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Fisheries Action Plans – a new approach to public consultation and the impetus for habitat enhancement works in the upper Thames catchment (England)

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ABSTRACT: In implementing its duty to maintain, improve and develop freshwater fisheries, The Environment Agency For England And Wales ("The Agency") has produced catchment-wide FAPs (Fisheries Action Plans). These plans are aimed at increasing public involvement, decision-making and ownership in the activities of The Agency and were developed through consultation. Two, of a total number of three, plans in the upper area of the River Thames catchment (England) have been completed. In the two sub-catchments, the public voted overwhelmingly that poor habitat quality was one of the major issues threatening the viability of fish populations and suggested that this is where the Agency should focus its attention. For over a thousand years the upper River Thames and its tributaries have been managed for the purposes of agriculture, irrigation, milling and navigation and some reaches are heavily impounded, braided and often have artificial banks. In addition, past flood defence activities aimed at protecting agricultural land have left many channels over-widened and deeply incised. The low fish biomass in many of these reaches is a reflection of the degraded habitat. Many previously dredged reaches are now in mid-successional stages and are uncharacteristic of natural channels: silt may have replaced gravels as the bed material and the profile is often over-deep and trapezoidal in form. In response to the consultation exercise, the Agency chose to develop a strategic approach to habitat enhancements that would lead to improvements in all the major upper tributaries of the River Thames. These, it is hoped, will exemplify suitable techniques and will act as a catalyst for future works. The majority of the proposed works involve bed-raising (using gravel), the formation of multi-stage channels and the creation of refugia for fish fry.

KEYWORDS: River Thames; Public involvement; Habitat enhancement; Fisheries Action Plan; Enhanced fish communities.

Introduction

The consultation process

In England and Wales the Environment Agency is charged, through legislation, with the duty to maintain improve and develop salmon and freshwater fisheries under the Salmon and Freshwater Fisheries Act and latterly the Environment Act. The Environment Act also makes it incumbent upon The Agency, in fulfilling this duty, to form and consult with groups of people who have interests in fisheries. These 'advisory groups' have been named RFERACs (Regional Fisheries Ecology and Recreation Advisory Committees). The RFERACs give their collective opinion on issues of regional and national importance and, in doing so, influence The Agency in terms of work load identification, delivery and priority planning. The groups are usually formed from community mem-

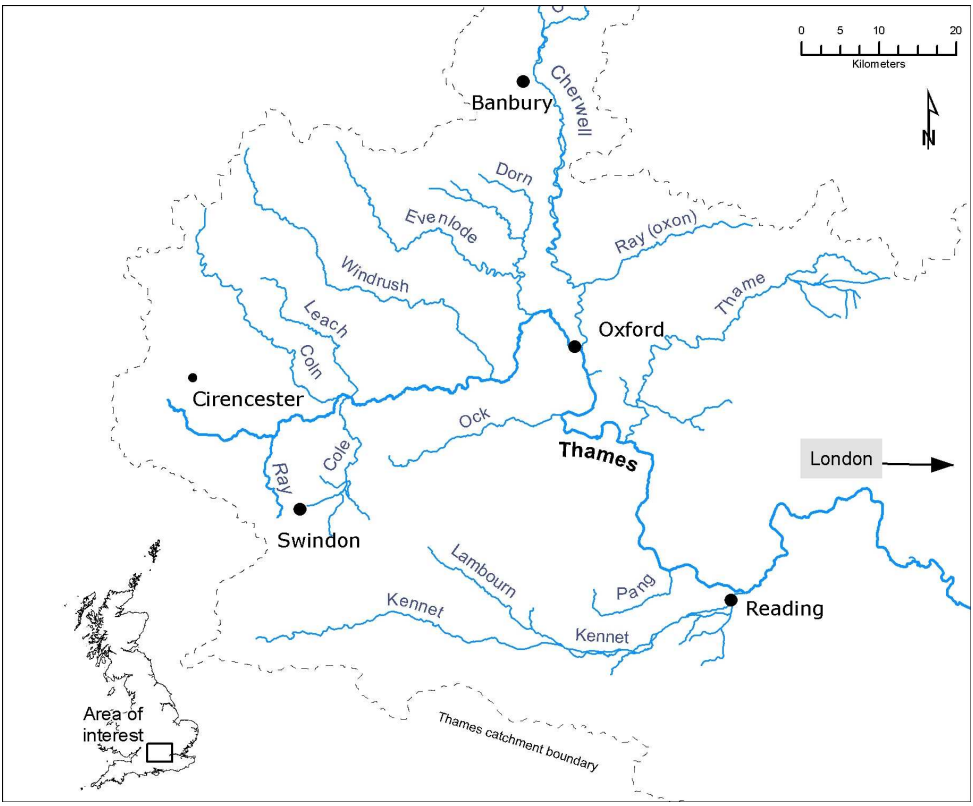

Figure 1: A map of the upper River Thames and its major tributaries

bers who have interests in angling, boating and wildlife conservation; meetings are held on a quarterly basis and are chaired by a senior member of The Agency management structure.

Whilst the RFERACs perform an essential role in influencing The Agency's activities strategically, the committee reporting on a recent review of salmon and freshwater fisheries policy and legislation in England and Wales felt that there was too little consultation with fisheries interests over specific operational activities at the local level.

The Environment Agency is now required to establish only 'such local advisory committees as it considers necessary to represent fisheries interests' and it has moved away from the formal local committee structure that existed in many regions (1). However, consultation at a local level continues to take place less formally through the 'angling consultative' groups, the majority of which are angling club members. Environment Agency staff attend such group meetings throughout the year and discuss local issues and work plans. It is expected that the views of the angling consultative will reflect those of the wider angling community in any locality. However, attendance at most consultative meetings has declined to just a handful of individuals and it is questionable as to whether it can be said that these groups are sufficiently in touch with the wider angling community as to be able to reflect its views. The reasons for this pattern of events are difficult to identify but it is clear that they are linked with socio-economic

changes, and in particular, the general increase in affluence of society and decrease in available leisure time.

The angling club movement was once prolific (Fig.2) and large clubs provided fertile recruitment grounds for consultative groups and an easy point of contact for the exchange of information with organisations like The Agency. Club membership was important to the post-war era of anglers when the standard of living was much lower and environmental conditions were poorer. Clubs often provided members with a means of transport, they opened up access to angling by collectively paying rents to landowners, and would lobby hard on issues affecting angling such as pollution and poor water quality.

Many anglers now are not affiliated to a club. This is evidenced by the decline in membership of some of England's largest clubs over recent half century (Fig 2). It can be argued that the need for clubs has diminished; the majority of anglers have access to cars (2) and the aquatic environment, in terms of biological and chemical water quality shows continual improvement (3) – consequently, the need for active pressure groups is less obvious. In addition, angling opportunities are increasingly available and anglers no longer need to join clubs to access fishing venues; this is largely due to the high demand for, and the proliferation of, small densely stocked still water fisheries that can be fished on a day permit (4).

Fig. 2. The change in number of members affiliated to some of the larger angling associations in England over the past half century (figures in brackets are approximate to the nearest thousand).

Year and number of members ( ) by decade					
Angling Association Name	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Birmingham Anglers Association	-	1976 (63,000)	-	-	2004 (11,000)
Reading and District Angling Association	-	-	-	1994 (7,000)	2004 (3,000)
York and District Amalgamation of Anglers	-	-	1988 (4,500)	-	2004 (1,200)
London Anglers Association	1963 (48,000)	-	-	-	2004 (2,000)

Improved consultation through Fisheries Action Plans

In recognition of potential problems with consultation at the local level, the Legislative Review group recommended that The Agency should produce FAPs in consultation with a group of local stakeholders. It was anticipated and would provide interests with a more structured mechanism for influencing activities affecting fisheries, and the wider environment, at a local level.

In 2000, five catchments were chosen from across England and Wales for the development of the first 'pilot' FAPs. The group members were asked firstly to identify problem issues that they felt were present in the catchment and secondly to suggest realistically achievable actions to resolve them, which would form part of the work-plan of The Agency and partners over the coming three to five years. The Agency made a commitment to focus its resources and activities on those actions which it, along with the group, felt were of highest priority.

Two FAPs have now been completed in the upper Thames catchment, one on the River Kennet and one on the River Cherwell (Fig.1). In both plans, stakeholders were asked to identify the top five issues. In both cases, water resources, water quality, alien invasive species (crayfish) and predators – namely increasing cormorant predation - were identified in the top five but the issue on which members felt most passionate was habitat degradation.

The major causes of river habitat degradation in the upper Thames catchment

The practice of large-scale channelisation was brought to Britain by the Roman invaders, though the earliest record is a document from King Edward The Confessor in 1065 (5)(6). As elsewhere, the main reasons have been for navigation, flood alleviation and agricultural development, through irrigation and drainage schemes. In the eighteenth and nineteenth centuries, the harnessing of water power for mills and the creation of improved navigable channels, and later formal canals, laid the foundations for the Industrial Revolution (7). Channelisation works generally involve embanking, channel enlargement (by widening and/or deepening), straightening to remove meanders, or lining the bed and/or banks with concrete. Backwaters are cut off and filled in for agricultural use, and the channel becomes isolated from its floodplain. The result is a fast-flowing watercourse, in an over-deep, over-wide, trapezoidal channel with steep banks (6)(8)(9). In the whole River Thames catchment, it has been estimated that over 90% of watercourse length has been modified (10). A typical example of channelisation works in operation is shown in Figure 3.

Figure 3: Channelisation works on Cuttle Brook
(a tributary of the River Ray, Oxfordshire)

Although rivers had been channelised for navigation for centuries, the period 1760 to 1840 saw the construction of canals and most commercial traffic used these new systems for transportation. This did not leave the natural watercourses unaffected, however: channelisation of rivers continued, to provide water for the canals, and under the British Waterways Enabling Act 1793, there was no restriction on the amount of water that could be taken by canals. Similar systems were also used to irrigate agricultural land (6)(7)(11).

However, it is land drainage that has been the major cause of river channelisation in Britain. Agricultural drainage has been carried out in Britain for over 550 years, though perhaps the most notable landmark is the Land Drainage Act of 1861 which, for the first time, formally permitted the maintenance and improvement of existing drainage works and the construction of new projects (6). Throughout the late nineteenth and twentieth centuries, various more Land Drainage Acts and Water Acts created and changed the water authorities responsible for agricultural drainage and flood relief and introduced grants from central government. Although rivers had been straightened and deepened for centuries, many British lowland rivers were channelised in the first half of the twentieth century, especially after the outbreak of the Second World War. Parliament empowered the drainage authorities to carry out extensive works and the government provided grants to cover 50% of the costs. The main reason was to increase agricultural production by extending the length of the grazing season or by bringing more land into arable production (6)(7)(8). Another reason in the Thames catchment (and elsewhere), however, was the establishment of many airbases with huge impermeable areas, leading to increased runoff. In many cases, local watercourses were not of adequate capacity and therefore had to be widened and deepened (12).

Stock (12) has documented some remarkable engineering works in the Thames catchment in the Second World War and early post-war periods. Prior to the war, only a few excavators were needed, as most of the work was still done by hand. However, with the wartime pressures and the need for more substantial clearance of river channels, the number of excavators rose from three (1937), to five (1940) and then to sixty-five (1945). The number of men employed rose from 168 at the start of the war to 838 by its end. The increase in the amount of material removed from river banks and beds each year is also remarkable: 40,500m^3 in 1937 and 765,000m^3 in 1944. A typical example of channel works took place on the River Cherwell, starting in June 1942. The works, designed to reduce flooding, involved a 5km stretch of river. In places, the bed was lowered by 1.7m and widened by 7.6m to give uniform width of 19.8m at normal water level. At the same time, some 38km of the River Ray was deepened by 1.4m and widened by 7.6m to give a uniform width of 15.4m. Some 80,000m^3 and 176,000m^3 of material was excavated from the Cherwell and Ray respectively and placed on top of the banks as additional protection against flooding (12).

The extensive flooding of March 1947 in the Thames catchment provided a general justification for the dredging and river clearance for the following forty years. However, during that time there was a gradual change in attitude (7). For example, under pressure from local anglers, in 1950 the Thames Conservancy (a predecessor of the Environment Agency) agreed to change their working practices on the River Windrush (and presumably other watercourses) to ensure that spawning redds were not disturbed and that some marginal plants were left in place. However, it is clear that all ecological concerns were still very much subsidiary to the main aim of drainage (13).

The period 1975-85 can be seen as a time when concerns for the environment became more widespread and conservationists became more organised and political. During the same period, the government halved the annual grants for drainage to £30million. Proposals in 1984 to drain Otmoor by further channel works in the River Cherwell were so opposed by local residents that the scheme was dropped. Concerns for the losses of Sites of Special Scientific Interests led, in part, to the enactment of the Wildlife And Countryside Act 1981, which required that water- and drainage authorities had to further the conservation of wildlife and landscape when carrying out their water management functions (7). The protection of water habitats was strengthened in 1989 by the formation of the National Rivers Authority (the direct predecessor of the Environment Agency), who had a clear duty of aquatic habitat conservation and protection in its flood defence and land drainage roles. These duties were also included in the remit of the Environment Agency and remain to the present day (8)(10).

The impact of channelisation on fish stocks in the upper Thames

Fish have evolved to survive in physically diverse systems and their habitat requirements vary with seasonality and ontogenetic development (9). Furthermore, habitat diversity is essential to enable fish to migrate, recruit and attain sufficient food and refuge; community stability will be altered and fish diversity, abundance and biomass limited where the variety of physical habitat and flow are also limited (6)(14)(15)(8)(16).

Human activities in riverine systems have had major negative effects on fish for many decades (17). Channelisation increases in-stream homogeneity by bringing about a reduction in habitat diversity, since it can remove or reduce sinuosity, pool-riffle sequences, substrate, backwaters, riparian vegetation and floodplain connectivity, as well as the variation in channel velocity, depth and river bank, all of which are habitat variables important to fish, macrophytes and invertebrates (18)(17)(14). In addition, channel-length is shortened by the removal of meanders, thereby further reducing available habitat (6). This all, in turn, leads to a reduction of the fish biomass (9). The effects of river channelisation on fish communities are apparent almost immediately after construction (6)(19). Anthropogenic disturbances affect fish species unevenly, however: specialist fish species (i.e. those that are adapted to a very specific habitat) are more likely to decline in numbers compared to generalist species, that can tolerate a variety of habitats (20). Furthermore, the recovery of fish communities following channelisation may vary from 5 to 52 years or longer depending on the magnitude of channel works, post-works maintenance and effectiveness of mitigation efforts (14). It is therefore clear that channelisation of watercourses has a major, and long-term, negative impact on fish stocks.

With the exception of the River Ray, the upper River Thames and the major tributaries which join it drain porous lime or chalk geology for much of their length and are chiefly groundwater fed, responding relatively slowly to precipitation. In their natural state, and with evidence from existing semi-natural reaches, it is expected that these relatively productive and chiefly lowland river systems would have been diverse and exhibited wide habitat heterogeneity. A typical river section would be expected to include pool-riffle sequences, areas of deep and shallow water, backwaters and other areas of slack water, varying substrates, steep or shallow banks and meanders, which themselves create areas of fast and slow-flowing water. The extant channels are often over deep which keeps the river in-channel, even during high flows and encourages fry washout and lack of floodplain connectivity – both of which are known to affect fish recruit-

ment (21)(22). These impacts are borne out in recent fisheries surveys which have shown that there is a marked absence of juvenile fish in many of the Upper Thames rivers; indeed, the communities are dominated by few, very large fish.

Other river sections are over-widened, a problem exacerbated by low summer flows as a result of increased needs for public water supply, urbanisation and land drainage schemes. This encourages weed encroachment and siltation of important gravel shoals which, again, is likely to affect recruitment of lithophilous species of fish. Many river reaches are going through secondary succession processes and river channels are re-narrowing to form their own sustainable width, but where this has happened, the hard gravel bed material is often absent.

Though the expectation is that channels not contained by 'hard' engineering or maintained regularly would recover naturally, evidence from the upper Thames rivers suggests that this is likely to take centuries rather than decades. The majority of the potential enhancement opportunities in the upper Thames rivers are simply speeding this process and are aimed at increasing floodplain connectivity through the creation of backwaters, re-introduction of gravel substrate, channel narrowing and shallowing. Other opportunities lie in removing or mitigating for 'hard' engineering structures, such as weirs and shoring, which prevent natural recovery processes from taking place. Key to the aims of enhancement works overall though are to achieve a return to the habitat complexity that once existed in the rivers and has now been lost.

The Upper Thames Enhancement Strategy

The Kennet and Cherwell FAP groups independently asked The Agency to perform a strategic review of habitat enhancement opportunities which would be developed subject to the availability of funds and landowner consent. Through further consultation, and recognition that these same issues applied to all rivers locally, The Agency took this idea further and decided to apply this approach to the whole catchment and in doing so initiated the Upper Thames Habitat Enhancement Strategy.

Local people who had knowledge of the area were asked to identify sites in need of enhancement, this was added to by the knowledge of Agency staff, many of whom had been working on the rivers locally for many years. A long-list of sites was drawn up and feasibility studies were undertaken for these in a prioritised order – the prioritisation being on a cost-benefit basis. Feasibility work included consideration of increased flood risk to housing and land, planning concerns, water resource requirements, scheme costs, maintenance requirements and, perhaps more importantly, landowner cooperation. Any of these factors could limit the acceptability of any individual scheme and many have been moderated or changed by the results of the feasibility studies. The cost of each of these schemes ranges from £10k to £250k, only a small proportion of which can be provided by The Agency. The difficulty will be in finding the funds to undertake the work. A key part of the 'enhancement strategy' will be to develop a separate funding strategy and publicity material which can be used to attract investment. The investment is expected to come from a variety of sources, some from national sources (Aggregates Levy, National Lottery Fund) and others from local investors such as angling clubs, landowners and businesses who might be encouraged to invest in local reaches. It is anticipated that funding should be easier to acquire if all enhancement projects are tied together in the form of a strategy of this kind – the project as a whole will be open to investment from more funding streams because delivery will be broader and local in-

vestors, it is hoped, will be more inclined to contribute to a larger, higher profile scheme.

To date, approximately twenty schemes have been identified and have passed through the feasibility process, we expect to add another ten or so sites to this before the five year plan is finalised. At this point, publicity material will be developed to map out the location and development plans. The content will be targeted to attract major national and local funding sources and the final success of the scheme will be far more dependent on the quality of the marketing, promotional and sales material than on the ecology underpinning the need for the work. However, the results of the consultation exercise suggest that society wants riverine improvements and public backing is the essential first step.

Conclusions

Fisheries Action Plans are being developed across England and Wales to increase public involvement, decision-making and ownership in the activities of The Agency.

Two such plans have been developed in sub-catchments of the upper River Thames (England) and in both cases habitat enhancements were identified as being of the highest priority for future action. In response to this consultation process, The Agency has developed a river habitat enhancement strategy to improve river habitats. The public consultation exercise and production of the Fishery Action Plans have been instrumental in identifying issues, prioritising resources and attaining funding and support from partner organisations for habitat enhancement works.

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