Taking stock of stocking

The Piscatorial Society's Bob Wellard questions the wisdom of stocking yearlings into wild fisheries and looks at the success of their 'naturalisation'.

The Piscatorial Society is one of the oldest angling societies in England, if not the world. Founded in 1836 the Society began as a group of friends who gathered together to dine and discuss fish and fishing. It was heavily involved in early freshwater fishery legislation along with bodies such as the Thames Angling Preservation Society. By the 1860s it had become a conventional fishing club providing fishing for its members, and it still flourishes today. Although members originally fished for all sorts of fish (the Society's crest still represents the head of a pike), the Society now concentrates on fishing for brown trout and grayling on its chalk streams in Hampshire and Wiltshire, including the Wylye, the Test, the Itchen and the Hampshire Avon with upstream dry fly or unweighted nymph imitations dressed lightly in the style of G.E.M. Skues.

The Society is more than just a fishing club. It has at its core three key objectives. First, to maintain a fellowship of flyfishers and the tradition of flyfishing, where possible, for wild or 'naturalised' brown trout and grayling. Secondly, to preserve what remains of the chalk stream environment; unpolluted water, healthy and appropriate weed growth and good fly hatches. Thirdly, to enhance the Society's libraries and archives.

Whilst the Society continues to operate a number of its waters as wild catch-and-release fisheries with no stocking, supplementary stocking is carried out in some waters "to meet the needs of those anglers who might wish to take a fish home". Where stocking is carried out, it is done on a little-and-often basis with 'takeable' 1-2lb triploid brown trout being introduced to selected sites throughout the early spring and summer. One-year-old trout, often referred to as 'yearlings', of 6-8" (150 – 200mm) were, until recently, stocked in July each year.

Historically it was perceived that a large proportion of stocked yearlings quickly became 'naturalised' in the wild and that they made a significant contribution to the available trout resource for angling. A review of past journals would confirm this to have been the case..."The success of the Society's river management policies has resulted in many of its waters holding a good head of wild and 'naturalised' fish. These fish react in a more natural way than stocked fish, which frequently have difficulty in adjusting to a river environment and have shorter survival rates."

Armed with this post-war evidence, the Society continued to stock several sites, but subject to the keepers feeding the stocked fish in the river, thereby providing 'improved' fishing in the years that followed. Improvements in catches, most likely due to a flourishing wild trout population and the result of better informed management techniques and improvements to habitats for all life-stages, began to raise questions about the need for continued stocking of yearlings and feeding them in the river. By 2007, the practice of feeding fish in-river had become ever more popular and the impacts of large-scale feeding, not surprisingly, had begun to raise a few eyebrows, with questions being asked of the Environment Agency as to its legality and appropriateness, especially in rivers with SSSI (Sites of Special Scientific Interest) and SAC (Special Areas of Conservation) designations. The negative ecological impacts of adding nutrients and organic matter to the river system, accumulated with other point source and diffuse nutrients, was no doubt impacting on the river ecology, including wild salmonid production and the potential for increased exposure to predators caused by seasonal concentrations of fish and the so called 'feeding station syndrome'.

In 2008, in responding to these questions, the Environment Agency and Natural England clarified their position on in-river supplementary feeding of trout in the

Figure 1. **Yearlings present 3 months after stocking**

Site No	2008	2009	2010	2011
1	2	4	5	3
2	5	8	16	2
3	1	2	1	5
4	2	3	1	0
5	1	3	0	2
6	0	2	1	3
Mean	1.8	3.7	4.0	2.5

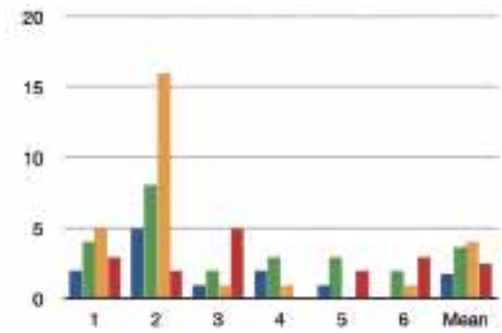
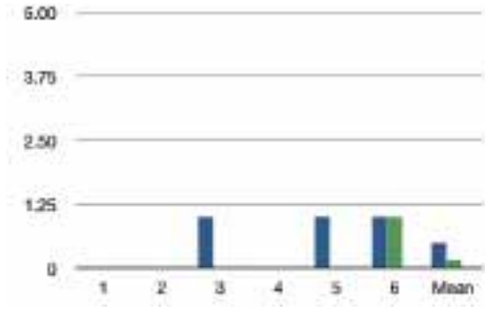


Figure 2. **Yearlings present 15 months after stocking**

Site No	2009	2010	2011
1	0	0	0
2	0	0	0
3	1	0	0
4	0	0	0
5	1	0	0
6	1	1	0
Mean	0.50	0.17	0.00




Damage caused by piscivorous bird


Secondary infection of bird wounds

Wessex and Hampshire areas including the Hampshire Avon, the River Test and River Itchen with the following statement: "Unless consent is granted, in-river feeding is an offence under Section 85 of the Water Resources Act 1991. This activity would currently not be granted consent by the Environment Agency. This position is supported by Natural England."

In 2008, in order to ensure we at least had some science-based evidence for future decision making, the Society undertook to review the yearling naturalisation process and assess the potential for yearling survival and/or displacement, without feeding, over a 3-year period (July 2008 - Oct 2011).

Our study began in 2008 with 300 hatchery-reared (triploid) yearlings being tattooed for identification, using Pan-Jet dye marks to the pectoral fins (2008 - left pectoral /2009 - right pectoral). Whilst this appeared to work well, during the second survey (2009) we noticed dye marks from yearlings marked the previous year were already beginning to fade. In 2010 we moved to using VIE (Visible Implant Elastomer) tags. The VIE tags, a rather more expensive method but quick and easy to insert with no ill effect and widely used for batch marking, had good retention rates (Summers, et al 2005) and were inserted under the skin on the belly of the fish with a different colour used for each year.

Stocking sites were assessed for their suitability in providing a best-case scenario for juvenile salmonid survival: medium-high gradient channels with plenty of in-river weed cover (*Ranunculus* spp.), marginal plants in abundance and a plentiful food supply (Riverfly AMI scores). Our stocking was only in small densities and with the best quality fish available. Each reach was stocked with 50 yearlings, with no feeding taking place for the duration of the study. Weed and water levels were managed by the Society's keepers along with the normal licensed control of piscivorous birds, as in previous years.

Results

Quantitative electric-fishing surveys (three-run, catch depletion methodology, with stop nets at each end) were carried out in October, three months after stocking, and thereafter at 12-month intervals. The results, shown in Figures 1 and 2, reveal zero to 32% of a total of 50 stocked yearlings remained at each site after 3 months (July to October) in each year surveyed. Zero to 0.5% remained after 15 months. No yearlings were present at any of the survey sites after 27 and/or 39 months of sampling. Of a total of 1200 yearlings stocked, only 72 were still present after three months (6%) and just two were still present after 15 months (0.16%).

Of those yearlings captured, a large proportion was observed to be in a poor condition and was of a lower weight when compared to wild fish of a similar length. Several yearlings exhibited predator (possibly cormorant or heron) damage and/or secondary infection

Conclusions

As we are all too aware, cormorant activity has increased significantly in recent years and evidence from several sources would suggest that stocked trout are far more vulnerable to predation than wild trout.

But then this should not really come as a surprise, especially when one observes these stocked fish in the wild. A stocked fish, a product of domestication through generations of line-selected breeding and grown in a hatchery environment, is somewhat handicapped by the fact that it seems completely oblivious to predators and doesn't understand the concept of 'taking cover' when predators are active. From my own observations the stocked yearling feeds, or should I say tries to feed, much as it did in a hatchery, at any time of the day and then seemingly with a low energy intake at a high metabolic cost. Again this behaviour has been well documented by others: "Hatchery brown trout, introduced for experimental purposes, fed less, moved more, and used cost-minimising features of the substrate less than wild trout. It is postulated that high-energy cost is a major cause of mortalilty among hatchery-reared brown trout stocked in streams, that at high population densities foraging sites are limiting factors, and that growth rate and drift of feeding salmonids is density dependant" (Bachman 1984).

Even our limited study has revealed sufficient evidence to suggest the naturalisation of stocked trout yearlings without in-river feeding is highly questionable and provides a very poor return. The specific cause of such significant losses being most likely due to a number of factors ranging from an increase in intra-specific and inter-specific competition leading to starvation and/or migration, high levels of predation and/or physical damage and disease or a combination of all of these.

All things considered, it is also possible the naturalisation of larger, takeable-size stocked fish is questionable and that is maybe something we will look at in more detail in future. In the meantime, we will continue to evaluate our stocking policies and strive to identify and improve upon any restrictions that may be limiting natural production of wild trout in all our waters. Where we do feel there is a need to stock, we will no longer stock with yearlings but introduce only non-breeding trout (all-female triploids) of an appropriate size (1-2lb).

And so it is, with a friendly nod to the past, the Society continues to maintain a fellowship of fly fishers and the tradition of flyfishing, where possible, for wild brown trout and grayling.

References:

Bachman, R. A. 1984. Foraging behaviour of free-ranging wild and hatchery brown trout in a stream. Transactions of the American Fisheries Society 113: 1-32.

Summers, D.W, Roberts, D.E, Giles, N, and Stubbing, D.N. 2005. Retention of visible implant and visible implant Elastomer tags in brown trout in an English chalk stream. Journal of Fish Biology (2006) 68, 622–627.