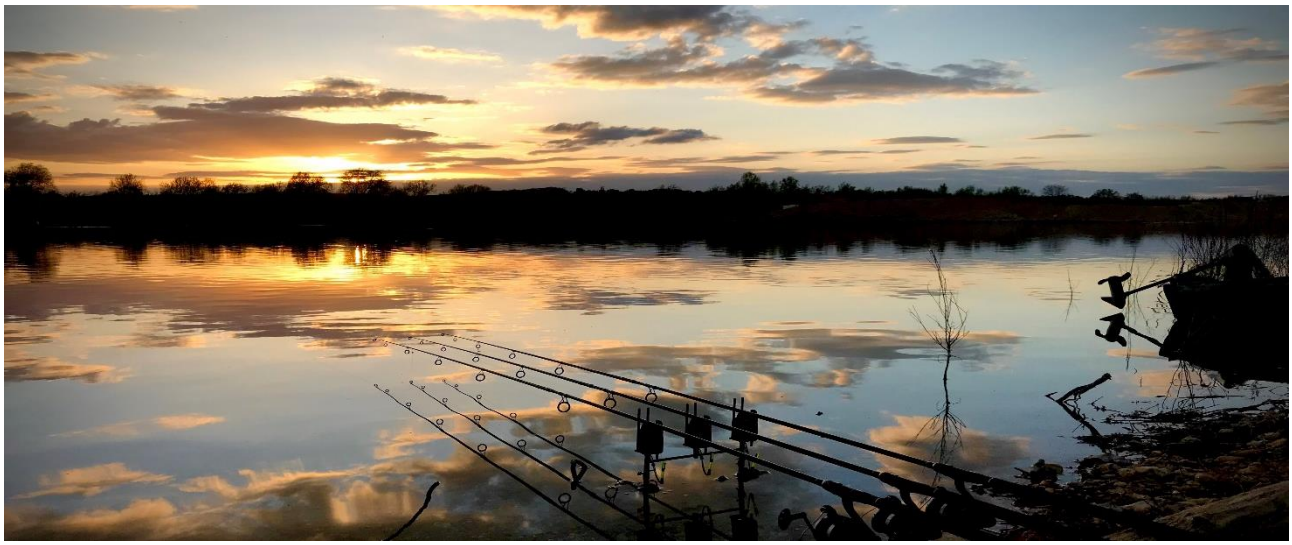
Good Fishery Management

The foundation for healthy and resilient fisheries

Good fishery management is the foundation for healthy fisheries. It increases the resilience of a fishery, promotes good fishery performance, and helps fish populations to quickly overcome common challenges. Fishery management is also crucial for preventing disease problems as well as promoting the recovery of fish should any health issues arise, helping minimise losses and avoid problems re-occurring. This document provides a 12-step guide to help you maintain a healthy fishery.



1. Seek expert advice to make the right decisions

Good fishery management is based on sound decisions that are made to achieve a clear outcome. Quick decisions or poorly considered actions can have significant and irreversible impacts, reducing fishery performance and resilience for years to come. Evidence-based decisions will always reap rewards, helping to maintain fish health and minimise the risks of things going wrong in the future.

Access to expert advice is crucial to help you make the right decisions. Engagement with your local Environment Agency fisheries officer or reputable fishery professional can ensure you get the correct advice and take the right actions. These contacts will also be vital in the event that a problem does arise, so think ahead and get a support network in place just in case you need it. If you are unsure about any aspect of fishery management, always seek advice from people who have the appropriate knowledge and experience to help.

2. Crucial biosecurity – better safe than sorry!

The introduction and spread of disease, as well as non-native species, represents a serious risk to any fishery. The most common route for such introductions is with the direct movement of fish, but they can also occur with infected equipment, contaminated water or anything that has come in to contact with these harmful organisms. Once introduced, pathogens and non-native species can rarely be removed, so prevention is always far easier than cure. Practising good biosecurity significantly reduces the risk of spreading disease to and from your fishery. This is particularly important during a fish mortality event.

Disinfection of fishing equipment is an easy and affordable method of biosecurity. This can be done by thoroughly drying equipment in direct sunlight, or through the use of chemical disinfectants such as Virkon® Aquatic. These are cost-effective ways to ensure anglers are not unknowingly transporting pathogens on their equipment to your fishery. Some fisheries provide their own equipment, such as nets and un-hooking mats, which further reduces the risk of anglers moving harmful organisms on and off the site. Having a comprehensive biosecurity plan is a valuable component for protecting any fishery.

3. Monitoring water quality – getting the basics right

Poor water quality is one of the most common triggers for health problems in fisheries. Adverse conditions or widely fluctuating environmental changes can be a direct cause of stress and can make fish susceptible to a wide range of infections. It can make fish less likely to feed, less tolerant of capture and can enable pathogens to proliferate.

Regular and frequent monitoring of water quality should be a priority for any fishery. This can provide early warning of an issue and allow preventative measures to be taken. This is crucial during changeable seasons like spring as well as periods of prolonged hot weather. Maintaining good water quality can help boost the natural defences of your fish and the balance of your fishery. It is also important for any fishery recovering from a health issue or mortality event, helping fish to recover and the fishery to get back on track.

Dissolved oxygen (DO), pH, ammonia and temperature should be monitored regularly. Oxygen should be tested first thing in the morning when levels are often at their lowest. This can be monitored using hand-held meters that are readily available and will always prove a worthwhile investment. Pond test kits can also provide a cheaper alternative for testing some water quality parameters. If readings are of concern, be vigilant, continue to test, and seek advice if unsure. Acting early before things get critical can be key.

4. Good habitat – so often overlooked

Habitat is an important component of any fishery but is commonly overlooked. Diverse habitats provide suitable conditions for different species and life stages of fish and should be the first step in maintaining balanced conditions for growth, survival, and reproduction. Even in intensive fisheries, habitat plays a key role in providing a varied food source as well sanctuary for fish, reducing predation, providing shade and shelter, and helping reduce stress – all important factors that help maintain fish health.

Managing diverse habitats can benefit fish health, water quality and the aesthetic value of the fishery. This includes well-maintained bankside trees, plentiful marginal cover, and diverse aquatic plants. These can help break down waste products and absorb nutrients that can cause undesirable algal blooms. Creating a diverse range of habitats at your fishery also encourages natural flora and fauna to thrive, increasing the carrying capacity of a fishery for a healthy and thriving fish population.

5. Stock management – don’t overload the system

Every fishery has a maximum biomass of fish it can support. This is called the carrying capacity of the fishery and will be dictated by factors such as size, depth, habitat, natural food sources, water quality and management practices. Excessive stock levels are one of the most common causes of poor water quality, disease, and ill health.

Consideration should always be given to the growth of fish, and that biomass may increase year on year unless stock is thinned out. If more fish are added to a fishery that is already at capacity, it will rarely improve catches and can quickly tip the fishery out of balance. Effects of excess stock levels include:

- Increased spread and proliferation of parasites, increasing transmission between fish.
- A reduction of water quality by lowering oxygen levels and increasing the levels of waste products and suspended solids within the water.
- Damaging habitat by reducing the number of plants and natural food sources.
- Increasing fish stress through competition for food and space, in turn reducing the capacity of fish to heal or overcome common infections.

6. Stock surveys – know the stock you've got, year on year

When was the last time you conducted a comprehensive stock survey of your fishery? It is important for any fishery manager to know the biomass of fish in a water, the number and size of each species, how quickly the fish are growing and their general health status. This can all be achieved through a stock survey, yet it's amazing how often this is overlooked or ignored in favour of stocking more fish.

Understanding biomass underpins most if not all fishery management approaches and is particularly important following any health or disease event. In most cases, it can prevent problems arising in the first place and holds the answer for improving and maintaining fishery performance for years to come.

Stock surveys are commonly done using netting or electric-fishing methods and should be regularly undertaken by a fishery professional. This approach also allows you to observe the general condition of your fish, assess recruitment and take essential measurements like fish growth. This information will help ensure the decisions and actions you take are evidence-based and not down to guess work.

7. Fish ageing and growth surveys – so much information in a scale

Fish ageing can provide valuable information on the health and performance of a fishery, simply through examining the scales of resident fish. This is one of many services offered free of charge by experts at our National Fisheries Laboratory.

Fish ageing surveys can reveal growth rates, fish age and size at maturity and recruitment success, as well as highlighting pressures on a fishery or early warning signs. For example, slow growth rates within a fish population could indicate a lack of resources such as habitat or food, suggesting that additional macrophytes or supplementary feeding may be needed. A lack of juvenile fish can indicate poor recruitment. Slow growth, or high recruitment of small size classes of fish could also indicate a need to thin out the resident population. This can be a cheap and effective way to improve fishery performance.

8. Nutrition and supplementary feeding

In most natural fisheries, a varied and balanced diet is provided by a combination of angler's baits and natural food items like invertebrates, small fish, and vegetation. In more intensively managed waters, greater reliance is placed on angler's bait, and this can become a challenge both in terms of quantity and quality of essential nutrients. Inadequate nutrition can quickly lead to ill health, poor growth, loss of condition and can greatly compromise a fishes' natural defences to common infections. It can also increase the scale of any problems that do arise, reducing the long-term resilience of the population.

If your fishery operates very high stock densities, or fish are entirely reliant on angler's baits then be mindful of the quantity and quality of available food that fish have access to. Excessive use of angler's bait may require management, especially in case of high angling pressure. Depending on stock levels, you may need to supplementary feed at certain times of year to maintain fish condition. If your fishery has a close season or closes for a period after spawning, then careful supplementary feeding may be beneficial in some situations allowing fish to overcome this stressful period. However, supplementary feeding always requires a clear understanding of fishery biomass. It also requires careful monitoring to ensure that any additional input of food (and therefore waste produced by the fish) does not compromise water quality. Feed choice, quantity and timings will depend on time of year, angling activity and how much of the fishes' dietary requirement you are having to supplement, so always seek advice as every fishery is different.

9. Wonder cures – there's no such thing!

It is not uncommon to hear people talk about wonder treatments that can solve any fish health problem. The reality is that these things just don't exist. In many cases the application of chemical treatments to a fishery can be illegal, harmful, expensive, and largely ineffective. Many of the treatments seen online, in pet shops or garden centres are licenced for use in aquariums or fish farms only. They are NOT for use in fisheries and their application could lead to prosecution. They could also have long lasting detrimental effects on the health and ecology of a water and can often do more harm than good.

The best, cheapest and most cost-effective approach to maintain fish health and avoid disease is simple - good fishery management. Prevention is so much easier than cure. Rectifying disease problems if they occur can take time but unfortunately there are no short cuts or quick fixes. If you get offered something you are not sure of, or that sounds too good to be true, stop and seek advice from a fish health professional.

10. Stocking more fish – ask the question, do you really need to?

Stocking fish can bring many benefits and is often essential when creating a new fishery. When done well and as part of structured management plan, stocking can also increase fish diversity and underpin good fishery performance. Following a mortality event there may also be a need to re-stock fish that have been lost. However, stocking also poses one of the greatest risks to a fishery, so it is important that you fully understand these risks BEFORE introducing fish and do everything you can to reduce them.

If stocking fish after a mortality, it's important to understand that losses may have arisen because of significant fishery imbalance or stressors, and so stocking more fish could just re-set the same problem. As such, stocking should only be conducted once it is understood what has caused any previous problems. Options such as rearing fish on site can be a good idea and can aid biosecurity, although this isn't always feasible. Stock ponds need planning, care, and attention if their benefits are to be realised.

Many fish health problems and disease events simply arise because of too many fish, so always ask the question if stocking is really the answer. A stock survey will usually tell you whether stocking is needed or whether fishery performance can be improved through other management measures. In many cases, cropping fish rather than stocking is the wiser choice, far cheaper and a lot less risky.

If you do need to stock, the risks of disease introduction can be greatly reduced by following some simple steps. So often these approaches are misunderstood or ignored in favour of a cheap deal or pressure from anglers, so take your time to get it right!

1. Seek expert advice from the outset, plan carefully and ensure that the stocking is legal with all necessary permissions in place.
2. Always allow a previous health problem to resolve for at least 6 months before introducing new fish. Never stock if the resident fish are showing any signs of ill health.
3. View any cheap deals with extreme caution – you often get what you pay for.
4. Agree a stocking plan and don't be swayed by last minute temptations – one unusual fish or species that you hadn't ordered can have devastating impacts.
5. New fish should only be stocked from reputable sources. Always check the true source of the fish and be aware that some suppliers, including fish farms, may crop fish from other still waters. Buying fish from a farm doesn't always mean they are reared on a farm or come with any guarantee of health status.
6. Always make sure fish have had a comprehensive health check done by a fish health professional – a quick visual inspection means very little. Fish from 'authorised' fish farms don't automatically come with a clean bill of health.
7. Get a copy of the health check, read it, check it covers the species and size of fish being moved and seek advice to understand exactly what it means.
8. Always be present at the time of stocking and never stock fish under the cloak of darkness. Allow plenty of time and never be rushed - ask to inspect fish BEFORE they are introduced and ensure that they meet all your expectations. If in doubt, don't stock.
9. Never stock ornamental fish, recently imported stock, or fish that have been held with ornamental species.

10. Where possible, fish should be quarantined prior to being stocked out, although this is not always feasible. Stock ponds can be a valuable addition to a fishery but need to be appropriately sized and carefully looked after to be truly beneficial.
11. Only stock when you and the fishery are ready to receive fish. Conditions should be optimal with good water quality and minimal stress to ensure new fish settle in well. Stocking during the cooler months where water temperatures are lower can be beneficial, when water quality is more stable and many pathogens less active.
12. Carefully monitor fish and fishery conditions after stocking. If possible, close the fishery or reduce angling activity for a period to enable fish to acclimatise.

11. Be vigilant - early response means better outcomes

Early awareness that a problem might be looming is vital to allow preventative measures to be taken and minimise any potential losses. Early warning signs might include a decline in catch rates, changes in water quality or water colour and most importantly of all, the behaviour and condition of the fish. Always engage regularly with anglers and encourage

them to report any concerns or sightings. Be particularly vigilant during stressful times of year like spring, or during extreme weather conditions - early morning can often be a prime time to observe the fishery and its residents before anglers arrive.

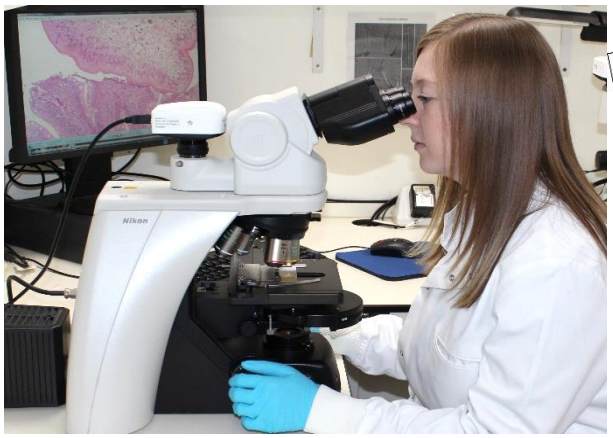
The occasional loss of old or weak fish is a natural occurrence in any fishery and not necessarily a cause for concern, but when a number of fish show signs of ill-health or distress, or increased losses occur, it's time to seek help. If in doubt, always get in touch!

12. What you should do if fish are dying - don't guess

If you suspect a fish health problem or encounter unexpected losses, stop fishing and **report it to us immediately on our incident hotline - 0800 80 70 60.** Prompt professional help from the outset will always improve chances of identifying the cause and will help to minimise the problem. If you encounter a mortality at your fishery:

- Close the fishery, operate good biosecurity, and report the problem immediately
- Check and optimise water quality as this will help reduce stress and aid recovery.
- Carefully monitor losses and keep a log of what is being seen on site, numbers of fish being lost and water quality parameters each day.
- Take images of affected fish or typical symptoms if safe to do so.
- Remove dead fish and dispose of them appropriately. If possible and advised to do so, freeze any freshly dead fish as these could be used as a last resort for virus testing.
- Never move sick fish in the hope they might recover elsewhere on site - you may be spreading serious disease.
- Never stock more fish either, as this will almost certainly exacerbate the problem.

Our National Fisheries Laboratory conduct the most comprehensive disease investigations available. Detailed diagnostic testing will help identify the cause of losses and help rule out other concerns. The more information you have about a mortality, the easier it is to make informed decisions and put things in place make your fishery more resilient for the future.



To report dead or dying fish, please contact our incident hotline immediately: 0800 80 70 60. For any further information on fish health matters, contact our National Fisheries Laboratory on 02084 745244 or fish.health@environment-agency.gov.uk