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Stocking fish:

A GUIDE FOR

fishery owners

AND

anglers



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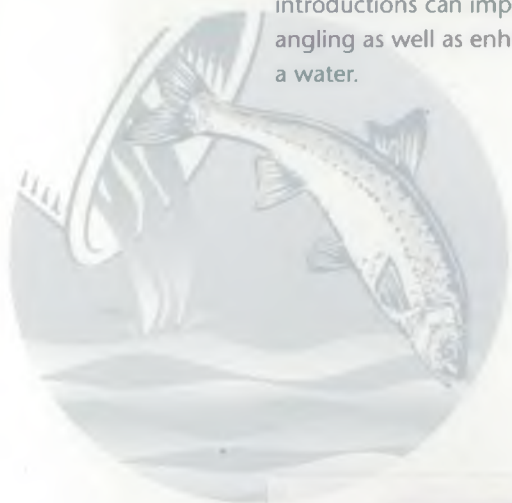
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Stocking fish: a guide for fishery owners and anglers

This booklet is a simple guide to the benefits, risks and legal requirements of stocking fish. It is intended for angling clubs, fishery owners and managers.

The act of fish stocking is undoubtedly one of the most important aspects of fishery management, bringing rewards as well as risks. To gain the best results from any fish introduction, it is essential to plan ahead carefully. This involves having a firm understanding of the processes involved, a clear idea of what can realistically be achieved and, perhaps most importantly, knowing the ultimate aims of the fishery.

It is becoming increasingly common for fisheries to practise stocking. With some 2 million fish, 6,000 separate fish introductions take place each year in England and Wales. Many factors require careful consideration before stocking is carried out, because inappropriate stocking can upset the balance of a water and have longlasting detrimental effects. Conversely, well-planned and carefully considered fish introductions can improve the quality and diversity of angling as well as enhancing the ecology and productivity of a water.



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Reasons for introducing fish

There are many reasons for stocking fish into a water. Although every situation will be different, the need to stock can be placed into one of four categories.

1. CREATION OF A NEW FISHERY

When a new fishery is to be created, the need to stock becomes fundamental and unavoidable. Such stocking involves either the introduction of fish to an empty water, or the introduction of a new species in order to create new sport within an existing fishery.

2. MITIGATION

Stocking may be done to overcome the effect of an activity on the productivity of a fishery. An example of stocking to mitigate such effects is the introduction of salmon parr to a river that has been obstructed, preventing the return of adult salmon.

3. ENHANCEMENT

Perhaps the most common type of stocking is carried out to enhance existing stocks, where recruitment is poor. This "enhancement stocking" helps supplement fisheries that are limited by low stock levels and capable of supporting more.

4. RESTORATION

"Restoration stocking" is carried out to restore fish stocks that have been depleted, for example by pollution or mortality.

As each stocking situation is different and the considerations for each case vary, the reasons for stocking should be clear long before it is carried out.

Planning fish introductions

Because the stocking of fish is expensive, it is important that it is carried out in the best way possible. Consideration and planning at the pre-stocking stage will maximise the potential of the stocking, minimise the risks involved and provide the best return for the money invested, to enhance the long-term development of the fishery. The following points should be carefully considered before any fish are introduced.

THE TYPE OF FISHERY

It is important to have a clear idea about the type of fishery you are creating or developing. This will influence the choice of fish species as well as sizes and numbers stocked. For example, if a good-quality mixed fishery is the aim, then it is important not to stock large numbers of any single species that may eventually dominate the fishery to the detriment of other species. Be realistic at this stage, and understand that the characteristics of a water (for example size, depth, habitat) will always dictate the type of fishery for which it is most suitable.

THE CARRYING CAPACITY OF THE WATER

Every water has a maximum population level of fish that it can naturally sustain. This is its "carrying capacity". This level is determined by the quality of habitat, the amount of food obtainable, and the space available to the resident fish. Table 1 below gives the recommended stock densities for different types of stillwater. These figures allow for growth and reproduction of fish populations and are based on a mixed-species fishery. Most waters can sustain greater stock densities of mixed species than single species.

If fish populations rise above this natural capacity, either as a result of stocking or natural recruitment, then a water may be said to be overstocked. Such conditions can upset aquatic plant and invertebrate communities which play an important role in the natural ecology of a water. More importantly perhaps, overstocked waters are more prone to poor water quality, reduced growth rates and disease outbreaks.

Stillwater type	Recommended stock density (biomass)
Mature acid/natural upland lake	100 Kg/ha
Recently created lake/gravel pit	150 Kg/ha
Mature gravel pit	250 Kg/ha
Mature lowland estate lake	350 Kg/ha
Rich farm pond	500 Kg/ha

Table 1. From: Freshwater fisheries & wildlife conservation - a good practice guide



THE FISH ALREADY PRESENT

To avoid overstocking and harm to existing fish, it is important to understand these fish populations prior to introducing more fish. Unless you ascertain the existing biomass you may upset the ecology of the water by new introductions, for example by increasing competition for food. Not only is it crucial to assess the numbers, species and sizes of fish present, but also their state of health. Introducing fish to an unhealthy resident population will only generate further ill health.

There are a number of ways to assess the stocks of a fishery. At a basic level, monitoring anglers' catches can provide an idea of the species present, their condition and approximate numbers. Scales may even be taken from such fish for ageing, to give an indication of growth rates. However, to gain accurate knowledge about the composition of a resident fish population, a full fishery survey must be carried out. The Environment Agency or independent consultants can give you information on assessing fish populations.

If fish stocks in a water are found to be low, you need to find out why successful natural recruitment has not occurred. Although stocking fish will, in the short term, increase fish numbers, it is possible that a water may be incapable of supporting elevated stock levels. If the population is limited by poor habitat, limited food availability or poor recruitment then the addition of more fish is unlikely to improve the fishery in the long term. In such cases the sustainable development of the fishery would be best achieved by improvements to habitat rather than the introduction of more fish. In some cases low fish numbers may be part of the natural fluctuations in a population that, given time, may rise to more desirable levels.

INTRODUCING NEW SPECIES

When introducing new species, you should find out why such species are not already present. Although it may be because the species has not been introduced in the past, it may equally be a result of unsuitable conditions. When predicting the success of introducing a new species to any water, the following points should always be considered:

- **Will the new species compete with existing, established stocks?**
- **Will the new species prey on existing fish?**
- **Is the new species suitable for the type of fishery?**
- **Are the habitat and environmental conditions suitable for the new species?**
- **Why is the species not already present?**
- **In older waters, was the species present before or has it been introduced before?**
- **What will the impact of the new species be on the habitat and ecology of the water?**

IMPROVING THE FISHERY WITHOUT STOCKING

The introduction of fish is only one of a number of ways you can improve the quality of angling in a fishery. Stocking is not always the answer to poor catches and greater value for money can and often be achieved by investing in the habitat of a water instead. Such improvements include promoting aquatic plant growth to provide cover as well as food, and creating shallow, heavily planted areas for spawning. The provision of "no fishing" areas will also offer safe havens for fish and other wildlife. The development of bankside cover, such as overhanging trees, may improve habitat, reduce predation and even protect anglers from the elements. In many cases, improvements to the habitat can be achieved easily and can prove highly beneficial to the long-term health, diversity and productivity of a water.

In certain situations, the quality of a fishery may be improved by removing fish rather than stocking them. In an overstocked water, where fish have become run down or stunted, removing a portion of the population can promote growth rates, rejuvenate stocks and return the water to its natural balance. In addition, reducing numbers of certain species may assist the growth and development of others. For example, reducing the size of the carp population may alleviate pressure on competing species such as tench.

Information about other methods of improving fisheries is available from local Environment Agency fisheries officers.

ACQUIRING FISH

Fish can be acquired from a number of sources, including fish farms, fish dealers, other waters or stock ponds. For more information and guidelines on purchasing fish see the Environment Agency's "Buyer Beware" leaflet, available from your local fisheries office. Although it is impossible to guarantee the health of fish, using fish from a known source with a known health "history", such as a stock pond, can prove valuable. However, all fish samples should be health-checked *before* being introduced to another water, irrespective of how healthy they look. In addition, good fish health can only be ensured if the water they are to be introduced to is suitable. If this is not the case then fish will struggle to establish to new conditions, for example, large common bream from large reservoirs rarely do well if introduced into small stillwaters.



TIME OF FISH INTRODUCTIONS

The best time of year to introduce fish is from autumn to early spring. At this time of the year water temperatures and the oxygen demands of the fish are at their lowest and the oxygen capacity of the water at its highest. Moving fish during this period is often less stressful than during warmer temperatures and fish tend to recover more quickly from the upset of the stocking process. In addition, many naturally occurring parasites and pathogens will be at relatively low numbers, posing less of a threat to acclimatising fish.

STOCKING NEW FISHERIES

In the case of a new fishery, it is vital to leave enough time for conditions to mature before you introduce fish. A barren, newly dug pond seldom provides a suitable habitat or adequate food for newly introduced stocks. Water chemistry, aquatic plants, invertebrate communities and bankside cover also take time to establish and stabilise. Introducing fish to unsuitable or immature conditions may be rapidly detrimental to both fish and fishery. Information about creating and developing new fisheries is available from local Environment Agency fisheries officers.




The risks of stocking fish

The act of fish stocking carries many risks. Every stocking may upset the stocked fish, the resident fish, the quality of angling and the ecology of the water.

As hazards exist with even the smallest of fish introductions, one fundamental question should always be asked long before a stocking takes place. Do I really need to stock?

Unfortunately, once fish have been introduced to a fishery and a problem arises, little can be done to rectify any damage. However, although the risks that stocking presents can never be completely avoided, careful planning and consideration can minimise them. Some of the main risks associated with fish introductions are outlined below.

INTRODUCTION OF DISEASE



One of the biggest risks of introducing new fish to a water is that the fish may bring parasitic diseases with them. To minimise the risk of introducing disease, ensure that a valid health check is carried out. The Environment Agency always recommends a health check prior to introduction, even if it is not requested as part of the Section 30 consenting procedure (see later section on legislation). Once a damaging parasite is introduced it is practically impossible to eradicate, and it will continue to damage the fish and the fishery. A health check performed by a private fish health consultant may initially appear expensive, but in the long term it will represent peace of mind and money well spent. For introductions of fish to waters connected to rivers, canals or other open watercourses or waters within the flood plain, the Agency requires health checks as a part of its operation of Section 30 (see legislation). In such cases, the Environment Agency National Fisheries Laboratory will carry them out free of charge.

REDUCING THE RISK OF DISEASE

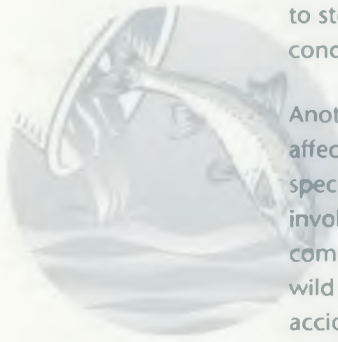
There are several ways of minimising the disease risks associated with stocking:

- **Always stock fish from only one source water.** This reduces the chances of introducing disease from an infected water.
- **Make sure that the fish sample on which a health check carried out is representative of the species and size of fish to be introduced.**
- **Make sure that the health check is fully understood.** It is likely that any parasites listed will be given their scientific (Latin) names. Make sure that the parasites are not potentially harmful and what impact they might have.
- **Follow the Environment Agency "Buyer Beware" 10-point code.** "Buyer Beware" leaflets are available from local fisheries offices.

DAMAGE TO EXISTING FISH STOCKS

The introduction of large numbers of fish, or particular fish species, may have a damaging effect on the resident fish population. The stocking of large numbers of fish will place an immediate demand on the available food resource and environment. Although in the short term this may cause an increase in anglers' catches, in the longer term it may reduce growth rates and potential sizes of the fish. In extreme cases reduced food availability and consumption will lead to stunted populations, nutritional deficiencies, loss of condition and even disease.

To minimise the impact of introduced fish on existing stocks, consider carefully the quantity and type of fish introduced.



A single large stocking is likely to have a bigger impact on the resident fish populations than smaller, targeted and phased introductions. Measured and controlled approaches to stocking often prove less damaging to a fishery and allow conditions to stabilise with minimal ecological disturbance.

Another way in which resident stocks may be detrimentally affected by fish introductions is by cross-breeding between species, or hybridisation. One of the most common examples involves crucian carp. This species hybridises readily with the common carp and, more frequently, goldfish. The brown or wild variety of goldfish is either stocked intentionally or accidentally as a result of misidentification as crucian carp or small common carp. True crucian carp populations can be seriously damaged by this hybridisation, leading to rapid decline in their numbers.

DAMAGE TO THE ECOLOGY AND WILDLIFE OF A WATER

The ecology of a natural water involves a balance between water chemistry, aquatic plants, algae, microscopic organisms, invertebrates, fish and other wildlife that lives on or around the water. The relationship between each organism can be complex and delicately balanced. Introducing fish may disrupt this balance, with irreversibly damaging consequences.

A well-documented example of how the ecological balance of a water can be disturbed is the introduction of common carp. Due to the feeding behaviour of this species, large numbers can rapidly lead to a reduction in submerged aquatic vegetation and a rise in the turbidity of the water. With fewer plants, reduced light penetration and an increase in available nutrients, more problematic varieties of plant such as blanket weed or algae often increase. Once this upset has occurred, it is extremely hard to reverse the process.

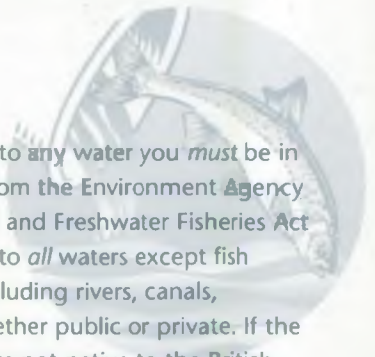
The presence of algal blooms can lead to wide fluctuations in dissolved oxygen between night and day. In addition, the seasonal nature of algal blooms causes them eventually to die off, or "crash". The resulting dead and decaying algae put a huge demand on available oxygen, reducing that available for other aquatic life. In severe cases, mortalities of fish and invertebrates can result.

THE PRECAUTIONARY PRINCIPLE

The golden rule of any stocking operation has to be "if in doubt, don't stock". If after considering all the points highlighted in this booklet, it is still not possible to assess the impact an introduction is likely to have on a fishery, then the best option is not to do it. Once the fish have been introduced to the water, removing them is often difficult and expensive. Many of the problems caused by inappropriate introductions also remain, despite efforts to remove the offending fish. These impacts may cause irrevocable damage to the fish, the angling quality, the ecology and the wildlife of a fishery. The precautionary principle should therefore always be applied.

Legislation

Before you introduce any fish into any water you *must* be in possession of written consent from the Environment Agency under Section 30 of the Salmon and Freshwater Fisheries Act 1975. This requirement applies to *all* waters except fish farms in England and Wales, including rivers, canals, reservoirs, lakes and ponds, whether public or private. If the fish intended for introduction are not native to the British Isles you will also need a licence under the Wildlife and Countryside Act 1981 and/or a licence to keep under the Import of Live Fish Act 1980, in addition to consent under Section 30.



SECTION 30, SALMON AND FRESHWATER FISHERIES ACT (1975). (INCLUDING AN AMENDMENT UNDER SECTION 34, SALMON ACT (1986))

Section 30 of the Salmon and Freshwater Fisheries Act (1975) states that:

"A person shall be guilty of an offence if he introduces any fish or spawn of fish into an inland water, or has in his possession any fish or spawn of fish intending to introduce it into an inland water, unless he first obtains the written consent of the water authority or the inland water is one which consists exclusively of, or of part of, a fish farm and which, if it discharges into another inland water, does so only through a conduit constructed or adapted for the purpose."*

*the authority is the Environment Agency.

Failure to obtain consent is a criminal offence and could lead to prosecution, with a fine of up to £2,500. Section 30 application forms are available from local Environment Agency offices and should be returned at least 10 working days prior to the planned introduction date. As part of the consenting procedure the Agency considers the effects that the fish stocking will have on the receiving and adjacent waters. This includes factors like fish health, fish ecology and the ecology of plants and other wildlife.

SECTION 30 HEALTH CHECKS

For the purposes of Section 30 health checks, waters are divided into two categories; mandatory and non-mandatory.

A health check will be mandatory if the fish are to be stocked into a river, stream, drain or canal, or if the receiving water is connected to any of these or if the consenting Agency officer considers that there is a risk of fish escaping from the receiving water into adjacent waters. In such cases, having

received a Section 30 application, the consenting Agency officer will request a sample of fish for a health check, which can be performed free of charge at the Agency's National Fisheries Laboratory.

On waters where the risk to other fisheries is considered to be minimal a health check may not be requested. In such cases the fishery owner has greater freedom and is responsible for their own stocks. However, the Environment Agency would always recommend that health checks be carried out and retains the right to request a health check in all cases.

More information about Section 30 health checks is available from local Environment Agency offices.

WILDLIFE AND COUNTRYSIDE ACT (1981)

Separate and additional rules exist under the Wildlife and Countryside Act (1981) if the intended stock fish are not native. A licence for non-native fish will only ever be granted where there is no risk of escape or release to other waters. It is important to remember that this licence is required in addition to, and not instead of, Section 30 consent. As with Section 30, the licence is required *before* the fish are introduced. For more information about the Wildlife and Countryside Act (1981) consent contact MAFF Fisheries Division II, Nobel House, London, SW1P 3JR or telephone 020 7238 5931.

Import of Live Fish Act (1980) (ILFA), Prohibition of Keeping or Release of Live Fish (Specific Species) Order

Under the Prohibition of Keeping or Release of Live Fish (Specific Species) Order, any person who releases or keeps certain species of non-native fish will require to be in

possession of a licence issued under the Import of Live Fish Act (1980). This Act applies to importers, fish dealers, fish farmers, the ornamental trade and fisheries. The licence is required for a specific list of species. The full list of species is given in the leaflet "Controls on Keeping or Release of Non-Native Fish in England and Wales". The leaflet, which also gives further details about this legislation, can be obtained from local Environment Agency Fisheries offices or from MAFF at the address below.

As with Section 30 consent and a WCA licence, the person intending to introduce the fish should be in possession of the licence *before* the fish are introduced. It is an offence for any vendor to sell ILFA-listed species to a person not in possession of the appropriate licence. For more information about ILFA contact MAFF Fisheries Division II, Nobel House, London, SW1P 3JR or telephone 020 7238 5937.

CONSERVATION STATUS

The conservation status of the receiving water may affect the outcome of the consents procedure. If the water is designated as a Special Area of Conservation (SAC), or a Site of Special Scientific Interest (SSSI), then under the Habitat Regulations 1992 an appropriate assessment may have to be carried out to demonstrate that the introduction of the fish will not disrupt the integrity of the site. For more information about the conservation status of a fishery, contact English Nature or Countryside Commission for Wales.

"Stock Smart"

– a checklist for introducing fish

The following checklist can be used to help assess the need for stocking fish and to plan the best method of proceeding. Not all the points apply in all cases but, as outlined above, it is important to consider as many aspects of fish introductions as possible.

Checklist



1. Have a clear idea of why the introduction is required.
2. Have a clear idea of the type of fishery that exists or is desired.
3. Know the carrying capacity of the water. How many fish can it hold?
4. Know what fish are already present. Is the water already stocked to its capacity? Are the fish stunted or growing well?
5. What should be stocked? Consider the species, size and numbers of fish. Does this meet the aims of point 1?
6. If a new species is to be introduced, why is it not already present? How will it impact on the fishery?
7. Consider what actions, other than stocking, would improve the fishery. Would they save money?
8. Think about the impact of new stocks on existing fish and wildlife on the water.
9. Think about where to get the fish. Always follow the "Buyer Beware" 10-point code.
10. Always ensure the fish have a health check. Always ensure the health check is representative of the fish to be introduced and that the findings are fully understood.
11. Ensure the introduction has Section 30 consent or any licences related to non-indigenous fish species *before* the introduction takes place.
12. Always apply the precautionary principle – "if in doubt-don't stock".
13. Remember that the Environment Agency can only offer help and advice to fisheries managers if it is sought. Local fisheries officers will treat all enquiries in confidence and they will be pleased to offer advice.

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