stretch if you want. Be aware of access rights - please don't follow the river through someone's property!

Unsure about describing the features on your stretch of river? Don't worry!

When you input your data, we will ask you **how confident** you are in your observations. You can rate your confidence as **High, Moderate** or **Low.** Even an observation with low confidence is helpful, so please note it down!

For this assessment, we will ask you to look at four components of habitat naturalness: **physical, hydrological, chemical** and **biological**. We will go through all of these here in your training material, with examples from different habitats. These are also detailed in the annexes found on the Priority Habitats website here, should you want to go further.

PHYSICAL

This part of the assessment is where you tell us about the **physical naturalness** of the river. This can be information such as whether there are any artificial, physical modifications to the river/stream, like weirs or straightened channels. It can also relate to the **variety of vegetation** on the banks and the amount of **tree cover.**

When looking for highly natural sites, i.e. sites that could be considered as priority habitats, we want to see a **good amount of tree cover** along the river banks for inclusion on the priority habitats map. Trees are extremely important in shaping river form and providing shade, fallen wood and leaf litter to the river, which is hugely beneficial to fish and invertebrate species that live in the water. If trees are not present, it usually means that the stream has been modified in some way by humans, for instance by **removing trees to make room for farming or grazing**. In some cases, tree cover might be absent due to altitude of the site.

You can usually tell when riparian vegetation has been heavily modified by intensive grazing and chemical applications - **vegetation will be simple** (i.e. dominated by grasses) and **heavily cropped**. This does not create a highly natural environment, and so would score poorly in the naturalness assessment.

Let's look at some examples of what you might see:

In example **a** we see a river with no apparent physical modifications. Complex vegetation is seen along the river banks, and there is wood in the channel, making for a fairly natural in-stream environment. We could call this a highly natural physical river habitat, scoring it a **1** in the assessement.

In example **b**, again there are no physical modifications, however the stream banks have very little vegetation with no tree cover at all. Plus, the river is running through agriculturally improved pasture. We could only give this a score of **3** in the naturalness.

Based on this: **what score would you give example c?** We would give it a score of **3**, because of the lack of trees and other semi-natural vegetation and evident high grazing pressure.

Scoring

1

Highly natural

- No evidence of physical modifications,
- At least 1/3 of surveyed area has tree cover, tree roots strongly interact with the channel, affecting flow,
- Leaf litter/woody material left in channel,
- Riparian zone has semi-natural vegetation.

2

Natural

- Some limited evidence of physical modifications,
- At least 1/3 of surveyed area has tree cover, tree roots interact with the channel to some extent,
- Leaf litter/woody material left in channel,
- Riparian zone has semi-natural vegetation.

3

Semi-natural

- Some evidence of physical modifications (up to 30% of survey area),
- Artificial impoundment structures, e.g. dams or weirs, present but rare,

4

Unnatural

- Extensive physical modifications, with some natural sections along the channel/banks,
- Artificial impoundment structures, e.g. dams or weirs, are present and impacting habitat

5

Highly unnatural

- Entire river is physically modified,
- River is straightened along length, with artificial or reinforced banks and no natural habitat features

Remember! if you are unsure about your assessment, you can just lower the confidence rating you give!

HYDROLOGICAL

In this part of the assessment, you tell us about the **hydrological naturalness** of the river. Hydrological modifications will impact the flow of the river, so can be difficult to identify in a one-off visit - as mentioned, the river may flow differently at different times of the year or following extreme weather events.

You may be able to spot obvious modifications, like **water pumping stations** for abstracting water or **artificial lakes** created by impounding the river or stream. However, if these features are not obvious, you may want to check local water resources data provided by the Envrionment Agency's abstraction licensing maps. If your survey site is in an area coloured **red or yellow** then it should not be scored Class 1 or 2 for naturalness. If it is in an area coloured yellow then it can be scored Class 3. Red should be scored no higher than Class 4.

In the case of hydrological modifications, we do not expect you to have complete confidence in your assessment, so do not worry! Whatever information you can give will be welcome. Let's see some examples:

In example **a** we see a river with a pumping station nearby. It looks to be in a maintained condition, so is probably still being used to abstract water. However, we do not know how frequently it is used, or whether it is the only type of abstraction happening on the river. We can still give it a lower-end naturalness score of **3**, but we need to lower our confidence rating accordingly.

Example **b** shows a river that has been impounded to make an artificial lake or

reservoir. Again, this is both a physical and hydrological modification, likely to cause low flows downstream. We would give this a low naturalness score too.

Scoring

1

Highly natural

- No evidence of impacts on natural flow, like pipes or pumps,
- Headwaters may be dry in the summer (intermittent streams).

2

Natural

- Some minor impacts on natural flow from abstraction or upstream impoundment,

3

Semi-natural

- Moderate impact of abstraction, diversion, or upstream impoundment on natural flow.

4

Unnatural

- Natural flow is heavily impacted by hydrological changes. Unnatural drying.

5

Highly unnatural

- The river is dry for the majority of the year due to abstraction or diversion of water.

CHEMICAL

In this part of the assessment, you will describe the **chemical naturalness** of the river. In the main, we are concerned about **evidence of pollution**, be that from nutrients, sediment or pesticides/herbicides.

In many cases you will not be able to say for sure how natural the chemical status of a river is, because there may not be any visible signs of poor water quality. However, there are a few things you might spot which can help you make your assessment.

Algae can be a really good indicator of water quality. Particularly, **blooms of algae** or lots of **filamentous algae** can tell us that a river has been polluted with nutrients like nitrogen or phosphorus. Additionally, the growth of sewage fungus

in or around the river can be evidence of poor chemical condition.

If it is available to you, you may wish to use water testing kits to get a more definitive view on the composition of the water.

Filamentous algae

You may see these hair-like threads of green in your river, made up of microscopic plants (algae). Thick growth of this clogging the river can evidence nutrient pollution.

Scoring

1

Highly natural

- No evidence of pollution, with no sewage fungus or filamentous algae,
- No direct effluent discharge.

2

Natural

- Evidence of low-level pollution, with small amounts of fungus and patches of filamentous algae,
- Potential effluent discharge upstream

3

Semi-natural

- Moderate levels of fungus and filamentous algae growth along the entire reach.

4

Unnatural

- High levels of fungus and filamentous algae growing along the entire reach.

5

Highly unnatural

- Major pollution issues, with thick mats of filamentous algae and extensive sewage fungus growth,
- May be poor water clarity.

BIOLOGICAL

This part of the assessment asks you tell us about the **biological naturalness** of the river, by gauging the presence of **non-native species**. These are plant and animal species that do not naturally occur in Great Britain, and have been introduced to habitats in England by human activity.

Here are a few examples of what you may see:

Himalayan balsam

Giant hogweed
(Do not touch me!)

Japanese knotweed

There are a number of other non-native species to be aware of. The **GB non-native species secretariat** website provides e-learning for the major species of concern, such as signal crayfish and other non-native crayfish species.. We recommend that you familiarise yourself with the freshwater species on the list, as this will help you be more confident in your assessment of the river.

INaturalist

Bring your phone!

We find these two mobile apps helpful when trying to idetify different plants and animals.

PlantNet

Scoring

1

Highly natural

- No evidence of non-native species present (assess for Himalayan balsam, Giant hogweed and Japanese knotweed as a minimum).

2

Natural

- One or more non-native species present but not extensive,
- Non-native plants take up 5% or less of channel length,
- Non-native animals should be only rarely encountered.

3

Semi-natural

- One or more non-native species present, with a significant presence along the reach (up to 25%)

4

Unnatural

- One or more non-native species are a major component of plant and/or animal life in and around the river (up to 60%)

5

Highly unnatural

- One or more non-native species dominate the plant and/or animal life in and around the river.

Remember! You can see a list of the non-native species we are interested in on your assessment form.

OTHER INFORMATION

On your assessment form, you will see we ask for other pieces of information to supplement the main visual inspection you have carried out. Some parts of this are quite simple, however, some parts require a bit of extra knowledge.

Key habitat features

While it is not essential to record habitat features, they can be very useful in helping us to understand your river or stream when we come to analysing the assessment data and mapping the presence of different habitat features around the country.

Let's look at some key habitat features:

Bankside flushes & springs

Areas where ground water is seeping into the system are known as **flushes & springs**. They are often appear as boggy areas along the bank.

Trees along the river bank may extend their **roots into the channel, or dip branches**, creating a more complex habitat.

Trees interacting with channel

Waterfalls & cascades

Waterfalls and cascades will often form in the upper reaches of streams, where the gradient of the land is changing more steeply.

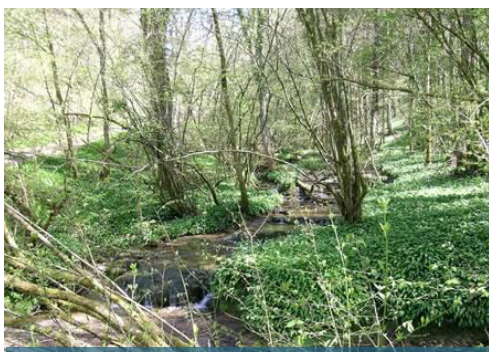
Discarded woody material such as **fallen branches or trunks** often make their way into undisturbed channels.

Woody material in-channel

Natural mire-stream transitions

Usually occurring in peatland, **mire-stream transitions** occur where the wetland and stream are connected to eachother.

You may see **meandering stretches** of river in your assessment, as well as rivers that have split into several distinct channels.



Sinuous & multiple channels

Riparian wetlands

Riparian wetlands (bogs/mires/marshes) are those which form on the land immediately adjacent to the river or stream channel.

Rivers naturally **deposit sediments** during high or low flow events. This can be an indicator that the river is not phyically modified.

Exposed cobble/gravel/sand

Moss-covered boulders

Moss-covered boulders provide extra complexity to the river habitat, and can indicate the river is not heavily polluted.

Well developed **fern vegetation** along steeper sided river banks are a unique habitat feature and should be noted.

Fern-filled ravines/ghylls

To see more examples of these habitat features, see the photo library in Annex III.

Species

Headwater streams often have a good variety of species of **invertebrates**, **fish** and **other animals** that depend on freshwater, living in or around them. Some are relatively easy to identify, but others can be quite specialist and require greater knowledge than we can offer in this project.

Most of the species we have included on your assessment form should be recognisable to you (like otter, kingfisher or water crowfoot), especially if you walk by your river frequently. As with other parts of this process, **do not worry if you do not feel you can answer** this part of the assessment. We have added a few more challenging ones to encourage you to expand your knowledge.

A full list of species considered to be a priority for recording is given in in Annex IV.

Want to expand your skills?

Learning to identify species is easier with a bit of help. Try joining a local recording scheme like the Riverfly partnership.

The Riverfly Partnership

RESOURCES

Priority Habitats Website

Priority river habitat in England

Freshwater Habitats Trust

Catchment Based Approach

GB non-native species secretariat

Riverfly Partnership

INaturalist

MORPh

PlantNet

iRecord

Environment Agency

Annexes

River naturalness assessment – guidance document

Annex I – Printable river naturalness survey form to use in field

Annex II – Examples of classifying stream naturalness

Annex III – Photo-library of key habitat features

Annex IV – List of species of high priority for recording

Assessing Lakes Naturalness

To assess the naturalness of your local lake habitat, you will be using a simple entry-level method to quickly evaluate your lake's natural features. Here we will explain step by step how you can go through this assessment yourself.

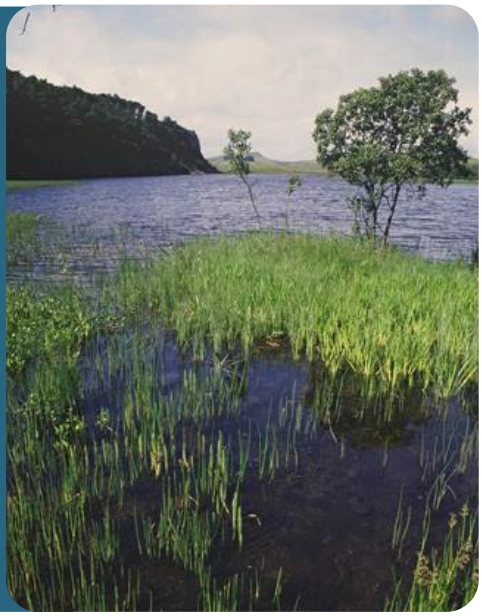
Getting started

We suggest that before you go out to your chosen site(s), you look through all the training material we have provided here. This will help you to feel more confident in your assessment. It is also very handy to print out copies of the **'Naturalness Forms'** or copy down the information that the forms ask you to collect in your own notebook. This will help you to remember what you are looking for when you go out to your lake.

We do not have any specific 'rules' on what time of the day, month or year that you choose to do your assessment. Just keep in mind that some **features of the lake will be different at different times of the year,** and after different weather events – it can be beneficial to visit a site at different times of the year, if you do you can update your assessment with any new information you gather! You do not have to visit the whole lake, but if you only visit a small portion of it adjust your **confidence rating** accordingly

Timing your assessments

- **Aquatic plants** are best assessed from **June to September**
- **Algal blooms** are more common from March to **October.**
- The best time to undetake **water chemistry** tests is **winter or early spring**.
- **Water-level** changes are most noticeable after periods of heavy rain or drought.



For this assessment, we will ask you to look at four components of habitat naturalness: **physical, hydrological, chemical** and **biological**. We will go through all of these here in your training material, with examples from different habitats. These are also detailed in the annexes found on the Priority Habitats website here, should you want to go further.

PHYSICAL

This part of the assessment is where you tell us about the **physical naturalness** of the lake. This can be information such as whether there are any artificial modifications to the lake shore, the shape of the lake (if artificial), and how the land is being used around the lake.

Shorelines

We are interested to know if there have been any modifications made to the shoreline, as this affects how the lake interacts with the terrestrial land around it. Here are some examples of artifical shorelines:

In example **a** we see a lake where the entire shoreline is replaced by a wall.

In example **b**, the modification is more subtle, using natural-looking boulders.

Example **c** shows a modification on the high water line, preventing the lake from reaching its floodplain.

Tip! if you are unsure about your assessment, you can lower the confidence rating you give! You can rate your confidence as **High, Moderate** or **Low**.

Land use

Lakes are greatly impacted by the land that surrounds them, so understanding how this land looks and/or is being used is important to a naturalness assessment. For the purpose of this assessment, the land we are interested in extends from the lake high water line to 10m away.

A lake with high naturalness will be surrounded by semi-natural land. This can include **woodland**, **fen** or **marshland**, **heathland**, **bracken** and **scrub**. On the other hand, non-natural land is that which is used for human activity such as **farms** and **improved grassland** for grazing, as well as **roads/pathways**, **urban structures** and **parks**.

If a lake has been created for example by gravel extraction it is far more likely to be good for wildlife it there is sufficient shallow water for plants to grow. Scoring the steepness of the sides and the area for plant growth evaluates this.

Scoring

Use these categories (shoreline, land use, lake shape) to help you decide on the naturalness class of your lake. Whichever is the lowest score you give for a category, use that as the overall class e.g. if you gave shoreline a 2 but land use a 1, the overall class should be 2! Please note: lake shape is only used for artifical lakes.

1

Shoreline	Land use	Lake shape
• No evidence of physical modification, • Fringing wetland.	• Land use around lake all semi-natural.	• Lake edges slopes gently, allowing for plants to grow in the water.

2

Shoreline	Land use	Lake shape
• No more than 5% of shoreline modified. • Fringing wetland.	• Majority of land use around lake is semi-natural.	• Plant growth possible up to 10m from lake edge.

3

Shoreline	Land use	Lake shape
• No more than 1/3 of shoreline modified • Little wetland.	• Around 2/3 of land use around lake is semi-natural.	• Plant growth possible up to 3m from, lake edge.

4

Shoreline	Land use	Lake shape
• Physical modifications across at least 2/3 of shore.	• At least 1/3 of the land use around the lake is semi-natural.	• Edges may be steep, leaving little habitat for plants.

5

Shoreline	Land use	Lake shape
• Physical modifications across more than 2/3 of shore. • Wetland absent	• Less than 1/3 of land use is semi-natural.	• Artificial edges leave little habitat for plants. May be some marginal or floating.

HYDROLOGICAL

In this part of the assessment, you tell us about the **hydrological naturalness** of the lake. This relates to features of the lake such as **water level**, **water abstractions**, **inflows** and **outflows** etc.

These features may be difficult to identify with confidence, especially as water levels will naturally fluctuate in lakes with weather, but try your best! Visiting the same site more than once can help you be more confident in you assessment.

Detecting water level fluctuations

When water levels retreat on a lake, we can see an obvious shoreline. You might also notice plants that usually grow under water are exposed, which can indicate that the water level changes are artificial. You may also see a 'trash line' of plant debris that has been left behind as the water retreats. Large artificial water level fluctuations limit the wildlife that can live there, but no fluctuations can also reduce wildlife potential, so it is good to know to what extent fluctuations do or do not occur.

You can see in the pictures below how the water has retreated, creating a shore.

Hydrological structures

Man-made structures can interrupt the movement of water as well as freshwater animals. A lake with hydrological structures is therefore less natural than one without, however, different structures will have different impacts on natural function based on the size and type. For instance, **a** and **b** are both weirs, but weir b has a fish pass.

Report structures impacting the lake

For reporting on structures on lake outflows, you can use the river obstacles app.

You may also see sluices, structures controlling water levels and even small dams.

Scoring

As with physical naturalness, use the lowest score you give for a sub-category as the overall class e.g. if a lake scores 2 on in/outflows but 3 on water level, you should give it an overall score of 3.

1

Structures	Water level	In/outflows
• No structures affecting water level/ creating barriers.	• Natural, seasonal water level fluctuations.	• In/outflows natural, surrounding land not drained or with ditches.

2

Structures	Water level	In/outflows
• Structures may be present, but are not unpassable to fish.	• Natural water level fluctuations, or, artifical mimicking natural pattern.	• No additional ditches, but may be some modifications to in/ outflows.

3

Structures	Water level	In/outflows
• Structure is present that is impassable to most fish species, most of the time.	• Water levels are fixed, unable to fluctuate naturally.	• Outflows modified, or, artifical inflows from land draining (ditches).

4

Structures	Water level	In/outflows
• Large structure present, impassable at all times to all fish species.	• Water levels heavily depleted by abstraction.	• Outflows modified, artificial inflows (if any).

5

Structures	Water level	In/outflows
• Very large, impassable structures present.	• Drawdown of more than 2m of water annually.	• Lake likely to be a reservoir or part of hydroelectric scheme.

CHEMICAL

In this part of the assessment, you will describe the **chemical naturalness** of the lake. While water testing is probably the best way to understand the chemical status of lake, we can also use simple observational methods to give us an idea of what is going on. If it is available to you, you may also wish to use water testing kits to get a more definitive view on the composition of the water.

Water clarity

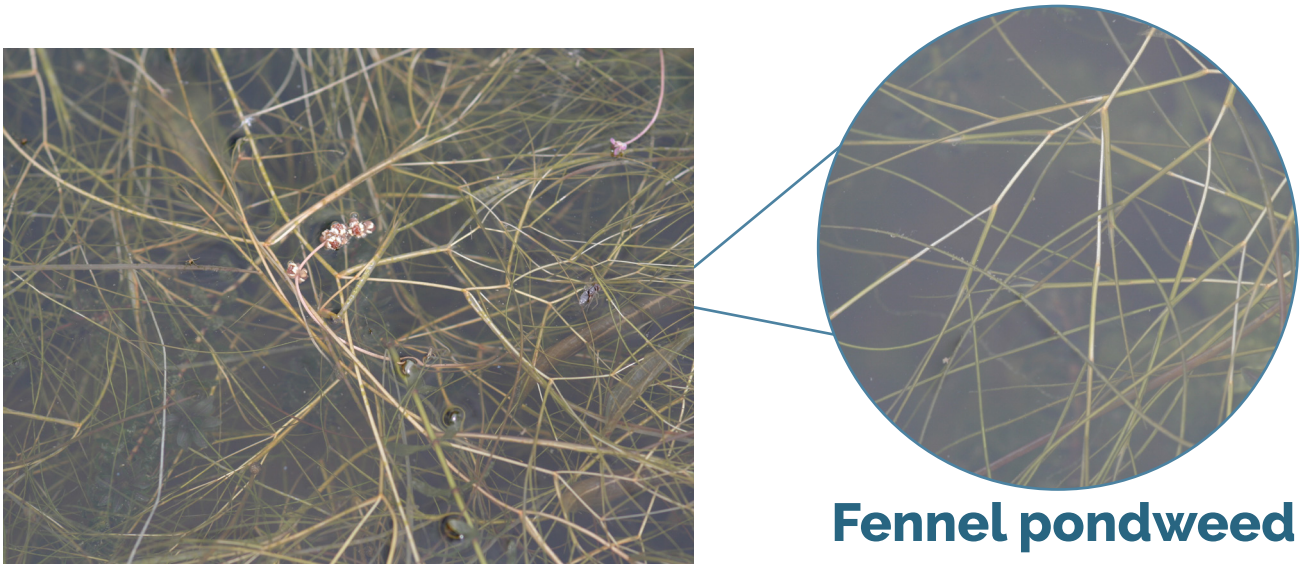
The **colour** and **clarity** of lake water can be a good indicator of the chemical condition of the lake. To check the water clarity of a lake, we want to see how **see-through or 'opaque' the water is**. You can do this with a Secchi disc or a painted measuring stick if you have those available to you, to see how deep you can see into the lake; alternatively, you can collect some water in a plastic bottle to assess how clear the water is.

Be aware that some water is naturally coloured! For instance, in places where water runs through peat the water will likely be tea-coloured - without the milk! (image a). The difference is that it will be clear, not opaque like polluted water (image b).

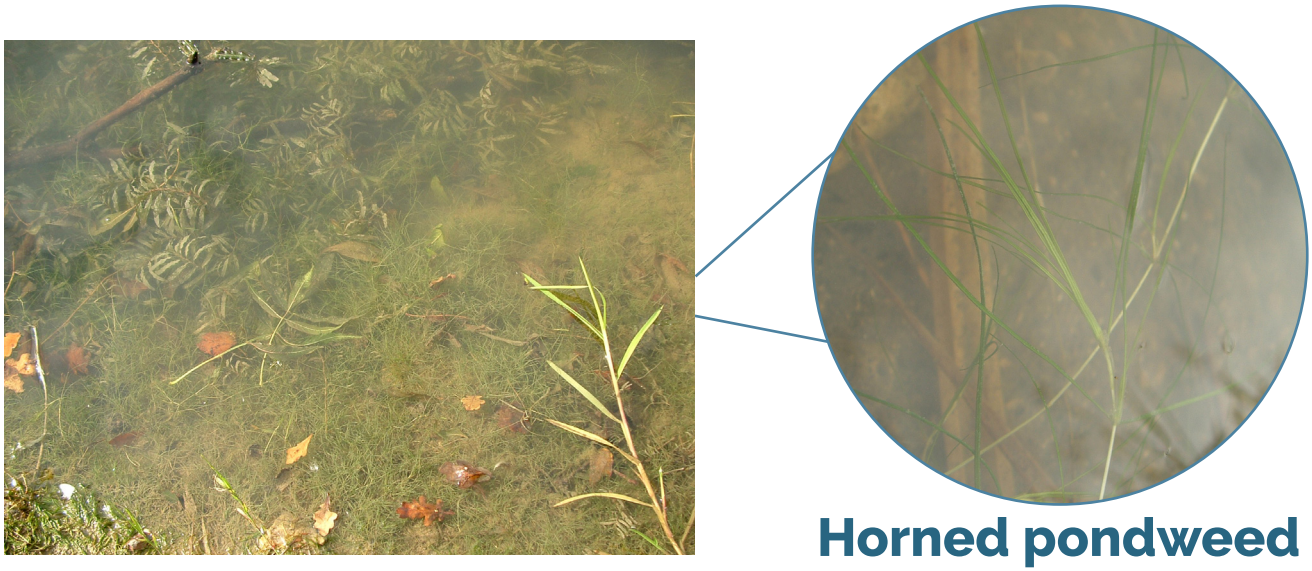
Aquatic plants

Plants that grow underwater in lakes will only do so if **enough light** can reach them. More opaque, polluted water will often lead to fewer plants at depth. It can be difficult to determine how deep plants are growing without access to a boat or dock, and a grapnel - if you have access to these things, then please do use them to help in your asessment. There are a few key plant species you can look out for to h**elp you determine if the lake is enriched** with nutrients: fennel

pondweed and horned pondweed (pictured), as well as Nuttal's waterweed and rigid hornwort.



Fennel pondweed



Horned pondweed

Algae

Algal growth can be a helpful indicator of chemical naturalness. Particularly, **blooms of algae** or lots of **filamentous algae** can tell us that a lake has been enriched with nutrients such as nitrogen or phosphorus. Algae may be seen as a scum floating on the water surface or coating rocks on the shore, in colonies, or in the colour of the water (e.g. blue-green blooms).

You should be aware that algal growth is **often short-lived**, so if you visit a lake and there is no evidence of algae you cannot truly be confident that this means algae does not bloom in your lake. If you can, visit the lake more than once, in different seasons or weather, to improve your confidence.

Spotting stoneworts

Be aware that the group of algae called 'stoneworts' are actually indicators of **GOOD** water quality. They look more like aquatic plants than algae.

Algae in lakes

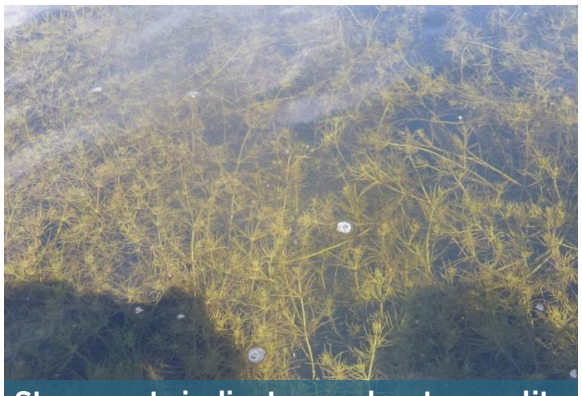
Lake green in colour from a bloom

Green 'scum' on lake surface waters

Algal mats on lake surface

Growth among aquatic plants

Rocks covered in algae



Stoneworts indicate good water quality

Scoring

You may use one, or several methods to decide a chemical naturalness class. If you use several, as before, use the lowest score you give for a sub-category as the overall naturalnes class.

1

Water clarity	Algae	Plants	Sampling
• Lake bottom or Secchi disc visible through more than 3m of water.	• Very little algae, hardly noticeable.	• Plants growing at 3m depth or as deep as the lake (if less than 3m)	• Water tests show no positive result, bio-sampling show no pollution.

2

Water clarity	Algae	Plants	Sampling
• Lake bottom or Secchi disc visible through between 1m and 3m of water.	• Occasional noticeable algae growth, not persistent or widespread.	• Plants growing at less than 3m depth, but more than 1m depth.	• Water tests register low pollution. Bio-sampling shows low level pollution.

3

Water clarity	Algae	Plants	Sampling
• Lake bottom or Secchi disc visible through 50cm to 1m of water.	• Moderate filamentous algae, with algal blooms in spring and autumn.	• Some plants present but not abundant unless adapted to nutrients.	• Water tests show moderate pollution. Bio-samples represent moderate water quality.

4

Water clarity	Algae	Plants	Sampling
• Lake bottom or Secchi disc visible through 25cm to 50cm of water.	• May be frequent blooms and extensive filamentous algae.	• Plants absent or sparse.	• Water tests register high pollution. Bio-samples represent highly impacted water quality.

5

Water clarity	Algae	Plants	Sampling
• Water brown or green, unable to see bottom of lake under 25cm of water.	• Frequent algal blooms and extensive filamentous algae.	• No submerged plants are present.	• Water tests and biological sampling represent very high levels of pollution.

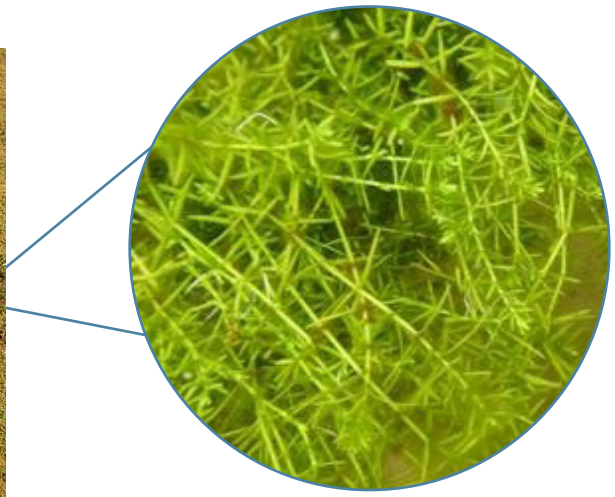
Bloomin' Algae!
You can report algal blooms using the app Bloomin' Algae.

BIOLOGICAL

This part of the assessment asks you tell us about the **biological naturalness** of the lake, by gauging the the presence of **non-native species**. These are species that are found in areas where they would not naturally live, without having been introduced there by humans. You may see these first-hand, or know about them through local databases.

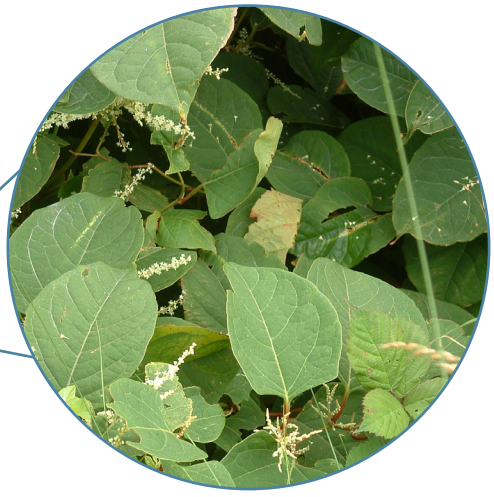
We want to know about plants and animals (if you can spot them!) - you can get help to identify non-native speices through the e-learning page on the **GB non-native species secretariat** website.

Here are some of the species you may see in and around the water:



New Zealand pygmyweed

Parrot's feather



Japanese knotweed

Bring your phone!

We find these two mobile apps helpful whenn trying to identify plants and animals,

INaturalist

PlantNet

Scoring

A single biological class is needed for the assessment. If you only see plants, or only see animals, that is fine. As before, if you see both then base you class on the lowest score.

1

Non-native plants	Non-native animals
• No evidence of non-native species in or around the lake.	• No evidence of non-native species in or around the lake.

2

Non-native plants	Non-native animals
• Non-native plants occupy no more than 5% or shoreline/lake area	• Non-native animals are rarely encountered, and have little impact.

3

Non-native plants	Non-native animals
• Non-native plants occupy up to 25% of the shoreline.	• At least one non-native species found when searched for.

4

Non-native plants	Non-native animals
• Non-native plants occupy up to 60% of the shoreline.	• Multiple non-native species found when searched for.

5

Non-native plants	Non-native animals
• Non-native plants occupy more than 60% of the shoreline.	• Non-native species are numerous and found with little effort.

A note on carp: their impact on their habitat will probably be easier to spot than the carp themselves. Carp make the water muddy and opaque by disturbing submerged plants. If there is only floating plants, muddy waters, and no boat traffic, it will usually be caused by carp.

OTHER INFORMATION

On your assessment form, you will see there is the option to include other pieces of information to support the main visual inspection you have carried out. Some parts of this are quite simple, however, some parts require a bit of extra knowledge.

Plant functional groups

The presence of different plant functional groups can tell us a lot about a lake, and functional groups are often **easier to identify** than single species. Lets go through the groups you might come across.

Rosette forming

Plants have **short, stiff leaves with pointed ends**. The leaves **join at the base** in a rosette e.g. shoreweed and water lobelia.

Floating leaved and rooted

Leaves **lie flat on the water** surface but are rooted to lake bed e.g. water lily and floating bur reed.

Free floating

Plants are not rooted, but lay on the surface of the water e.g. duck weed.

Submerged linear leaves

Grass-like leaves, mostly submerged underwater, and rooted to the lake bed e.g. horned pondweed.

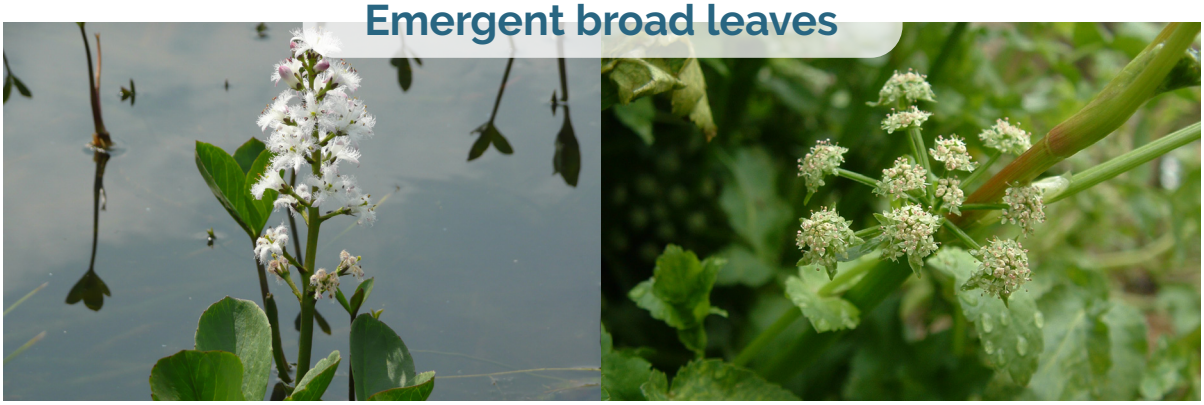
Submerged broad leaves

Broad leaves, mostly submerged underwater, and rooted to the lake bed e.g. waterweed and clasping-leaved pondweed.

Submerged fine leaves

Very **fine, branched 'leaves'**, mostly submerged underwater, and rooted to the lake bed e.g. stoneworts and water milfoils.

Emergent broad leaves



Broad leaf plants rooted to the lake bed, with **flowers and leaves above water** e.g. bog bean and fool's watercress.

Emergent narrow leaves

Narrow leaf plants rooted to the lake bed, with **flowers and leaves above water** e.g. reeds and horsetails.

Filamentous algae

Algae that **grow in threads** that interweave. This forms a mat that **looks like wet wool**. May be attached to substrate or free-floating.

Species of interest

Freshwater habitats often have a good variety of species of **invertebrates**, **fish** and **other animals**. While recording species is not essential, it is very helpful in understanding the lake you visited.

The species we have included on your assessment form may already be recognisable to you (like otter, kingfisher or water crowfoot), especially if you walk by around your chosen lake frequently. However, it is ok if you cannot or do not identify any species.

You can see a full list of priority species in Annex VI.

Record your findings

Spotted a species from the priority species list? If you wish you can record the sighting on iRecord!

Key habitat features

While it is not essential to record habitat features, they can be very useful in helping us to understand your chosen lake. You might notice these features during your visit(s), or through maps and other online resources.

Shoreline modification: this includes any changes to the shoreline such as reinforcing the banks or adding articfical structures.

Riparian zone up to 10m from bank: the same description is used for the area around the lake and semi-natural habitat under the physical naturalness assessment.

Perimeter trees: this describes the amount of trees around the lake perimeter, whether thin or extensive. Make a note, if you can, of the percentage of lake perimeter that has trees.

Fringing marginal emergent vegetation: this describes the emergent vegetation (i.e. plants that extend from the lake shore into the lake). This might be tall reeds, around lowland lakes, or less obvious rushes around highland lakes. Make a note, if you can, of the percentage of the lake perimeter that has emergent vegetation.

Number of ditches: ditches may drain into the lake from the land surrounding, particularly if land is agricultural. You may see these as you walk around, or on aerial maps.

Presence of outflow structures: can include sluices, weirs or dams.

RESOURCES

Priority Habitats Website

Priority lake habitat in England

Freshwater Habitats Trust

INaturalist

GB non-native species secretariat

PlantNet

Bloomin' Algae

iRecord

River Obstacles

Annexes

Lake naturalness assessment – guidance document

Annex I – Printable lake naturalness survey form to use in field

Annex II – Physical naturalness photographs

Annex III – Hydrological naturalness photographs

Annex IV – Chemical naturalness photographs

Annex V – Plant functional group photographs

Annex VI – Further species recording

Setting up and using Cartographer

Now that you have completed your assessment, you can start entering your data into our Priority Habitats data portal.

If you haven't already, visit the priority habitats 'Contribute' page, and click on the icon that says 'River and Lake Naturalness'. Here you can find all of the documents mentioned in these training pages in PDF format, as well as some information about using the portal.

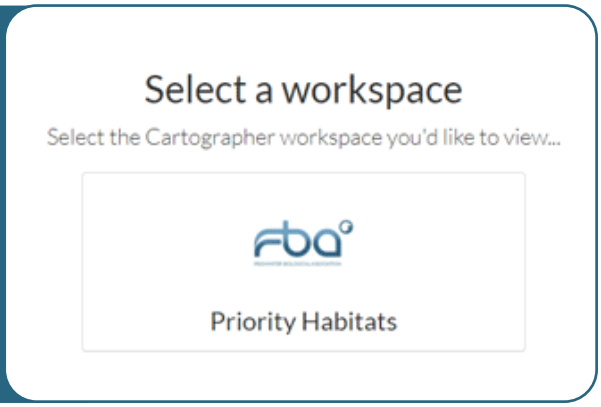
If you have already set up an account, you can use to 'Log in' button on the page to go straight to Cartographer. If you have not used Cartographer before for other projects, you will need to **fill in the form** at the bottom of the page to **request access to the portal**. Following this, you will recieve an email inviting you to join the Priority Habitats portal. Click on the link in the email to set up your account with a password.

Once you have accessed the portal, you will see a menu on the right-hand side of the page. Under '**Surveys**' you can view existing surveys from other users, as well as add your own survey.

Click on '**Add a Survey**' and you will see an electronic version of the printable naturalness form that you have already filled out with data about your watercourse. You can transfer the information from your printable form (or your notebook) onto this electronic version to add it to the interactive maps.

Selecting a workspace

When you log into Cartographer, you may see the option to 'Select a workspace'. To add your naturalness data to the Priority Habitats portal, click the icon shown here.



GLOSSARY

This glossary is comprised of words for which surveyors have asked for.

Abstraction- artificially removing water from natural freshwater sources such as groundwater, rivers, streams and lakes for various human uses.

Algae- a simple, non-flowering and typically aquatic plant of a large group that in freshwater includes many different filamentous (stringy) and single-celled forms. Some species attach themselves to stones or plants whilst others live freely in the water. They come in many different colours, forms and sizes.

Biodiversity- the natural variety of plant and animal life in a particular geographic location. It includes genetic variation within species, the variety of species and the variety of habitats and ecosystems.

Biological- relating to biology or living organisms.

Biosecurity- in terms of nature conservation this means procedures or measures designed to protect the wildlife against non-native species or diseases..

Citizen science- the practice of public participation and collaboration in scientific research to increase scientific knowledge. Through citizen science, people share and contribute to data monitoring and collection programs.

Conservation- in the context of this initiative, protection or restoration of wildlife, habitats, ecosystems and associated natural resources to prevent damage, destruction, or neglect and promote a healthy and vibrant natural environment.

Deposition- In the context of this initiative, the settlement of material on the bed of rivers, streams, lakes or ponds. Of particular concern is the excessive deposition of fine sediment from artificially enhanced erosion of soil and channel banks in the catchment, as well as physical modifications to river and stream channels that reduce the transport of fine sediment downstream.

Discharge – In the context of rivers and streams the total volume of water transported through the channel in a given time, . This includes any suspended solids (sediment), dissolved chemicals, or biological material (e.g. diatoms) in addition to the water itself.

Ditch - a straight channel dug for land drainage purposes. Natural headwater streams may be channelised and take on the appearance of a ditch. Natural stream channels can also be artificially extended into natural wetlands to drain the land for agricultural or forestry purposes

Effluents- sewage or other liquid waste discharged into a river, stream, lake or the sea.

Erosion- the wearing away of materials by water or wind. On land this relates to the erosion of rocks and soils, much of which is deposited as sediment (mud, silt, sand, gravel, pebbles, cobbles) in rivers, streams, lakes and ultimately coastal waters, These sediments are then themselves eroded and re-deposited within freshwater and coastal habitats. .

Ghyll- a small deep ravine, especially a wooded one, in headwater steam systems.

Hydro-electric scheme- an installation that generates electricity from turbines that convert the potential energy of falling or fast-flowing water into mechanical energy.

Hydrology- the study of the properties and behaviour of water e.g. flow.

Impounding structure- a man-made installation used to retain or store water in river and stream systems or store artificially enhanced amounts of water in natural lakes.. They transform river and stream sections into lake-like environments which 'drown out' in-channel habitat mosaics and artificially increase fine sediment deposition. They also artificially stabilise water levels in river, stream and lake margins, creating impacts on the plants and animals that naturally inhabit these areas.

Inflow - water entering a river, stream, lake, pond, wetland or other habitat..

International Convention on Biodiversity- the international legal instrument for 'the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources'. It has been ratified by 196 nations including the UK.

Intermittent flow- water flow in streams and sometimes rivers that is only present at certain times, signified by drying of the channel. It is a natural phenomenon, particularly in headwater streams where natural water supply from the catchment is insufficient to sustain flows all year round. Intermittent flow can also be artificially created by abstraction, water diversion, and land drainage.

Lake- a body standing water of over 2 hectares in surface area. Lakes may be a natural feature of the catchment or may be generated by impounding structures or the excavation of soils and rock.

Marginal fringing wetland– Wetland habitats that occur on the fringes of river, streams and lakes.

Mire-stream transition zone- naturally swampy or boggy ground in headwater areas and valley sides within which very small hydrological pathways form and erodes small channels (rivulets, runnels) that join together to form a natural stream channel. Trees, fallen wood and bed rock obstruct the flow of water and create dynamic complexity within the transition zone. These areas are typically drained for agriculture or forestry.

Morphology- the physical form, shape or structure of something, in this case of rivers, streams and lakes.

Non-native species- an organism that is not indigenous or native to a particular area. Some of these species are particularly invasive and cause major disruption to natural ecosystems.

Organism- an individual animal, plant or single-celled life form.

Outflow- the location where water leaves a lake or pond or the downstream end of a river system.

Priority Habitat- cover a wide range of semi-natural habitat types that were identified where action to protect and restore biodiversity is a priority.

Reservoir- a large natural or artificial lake used as a source of water supply.

Restoration- the action of returning something to its former condition.

River- a large natural stream of water flowing in a channel to the sea, a lake or another river.

Ravine- a deep, narrow gorge with steep sides.

Riparian zone- the land/wetland adjacent to rivers and streams.

Secchi disk- an opaque disc, typically white, used to gauge the transparency of water by measuring the depth, known as the Secchi depth- at the which disc ceases to be visible from the surface.

Semi-natural- modified by human influence but retaining many natural features.

Shoreline- the line along which a large body of water meets the land.

Species- a group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding.

Water diversion- the removal or transfer of surface water from its natural pathway through the catchment, either within the catchment or between catchments.

Water Framework Directive- EU and UK legislation aiming to prevent deterioration of the water environment and improve water quality by managing water in natural river basin districts, rather than by administrative boundaries.