NRA-Fisheries 8

THE RIBBLE FISHERIES MANAGEMENT PLAN

A Consultation Document
produced by
the National Rivers Authority

July 1992

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FOREWORD

by Tom Barnes, OBE

Chairman, Regional Fisheries Advisory Committee

I was delighted to be invited to write the foreword to what is, in some ways, an historic document, heralding a revised and more comprehensive approach to fisheries management on the River Ribble.

It is no secret that there has been a decline recently in catches from Ribble fisheries. However, dealing piecemeal with individual problems is not a satisfactory approach and the Ribble Fisheries Management Plan is an attempt to establish a more comprehensive and cohesive strategy. I am convinced that this is essential for the proper management of all major fisheries and I fully endorse the concept.

I would like to stress that this is a consultation document, seeking the views of anglers and other interested parties who, in my opinion, have an important role to play. Written comments are invited on any aspect, particularly objectives, targets and timescales. What would anglers, fishery owners and the public like to see done? How far should public consultation go? Most importantly, what assistance can the NRA expect from the public, anglers, owners and conservation bodies? If we are all to work together towards a common goal, a high degree of cooperation will be necessary.

I hope that this document will introduce a new era of collaboration between all those who wish to see a better system of communication and consultation leading to an improvement in Ribble fisheries.

Resource constraints may not allow all our aspirations to be realised at once. I would like to be able to say that similar River Management Plans could be developed and implemented concurrently, but this may not be practicable. However, the development of the Ribble Plan will be an excellent model for other rivers in due course.

In conclusion, I would like to congratulate Chris Mills and his team as the architects of this plan, and all those who have contributed to it in one way or another.

THE CENTRAL AREA FISHERIES TEAM

From left to right:

Andrew Blezzard (Bailiff), Grant Talbot (Technical Assistant), Len Idiens (Bailiff), Jim Jacques (Fish Farm Manager, Witcherwell), Ian Bentley (Bailiff), Mark Walsingham (Technical Officer), Brian Clarkson (Coxswain Bailiff), Chris Mills (Area Fisheries Manager), Steve Leech (Senior Bailiff), John Kidger (Area Fisheries Officer), Geoff Wharton (Bailiff), Melvyn Swindells (Fisheries Inspector), John Johnson (Bailiff), Rod Taylor (Fish Farm Manager, Leyland), Paul Glover (Bailiff), John Stone (Hatchery Assistant).

CONTENTS

1. INTRODUCTION

The National Rivers Authority (NRA) was established by the 1989 Water Act as a Non Departmental Public Body. It is a multifunctional organisation with statutory responsibilities not only for fisheries but also for water resources, pollution control, flood defence, recreation, conservation and navigation. The Authority consists of a Head Office and ten regional structures. Each NRA region is managed individually and each function within that region has its own management structure. In the case of NRA, North West, the Fisheries Function operates on an area basis, the Ribble catchment being the responsibility of the Central Area Fisheries Team.

The overall duty of the NRA's Fisheries Function is to maintain, improve and develop salmon, trout, freshwater and eel fisheries under its jurisdiction. More specific duties include:

- Making and maintaining fish passes and ensuring the safe passage of migratory fish.
- Regulating both commercial and recreational fisheries for salmon, trout, freshwater fish and eels by a system of licences.
- Controlling the movement and introduction of fish into natural waters.
- Regulating illegal fishing.
- Making byelaws for the general regulation, maintenance, improvement and development of fisheries.
- Managing specified sea fisheries.
- Playing a role in fish disease notification and control.

The NRA aims to provide a fisheries service to fulfil the objectives set out in its Corporate Plan which includes being responsive to the needs of anglers and fishery owners. In doing so, it seeks the views of fishermen and other river users at many levels. Regional Fisheries and Rivers Advisory Committees are consulted as to the manner in which the general duties outlined above are performed. The Area Fisheries Manager and his staff regularly participate in a wide range of liaison meetings, some of which are sponsored by the NRA, others by organisations such as the Ribble Fisheries Association and the Lancashire Fisheries Consultative Association. At grass roots level, each bailiff in the Central Area Team is allocated to a specific river beat. This system ensures that bailiffs are fully aware of what is happening on their "patch" and that fisheries staff remain in touch with the views of the river users.

The Ribble catchment is the largest and most diverse river system within NRA, North West's Central Area. The River Ribble and its tributaries support major recreational fisheries for both coarse and game fish, providing sport for thousands of anglers. Within the Ribble estuary there are commercial net fisheries for salmon and sea trout as well as sea fish such as mullet and bass.

A.T.R. Houghton in the introduction to his book "The Ribble Salmon Fisheries" traced the history of the river's salmon and sea trout fisheries from medieval times to the 1950's. During this time, the salmon fisheries of the Ribble were subjected to similar and far worse causes of deterioration than today. These included over-fishing, obstructions, pollution and abstraction. Indeed, pollution resulting from the Industrial Revolution decimated the Ribble salmon fishery and catches were almost non-existent during the period 1900 to 1930. Since then, stocks of migratory salmonids have increased very considerably and today controls regarding over-abstraction from the river and discharges into it are more stringent than ever before.

Despite these controls and the significant improvements in the river's water quality, during recent years anglers have voiced considerable concern regarding a perceived decline in both the salmonid and coarse fisheries. It is therefore timely that the NRA should produce a Fisheries Management Plan for the Ribble which will address these concerns.

The drawing up of this Ribble Fisheries Management Plan is a major new development in the process of informing and consulting River Ribble users. It is hoped that this plan and many of the initiatives outlined in it will provide, on an ongoing basis, both a source of information and forum for the development of all Ribble fisheries.

Just as the Ribble Way footpath leads the walker along the banks of the river, so the Ribble Fisheries Management Plan will provide a pathway through the complex issues which affect Ribble Fisheries from source to sea. In addition, the plan gives a simple, practical means of directing resources to improve and develop all the fisheries which exist within the Ribble Catchment.

The plan is designed to identify:-

i) The many issues which affect the fisheries on the River Ribble. These include pollution, declining catches, illegal exploitation, bird predation on fish stocks, water abstraction, tainting of fish flesh, conservation measures, fishing methods and controls to name but a few.

ii) What is being done to address these issues at present.

iii) Further goals.

iv) A strategy to enable these goals to be achieved over the next five years.

A large number of targets are set down in this plan. It is important that progress in achieving these targets is reviewed regularly. It is therefore proposed that at the end of each year, a progress report will be produced by the NRA.

The NRA has inherited a legacy of complex environmental problems on the River Ribble. Although the NRA is already working hard to address these problems, it will be many years before all the work needed can be assessed, funded and carried out. This plan cannot give all the answers but will provide the necessary framework to achieve long term success.

However, to achieve the objectives set out in this management plan requires not only the clear and strong direction of the NRA but also the help and support of all those concerned with the fisheries of the River Ribble.

There are many tasks within such a plan that the NRA alone has statutory obligations to perform and clearly these must be carried out to the best of its ability. However there are other initiatives which could be adopted and developed by riparian owners, associations, clubs and individual anglers as well as other members of the public. Many of these initiatives will be clearly identified within the document, however it is hoped that during consultation, interested parties will put forward their own ideas.

It is easy to understand why the fisheries of the River Ribble are of such importance to those groups of people who exploit them both for profit and recreation. However increasingly fish are becoming important to those who never exploit the stocks. This is because it is recognised that healthy fish stocks are clear and highly visible indicators of good environmental quality. Consequently, the Ribble Fisheries Management Plan is dedicated to the improvement of the aquatic environment, as well as the fish stocks that live within it.

2. STRATEGY

Although this is an issues driven plan, it is still necessary to have an overall strategy. Very many of the issues relating to the Ribble emanate from a reported decline in catches during recent years. As in many cases, catch data is the only means of assessing fish stock levels at present, it is vitally important that a representative and accurate picture of catches is obtained.

Stage 1: Obtain high quality catch data, wherever possible with a measure of fishing effort.

The assumption is made that reduced catches are due to lower stocks. However, in most instances, little is known about the exact relationship between catch, stock, fishing effort and environmental variables. Consequently it will be necessary to carry out intensive surveys of fish stocks.

Stage 2: Establish stock levels.

The stock assessment programme will reveal whether and where there are problems in terms of numbers of fish. If stock levels are found to be low, then it will be necessary to find out the reason why. The results from fish surveys may give valuable clues by giving information about the distribution, total numbers and numbers within particular life stages or year classes. However where stock levels are lower than expected it will also be necessary to:

Stage 3: Investigate the factors that may limit fish populations.

These factors include water quality, water quantity, competition, food supply, predation and exploitation. The issues relating to these factors are fully discussed in this plan.

If and when the cause of a fish stock decline can be identified, then a solution to that problem needs to be found.

Stage 4: Develop a programme of remedial measures to remove limiting factors and restore fish populations to their natural level.

Trying to solve any problems that might exist will be a high priority. However the NRA will continue to further its duties to maintain, improve and develop fisheries.

Stage 5: Implement the NRA's programme of fisheries developments and improvements.

This plan not only gives the NRA an opportunity to inform the General Public about its current and intended work programme on the River Ribble but also provides a forum for consultation with river users.

Stage 6: The NRA will consult widely regarding its proposed Ribble Fisheries Management Plan. It will also encourage participation in the implementation of this plan. At regular stages, information will be given as to progress made in achieving the targets set.

3. OBTAINING HIGH QUALITY CATCH DATA

The major issue regarding the Ribble concerns declining catches. During the last two years, anglers have expressed particular concern about the status of salmon, sea trout, wild brown trout, grayling and mixed coarse fish stocks. These concerns are based on poor catches and/or the absence of visible fish. In many cases the assumption is made that reduced catches are due to smaller stocks of fish being available.

At present, there is a lack of high quality catch data available. In the case of migratory salmonids, it has been recorded that as few as 10% of game fishermen submit a catch return and no catch data have been collected from coarse fishermen.

The NRA is committed to improving both the quantity and quality of catch data collected from the River Ribble. Although comparatively little is known about the exact relationship between catch and stock, at least for salmonids, catch statistics do give information about broad trends in population level. The NRA is carrying out research within its National Research & Development (R & D) Programme to gain greater understanding about the use of catch statistics and the factors affecting them, particularly fishing effort.

There are very considerable physical problems in sampling coarse fish populations inhabiting the large, deep reaches of the lower Ribble. Consequently in the shorter term, the collection and analysis of catch data will be vitally important to assess Ribble coarse fish stocks.

Actions taken in 1991:-

3.1 A total of 200 log books were issued to salmon and sea trout fishermen both to increase the number of catch returns and to improve the quality of data obtained.

3.2 A 100% catch return was obtained from commercial salmon drift netsmen fishing in the Ribble estuary detailing catches and effort.

3.3 Preliminary enquiries were made to coarse angling representatives as to the best method of obtaining catch data from the River Ribble coarse fishery.

Future Actions:-

3.4 A comprehensive review of the historical catch record for salmon and sea trout from the Rivers Ribble and Hodder will be carried out. A report will be produced by December 31st, 1992. Certain angling clubs have already contributed valuable data and others are invited to do so.

3.5 The log book scheme will be continued and expanded in 1992. Not only will the salmonid log book be distributed to more game fishermen but also a separate log book has been produced for coarse fishermen.

3.6 Collection of coarse fish catch data from the Lower Ribble will be initiated in 1992. As well as issuing log books to selected anglers, bailiffs will carry out a creel census on their beat twice a month during the open season. In addition, six match censuses will be carried out. It is hoped to hold one of these on the NRA's own fishery at Mitton.

3.7 Full monitoring of the Ribble salmon drift net fishery catch and surveillance of the bycatch of commercial sea fishermen's nets will be continued.

4. ESTABLISHING STOCK LEVELS

When catches are poor, anglers want to know whether this is caused by low stocks of fish or other factors. The NRA needs to find out much more about actual stock levels.

A good knowledge of fish stock levels is fundamental if the NRA is to maintain, improve and develop fisheries. Consequently the NRA is fully committed to assessing and monitoring fish populations to a nationally agreed standard throughout England and Wales. A national task group has been formed to set the necessary standards and targets. In NRA, North West's Central Area, a strategic stock assessment programme was initiated in 1991 which included electric fishing surveys, the use of electronic fish counters and redd counts. The aim of this programme is to provide comprehensive data about all fish stocks not only in the Ribble catchment but throughout the Region.

Although it is difficult to assess fish stocks in certain habitats such as large deep rivers, national research is being carried out to evaluate and develop new techniques such as hydroacoustics. In time it is hoped that such research will provide answers to the problems faced in monitoring coarse fish stocks under conditions such as those found in the lower Ribble.

Actions taken in 1991:-

4.1 A total of 51 fifty metre sites were electric fished in the River Ribble and its tributaries during the summer and autumn of 1991.

4.2 Three electronic fish counters at Winkley, Waddow and Locks weirs were continually operated throughout the 1991 season.

4.3 A comprehensive redd count survey of spawning streams was carried out during winter, 1991.

Future Actions:-

4.4 The new post of Technical Officer has been created to help plan and implement the stock assessment programme.

4.5 A comprehensive review of past electric fishing surveys in the Ribble catchment has been initiated. Where possible this will include comparisons with the 1991 survey. The results will be published in a report to be produced by the end of 1992.

4.6 A three year programme of strategic surveys will commence in 1992. During the course of this programme the entire Ribble catchment will be surveyed. However, in 1992, the survey will concentrate upon the coarse fish populations in the lower Ribble and the salmonid populations in the upper Ribble. It is envisaged that this survey programme will be ongoing; sites which were electric fished or netted in 1992 will be revisited in 1995.

4.7 The Waddow fish counter site will be rebuilt in 1992. In addition to the installation of new electronics, the structure will be completely refurbished and redesigned so as to allow video films to be taken of fish passing over the counter. This enables the accuracy of the counter to be validated. Above the counter channel, a trapping facility will be installed which could be used to determine the age composition and proportion of microtagged fish in the run. The trap will also allow an effective and less stressful means of collecting selected brood stock at the end of the angling season. This major capital project will enable an accurate assessment to be made of the numbers of migratory salmonids returning to the main spawning and nursery areas of the Ribble.

4.8 New Logie type counters will be installed at Locks Weir on the Ribble and at Winckley on the Hodder during 1992. These are the most advanced type of electronic fish counter and will improve the accuracy of these existing counter sites.

4.9 Experiments will be conducted to evaluate methods for surveying coarse fish populations in stretches of the lower Ribble during 1992.

5. FACTORS THAT MAY LIMIT FISH POPULATIONS

Clearly before there are data on the size of fish populations, it is hard to judge the extent to which factors such as water quality or exploitation affect particular fish stock levels. Nor will it be possible within the scope of this report to cover all the multifarious factors that can limit fish populations. Nevertheless there is much to be gained by discussing the issues relating to some of these factors and, where possible, the solutions to any known problems.

5.1 Water quality in the river

Pollution incidents and overall water quality are major concerns to both coarse and game anglers on the Ribble.

Monitoring water quality and the control of pollution is the responsibility of the NRA's Environmental Quality Function.

The history of pollution dating from the Industrial Revolution emphasises the need for high and consistent water quality to maintain good quality fisheries in the Ribble catchment.

The NRA defines the water quality of a river by a grading system from 1 to 4, based on chemical and biological indicators.

Description	Class	Current Potential Use
Good Quality	1a	Water of high quality suitable for potable supply abstractions; game or other high class fisheries; high amenity value.
	1b	Water of less high quality than Class 1a but usable for substantially the same purposes.
Fair Quality	2	Waters suitable for potable supply after advanced treatment; supporting reasonably good coarse fisheries; moderate amenity value.
Poor Quality	3	Waters which are polluted to an extent that fish are absent or only sporadically present; may be used as a low grade industrial abstraction; considerable potential for further use if cleaned up.
Bad Quality	4	Waters which are grossly polluted and are likely to cause nuisance.

The Ribble rises in a limestone area west of the Pennines, which produces water that is alkaline, has a high calcium content and is very clear. Overall, water quality in the River Ribble is good and improving. From the headwaters downstream as far as the junction with Stock Beck it is a Class 1a river.

From this confluence to Calder Foot the river is 1b. As a result of the influence of the River Calder, there is a further decrease in water quality to Class 2 from this junction downstream to the tidal limit.

The river has two major tributaries: the Hodder, which is Class 1a and slightly acidic and the Calder, which has a Class 3 water quality, as a result of both urban and industrial pollution.

Pollution in the Ribble catchment has occured both from point source inputs and from more diffuse sources. The former type of pollution can usually be traced back to its point of input and appropriate action taken. The sources of more diffuse pollution, such as agricultural run-off, are harder to trace and quantify. Remedial action for this type of pollution tends to be taken in the form of general campaigns, such as the farm campaigns highlighted later in this section.

The three main sources of pollution in the Ribble catchment are:

i) Industrial pollution

All major trade effluents in the Ribble catchment now drain to sewage works rather than directly into the river. However such an arrangement has not always prevented pollution occurring. In the 1980's, for example, major fish kills occurred on the Calder and Ribble due to spills of parachlorophenol which entered the watercourse via Hyndburn sewage works.

Today, industrial pollution most commonly occurs as a result of bad practice such as spillages on delivery or from non-bunded tanks.

The Ribble estuary receives one direct trade effluent discharge from the British Nuclear Fuels (BNFL) site at Springfield. This is discussed in section 5.2.

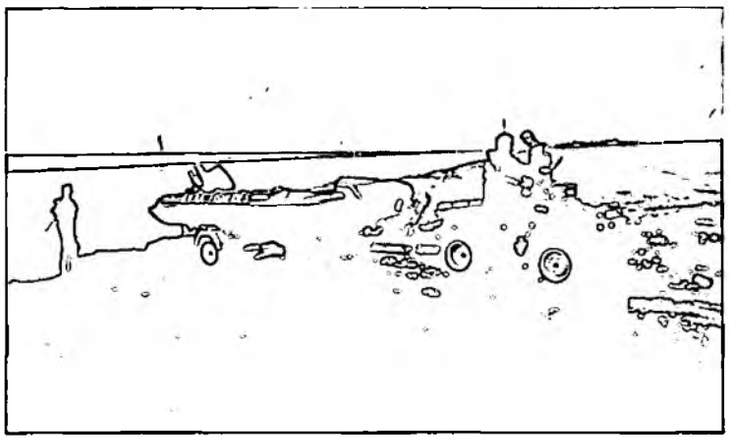
ii) Agricultural pollution

The National Farm Waste Pollution Risk Model clearly shows that the Ribble catchment is a very high risk area. During the 1970's and early 1980's an increase in dairy farming caused increases in both silage and slurry production. These had an adverse effect on water quality in many of the salmonid spawning becks of the middle Ribble and also resulted in a perceived deterioration of water quality in the main river attributed to an influx of agricultural nutrients.

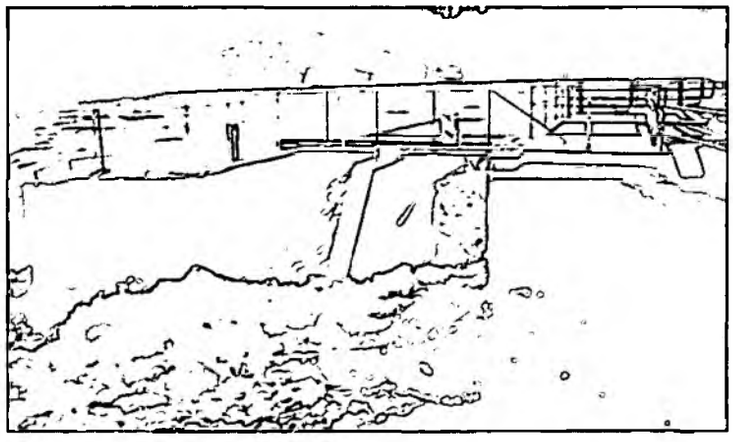
NRA Biologists have also discovered problems associated with pesticide pollution from sheep dips. These have a localised low-level effect on invertebrate populations but have never been shown to be responsible for fish mortalities in the Ribble catchment.

STOCK ASSESSMENT

HABITAT IMPROVEMENT



ESTUARY PATROL BOAT



FISH COUNTER AND TRAP

Herbicide pollution has not been identified as a problem on the Ribble.

iii) Domestic pollution

Problems exist in many of the urban areas of the Ribble catchment with pollution from domestic sources. The incorrect connection of waste water systems to surface drains instead of the foul sewer is a major source of pollution, particularly in the Calder catchment.

Localised problems also exist as a result of domestic sewage outfalls and out-dated sewerage systems.

The easiest way to examine the impact of these different types of pollution on the water quality of the catchment is to follow the river downstream from its source to the tidal limit and discuss each potential source of pollution as it is encountered.

In the upper Ribble catchment, above Stock Beck, there are localised water quality problems on some tributaries but these have no major impact on the main river. The most notable are the effects of quarry drainage and waste from old limeworks on Whit Beck, which result in this tributary attaining Class 4 status. Other more minor impacts are discharges from sewage works. The commissioning of a new sewage works at Horton should produce a localised improvement in water quality and a new sewage works at Hellifield is expected to help in the restoration of Pan Beck, a potentially important spawning tributary for salmon. Settle sewage works complies with the discharge consent relating to its operation which is particularly important because it has an input into the river above the Site of Special Scientific Interest (SSSI) at Long Preston Deeps.

The adverse effect on water quality seen at the junction of Stock Beck is attributable mainly to raised levels of ammonia generated by the discharge from Barnoldswick sewage works. This produces a high quality effluent but suffers from problems of low dilution in dry weather. Water quality in the Stock Beck catchment, along with that of many other tributaries in the middle reaches of the river, has also been periodically affected by agricultural pollution.

There has been some concern that the salmonid spawning and nursery areas in the middle Ribble are under-productive in terms of egg survival and smolt production. This perceived problem has been blamed on poor water quality in the spawning becks. A study was carried out on Swanside Beck, Stock Beck and Skirden Beck in 1988 using artificial redds to investigate egg survival. This showed that there were problems and that poor egg survival was probably related to water quality.

However, electric fishing surveys carried out in 1991 showed that the densities of salmon and trout parr in Swanside and Ings Beck were good. These improved fish populations are almost certainly due to a series of farm campaigns which were targeted at improving the water quality in these spawning areas.

There are further minor water quality problems at Clitheroe. There is a consented discharge into the Ribble from the Castle Cement works that has a visual impact on the river which often gives rise to complaints from anglers. A settlement lagoon, to be constructed at West Bradford bridge, will improve the surface quality from this discharge. The sewage works at Clitheroe produces high nitrate levels in the river due to trade effluent from the ICI works and this can produce localised problems at times of low river flows.

The River Hodder has no adverse effects on the water quality of the Ribble. The only tributary of the Hodder which has suffered from water quality problems is the River Loud. This river has suffered from agricultural pollution in the past, but a farm campaign in 1990 improved and stabilised the situation.

The main adverse effect on the quality of the Ribble is the influx of poor quality water from the Calder. In the past ten years, large areas in the Calder catchment have been provided with new sewerage systems and the historical problems related to storm overflows have been alleviated. The last major fish mortality as a result of flash storms and inadequate sewerage systems was in 1980 and killed fish in the Ribble as far downstream as Preston. The major industrial pollution problems which used to be associated with this tributary have also been largely eradicated but the river is still affected by urban drainage, sewage discharges and occasional industrial spillages.

Downstream of Calder Foot there is concern about farm effluent problems on some tributaries but there are no other major problems until the estuary is reached (Section 5.2).

Monitoring water quality is not the duty of the NRA Fisheries Function; However, Fisheries staff work closely with Pollution Control Officers to improve the water quality of fisheries and to protect and restore fish stocks if pollution should occur.

Actions taken in 1990/91:-

5.1.1 In 1990, three 'farm campaigns' were targeted at specific tributaries of the Ribble. These campaigns, called 'Farm Alarm Ribble', consisted of an initial assessment of the impact from agriculture on the water quality of the tributaries, followed by consultation with local farmers on both general and specific issues that required action. The farm campaigns targeted at Swanside Beck, Stock Beck and the River Loud have resulted in an overall improvement in water quality and have reduced the likelihood of future pollution incidents occurring.

5.1.2 North West Water plc have commissioned new sewage works at Horton and Hellifield which will be of localised benefit to the main river. The discharges from all of the sewage treatment works in the Ribble catchment are subject to closely monitored discharge consents issued by the NRA. Modern 'full treatment' sewage works are far more efficient than older designs and are particularly efficient in reducing the ammonia levels in discharges. The commissioning of more of these facilities by North West Water plc is being pursued by the NRA during discharge consent negotiations.

5.1.3 There were 27 prosecutions in 1991 relating to pollution events in the Ribble catchment. These resulted in 21 convictions as follows:

	Prosecutions	Convictions
Industrial pollution	10	8
Agricultural pollution	16	12
Domestic pollution	1	1
	27	21

6 cases were dealt with by formal caution or warning letter.

5.1.4 NRA Pollution Control Officers and Biologists maintain a strategic survey programme to monitor the environmental quality of the water at sites throughout the Ribble catchment. These data contribute to the water quality classification system outlined above. A comparison of this classification between 1985 and 1990 is summarised in the table below.

River	No. of sites sampled	Water Quality		
		Improved	Deteriorated	Unchanged
Ribble	17	6	4	7
Calder	45	10	2	33
Hodder	12	0	2	10
Darwen	22	2	2	18

Future Actions:-

5.1.5 Following the success of previous farm campaigns, an ongoing programme of farm inspections will cover all of the main rivers in NRA, North West's Central Area. This programme will include surveys in the middle reaches of the Ribble in 1992.

5.1.6 Inspection of domestic wrong connections of waste water drains to surface discharges is to be initiated in 1992 and will be aimed primarily at the Calder catchment. This rate is believed to be as high as 25% on some housing estates.

5.1.7 A rolling programme of industrial inspections will be carried out in 1992. This is aimed at minimising the input of pollutants into the water course from discharges of waste water into the surface drains.

5.1.8 Discussions are being pursued with North West Water plc over the new consent conditions for Hyndburn sewage works which discharges into the Calder catchment. The improvement in effluent quality from this site is to be achieved within the next two years and should result in an upgrading of the Calder from Class 3 to Class 2. This in turn should lead to an upgrading of the water quality of the main River Ribble below Calder Foot.

5.1.9 The statutory programme to monitor water quality will be continued by NRA Pollution Control Officers and Biologists. As problems are discovered, remedial action to improve the situation will be actively pursued.

5.1.10 In 1992, a rolling programme of fishery surveys will commence. Initially these will look at coarse fish populations in the Ribble below Hodder Foot and juvenile salmonid populations in the Ribble and its tributaries above Long Preston Beck. Further surveys and specific studies will be targeted at areas where it is felt that water quality may be affecting fish populations. One such study will be carried out on Swanside and Ings Becks during summer 1992. Hopefully, this will confirm that the marked improvement in fish populations found in these streams during 1991 has been maintained.

5.1.11 NRA bailiffs will continue to patrol the river on a regular basis. In addition to carrying out their enforcement duties, they are often the first to report pollution incidents and usually attend any daytime fish kill in the Ribble catchment within two hours of being notified.

Before moving onto water quality in the Ribble estuary, it is necessary to discuss two specific issues which are associated with water quality. The first of these is tainting.

A number of reports have been received from anglers, complaining that the flesh of salmon which they have caught from the Ribble had a flavour tainted with an oily, chemical or disinfectant taste.

The principal known causes of tainting in fish flesh are oils and phenols. Such tainting can occur at very low levels particularly with oils. For example, tainting has been found to occur when levels as low as just 1 to 5 microgrammes per litre (parts per thousand million) of oil have been present. Phenols only cause tainting when concentrations of 15 to 25 mg per litre (parts per million) are present in fish flesh. However parachlorophenols, a constituent of disinfectants, have been found to taint fish flesh at far lower concentrations, in the region of 0.045 mg per litre.

There have been no major oil pollution incidents recorded in the Ribble catchment and no discharges of oils into the catchment are consented. It seems unlikely, therefore that oils are a cause of tainting in fish flesh in the river, despite the very low levels required.

Levels of phenol measured in water samples taken from the Ribble and Calder catchments in 1991 had a maximum concentration of 0.039 mg per litre, well below the lowest concentrations that have been shown to cause tainting problems in fish.

There are no direct discharges of phenols or parachlorophenols into the Ribble. However there is a potential source of input of these substances from a chemical works at Oswaldtwistle. This works has an industrial discharge via Hyndburn sewage works. The sewage works outfall is closely monitored and no evidence of a discharge of these chemicals, at levels likely to cause tainting, has been found.

A complication at the Oswaldtwistle site, however, is the historical use of old mineworkings as a sump for chemical waste. This practice is no longer carried out, but contamination of groundwaters could still be occurring.

Especially close attention is paid to this area during water quality sampling.

Future Actions:-

5.1.12 NRA Pollution Control Officers now regularly monitor water samples from a number of locations on the Ribble and Calder for levels of phenols and parachlorophenols. If any significant levels of tainting substances are found, every effort will be made to trace them to source and to control their discharge.

5.1.13 Anglers who catch salmon or sea trout which they believe to be tainted should retain a sample of the flesh in a freezer and contact the NRA's Central Area Office, which will arrange for the sample to be collected and analysed.

5.1.14 NRA Fisheries staff are liaising with the Torry Research Station, Aberdeen, where complaints of fish tainting from throughout the U.K. have been investigated since 1935.

The second issue concerns *Cladophora* spp, commonly known as blanket weed.

During recent years anglers have expressed concern about the spread of blanket weed in the middle Ribble. This is commonly blamed on nutrients from agriculture entering the watercourse.

Cladophora spp, are green, filamentous algae that grow rapidly in low water conditions in the spring and early summer as light intensities increase and the water temperature exceeds 10°C. By early summer, vegetative growth is at a maximum but may slow down before a second rapid growth phase in the autumn. The upright parts of the plants then become detached, leaving the basal fragments attached to the rocks. These thick-walled filaments form the basis for the next year's growth.

The limestone that underlies much of the upper Ribble catchment, combined with the relatively shallow channel topography of the river produces ideal conditions for the growth of aquatic plants. Phosphate and nitrate levels which occur naturally in the river are quite sufficient for the growth of *Cladophora* spp, regardless of influxes from farm effluents, the leaching of fertilizers and the effluent from sewage treatment works.

Recent successive dry years have favoured *Cladophora* spp, as the dominant algal species in some areas of the river. Low water conditions favour the growth of *Cladophora* spp, whereas wet springs and higher river flows tends to result in *Ranunculus* spp, becoming the dominant plant.

In recent years, prolific growths of blanket weed in the Ribble have been linked to fish mortalities. These could be as a result of low levels of dissolved oxygen at night due to plant respiration, or high pH levels and increased ammonia toxicity, caused by the alga's rapid photosynthesis during the day.

Fish mortalities such as the incident at Sawley in the late spring of 1989 have drawn attention to this problem. This particular incident was linked to an increase in pH levels, to which trout stocked from more acidic waters without the opportunity to acclimate, are particularly susceptible.

Some anglers have also expressed concern that blanket weed may inhibit the passage of migratory salmonids and affect the survival of eggs and fry in spawning tributaries.

The algae are unsightly if extensive growths are present in a watercourse and can interfere with anglers' lines making fishing difficult.

Action taken to date:-

5.1.15 The occurrence of blanket weed in the Ribble is being monitored during regular patrols by NRA bailiffs. This will allow appropriate action to be taken quickly if the conditions in the river indicate that a fish kill might occur.

The spread of *Cladophora* spp, appear to be a result of natural climatic changes rather than nutrient influx into the watercourse. Farm campaigns, resulting in a decrease in agricultural pollution, may be of benefit in slowing the spread of this alga, but only a succession of wet springs and associated high flow rates in the river will result in a significant reduction in its distribution.

5.2 Water quality in the estuary

Poor water quality in the Ribble estuary is of concern to anglers because of the possible adverse effects on migratory salmonids, which pass through these waters on the way to and from the marine stage of their life cycle.

Downstream of the M6 motorway roadbridge, the Ribble estuary receives a significant level of pollution from a number of agricultural, industrial and domestic sources.

There is a considerable influx of domestic sewage pollution from combined sources in Preston. This results from the inability of the existing Preston sewerage system to cope with the increased population of the town. The storm sewage discharges into the river directly or through culverts and minor tributaries.

The sewage treatment works at Walton-le-Dale complies with the discharge consent requirement for the site and presents no major problems in terms of sewage discharges. The main Preston sewage treatment works, however, produces a continous settled sewage discharge. This has an adverse effect on water quality in the lower reaches of the river.

The River Darwen also affects water quality downstream of its confluence with the Ribble. This river flows through Blackburn and Darwen and is of Class 3 water quality, mainly as a result of sewage pollution. There is a crude sewage outfall at Fairhaven which serves Lytham St Annes and further small untreated sewage discharges at Freckleton Naze and Liggard Brook. All of these discharges contribute to an organic pollution load in the estuary.

In addition to these pollution inputs, many of the tributaries in the Lower Ribble are of a Class 3 or Class 4 water quality as a result of farm drainage.

The trade effluent discharge from the British Nuclear Fuels (BNFL) site at Springfield is a cause for concern to the public, because of the radioactive nature of this discharge. Discharges of radioactive waste into the environment may only be made by authorisation, granted under the Radioactive Substances Act, 1960. Her Majesty's Inspectorate of Pollution (HMIP) is responsible for implementing this Act. Nuclear sites have discharge consents which are issued and monitored jointly by HMIP and the Ministry of Agriculture, Fisheries and Food (MAFF). These consents specify limits for the level of discharge into the environment.

HMIP and MAFF monitor the effects of the BNFL Springfield discharge in the following ways:

i) Uranium levels are monitored in Deepdale Brook, a small Ribble tributary that flows through the BNFL site. Measurements are taken in the sediments and in the water of the brook.

ii) Gamma radiation levels, both in the sediments below the Ribble outfall and in the water column in the region of the outfall, are monitored and compared to expected levels from background activity.

iii) The uranium concentrations and gamma dose-rates in the estuary are monitored. The uranium concentrations have been found to be the same as background levels. Gamma dose-rates are raised compared to background values but fall within the levels specified in the discharge consent relating to the site.

iv) Monitoring of radioactivity levels is now being carried out in Preston where the river flows through areas of high population such as Lower Penwortham. Although this is upstream of the outfall, it is tidally influenced. The outfall site itself is remote and not frequented by the public.

v) HMIP have commissioned the University of Bangor to carry out a survey of radioactivity levels throughout the estuary.

vi) The MAFF Fisheries Research Laboratory at Lowestoft is responsible for monitoring radiation exposure through fish consumption pathways.

The NRA has no control over radioactive discharges, but non-radioactive substances are controlled by the NRA and discussions are being held to determine the discharge consent from this site.

Future Actions:-

5.2.1 An area drainage plan for Preston is currently under discussion with North West Water plc. The options for upgrading the Preston sewerage system are to be considered. Preston sewage treatment works is to be upgraded to full treatment capability by 1995/96. The Liggard Brook and Freckleton Naze sewage outfalls will be redirected through this new facility. Under the Fylde coast scheme, the raw sewage outfall at Fairhaven is also to be redirected through a full treatment sewage works by 1994/95.

5.2.2 Upgrading of the sewage treatment works discharging into the Douglas catchment is being pursued by the NRA during discharge consent negotiations with North West Water plc.

5.2.3 A series of farm campaigns is to be carried out by the NRA Pollution Control Function, with the aim of reducing the level of agricultural drainage into the Ribble estuary. These campaigns will follow the format of the farm campaigns highlighted in Section 5.1. The first of the campaign visits have already been made by Pollution Control field staff.

5.2.4 In a series of experiments carried out between 1980 and 1986, adult salmon were tracked through the Ribble estuary using acoustic tags. The results from this study suggested that at that time water quality conditions, particularly the levels of dissolved oxygen, were often not satisfactory for salmonid migration. Further studies are required to establish how successfully adult salmon are negotiating the estuary today. Poor water quality could also pose a problem to downstream migrating salmon and sea trout smolts. Despite the small size of these fish, acoustic tags have now been developed for smolts and their use is being evaluated in a joint NRA/MAFF research project on the Conwy estuary in Wales. If and when this equipment becomes available, high priority should be attached to the examination of salmon and sea trout smolt behaviour in the Ribble estuary.

5.3 Water quantity

Water quantity has become an issue on the Ribble and Hodder in recent years because of three consecutive dry summers. Records clearly show that during 1989-1991, rainfall throughout the Ribble catchment was below average in May, July, August and September when compared with the long term average, 1941-1970. This particularly affected the migratory salmonid fishery by retarding upstream migration and by reducing both fishing effort and catches. However total annual rainfall during these years was similar to the long term average, except in 1989 when it was about 20% below normal.

Water flows, both high and low, can affect fisheries in a number of other ways. Low flows, due to their limited powers of dilution, can lead to poor water quality. For example, the problem of high diurnal fluctuations in oxygen and pH associated with *Cladophora* growth (Section 5.1) only occurs under low flow conditions. Low flows can also physically limit the amount of habitat available to fish. Drought conditions on small spawning streams may dry out salmon and sea trout redds or dramatically reduce survival rates at the time when these fish have hatched and are beginning to feed.

Heavy rainfall can lead to surface run off containing high levels of pollutants, nutrients and suspended solids. The high flows that ensue may not only pollute but also cause siltation and deoxygenation within salmon and sea trout redds resulting in low egg survival. In extreme cases, redds may be washed out. Of course flooding is a natural process but changes in land use and drainage systems may have altered the pattern of flood events and their effects on fisheries during recent times.

The Water Resources Function of the NRA has a duty to conserve, redistribute and augment water resources and to ensure their proper use. This Function manages abstractions from surface and groundwaters by means of an abstraction licensing system and has Hydrometric Sections which monitor river flows by means of flow gauging stations. In carrying out these duties, the NRA is also required to take appropriate action to conserve and enhance the environment.

The major environmental concern regarding water resources in the Ribble catchment is that of low flows on the River Hodder.

A total of 49,343 megalitres of water was abstracted for public water supply from the Hodder catchment in 1991. Sixty-three percent of this water came from Stocks Reservoir which collects all the water from the upper Hodder watershed.

As laid down in the Fylde Water Board Act, 1925, a compensation flow from Stocks Reservoir is released down the Hodder every day: three million gallons per day from October to April, rising to four million gallons per day during the summer, from May until September. In addition, a water bank of 200 million gallons is available to be released at the NRA's request, up to a maximum of 16 million gallons per day.

The estimated mean daily flow down the Hodder is 608 megalitres/day, giving a total of 221,920 megalitres/year. A crude calculation shows that overall, flows in the Hodder are reduced by about 22% due to abstraction for public water supply. A similar calculation for the River Ribble, above its confluence with the Hodder, shows that only a fraction of a percent of the estimated mean daily flow is taken from the system by abstraction. The total level of abstraction from the Hodder is high and the NRA is addressing this issue.

Present Actions:-

5.3.1 The NRA Water Resources Function is enforcing total compliance with abstraction licences and compensation agreements by North West Water plc throughout the Ribble catchment.

5.3.2 NRA Water Resources, as part of its Low Flows Alleviation Programme, has identified that the Brennand and Whitendale rivers are areas where low flows are causing environmental problems. The NRA has appointed an independant consultant to examine the exact nature and scale of these problems and to produce recommendations for their solution.

5.3.3 An NRA national R & D project has been set up to look at the subject of ecologically acceptable flows. Various study sites have been selected throughout England and Wales, one of which is on the River Hodder.

5.3.4 The Water Resources Section in Central Area has recently gained agreement from North West Water plc to upgrade the existing floating weirs to automatically adjusted weirs at the Langden and Hareden water intakes. This will ensure more efficient regulation of water flows down the fish passes at these intakes and make it easier for migratory salmonids to gain access to spawning and nursery areas upstream of these points.

Future Actions:-

5.3.5 The NRA Fisheries Function needs to find out how the water bank releases from Stocks Reservoir can be best used to enhance the salmon and sea trout fishery on the Hodder. A study was carried out in the early 1970's to look at the effects of controlled water releases on fish movements through the Winckley Counter and angler catches throughout the river. The results from this work will be re-examined and if necessary further studies carried out to ascertain the optimum use of this water bank.

5.3.6 A strategic stock assessment survey will be carried out on the River Hodder in 1993. This will provide important information on fish stocks in an area where low flows are common.

5.3.7 More data are needed throughout the Ribble catchment on migratory salmonid movements in relation to river flows. The upgrading of the fish counters will enable more reliable fish counts to be made and in future these counts will be analysed in relation to flow data which can be provided by the Hydrometric Section. There are also plans for the Regional Fisheries Technical Team to purchase radio tracking equipment. If and when this equipment becomes available, salmon and sea trout could be trapped and tagged at Waddow Weir. These fish could then be radio tracked as they migrated upstream providing not only information on their behaviour in relation to flows but also estimates of both legal and illegal exploitation.

5.4 Exploitation

This section relates entirely to salmonids, as coarse fish are generally returned to the water after capture. Migratory salmonids from the River Ribble are exploited by commercial and recreational fisheries, both legally and illegally, throughout their adult life. Exploitation takes place on their sea feeding grounds, during their return to the natal river and on their spawning migration. In contrast, non-migratory species such as brown trout and grayling are mainly exploited by rod fishermen when they reach a "takeable size".

Anglers often express concern at the possible impact high seas fisheries may be having on the numbers of adult salmon returning to fresh water.

In 1983, the Convention for the Conservation of Salmon in the North Atlantic Ocean came into force. This Convention established a new international organisation, the North Atlantic Salmon Conservation Organisation (NASCO) which is responsible for contributing to the conservation, restoration, enhancement and management of salmon stocks in the Greenland and Faroes fisheries. A total of nine parties have ratified this convention. The United Kingdom are not members in their own right but are represented by the E.C. The NRA's Head of Fisheries inputs to the E.C. Group as a representative of England and Wales.

The two major high seas atlantic salmon fisheries are off the coasts of Greenland and the Faroes. The Greenland Fishery which uses drift nets is open from August through to October, whilst the Faroes Fishery utilising long lines operates during a winter season from November to April.

The quotas and catches for 1990 and 1991 are shown below, as are the quotas set for these fisheries in 1992. A 15% excess catch is allowable on the quota figures.

	1990	1991	1992
Faroes			
Quota	550 tonnes	550 tonnes	550 tonnes
Catch	312 tonnes	*81 tonnes	-
Greenland			
Quota	840 tonnes	840 tonnes	840 tonnes
Catch	227 tonnes	*440 tonnes	-

(* very provisional figures)

The fishermen in the Faroes have accepted a compensation payment relating to the quota figure, for a voluntary "tie-up" policy of no fishing in 1992. A 12 tonne catch for research purposes is expected in the 1992 season. A similar 12 tonne catch may still need to be added to the 1991 catch figure of 81 tonnes.

Future Actions:-

5.4.1 Screening for microtagged fish takes place in the high seas fisheries. Consequently NRA, North West through their microtagging programme can begin to evaluate the extent to which salmon stocked into the Ribble and Hodder are exploited in the Greenland and Faroes fisheries. The NRA will continue to monitor and assess the impact of high seas fisheries on homewater stocks and data regarding catches and quotas will be regularly updated and made available to interested parties.

Many game anglers are concerned about the possible level of exploitation by legal and illegal interceptory fisheries on salmon and sea trout returning to their natal river to spawn.

Almost certainly, some salmon returning to the north west coast of England will be exploited by the drift net fishery which operates off the north west and north coasts of Ireland. This is a legal fishery although a number of non licensed fishermen also fish illegally in this area. Reports of large "foreign" boats fishing up to 50 miles off the north coast of Ireland are unsubstantiated despite regular air and sea patrols carried out by the Irish navy. Likewise salmon returning from a more northerly direction could be exploited by any illegal net fisheries that might exist off the south west coast of Scotland. Again such exploitation has not been proven. Once salmon are much nearer to their river of origin they may enter into specific estuaries. Tagging studies have shown that such behaviour can result in salmon being exploited in the estuaries of river systems which they would not eventually enter to spawn. Thus an unknown number of salmon destined for the Ribble are very probably caught in estuarine net fisheries such as those operating on the Welsh Dee or Lune estuaries.

Sea trout do not travel nearly as far as salmon to find sea feeding grounds. Indeed the evidence that exists suggests limited coastal migrations. Thus sea trout are highly likely to be exploited by any nearby coastal fishery not only during their return migration to spawn but also during the sea feeding phase of their life cycle.

Some anglers have expressed concern that sea fishermen are illegally exploiting migratory salmonids that are in or around the Ribble estuary.

A legal sea fishery exists in the Ribble estuary, using drift nets mainly to catch mullet and bass. This fishery is primarily regulated by the North Western and North Wales Sea Fisheries Committee. However in the past, the NRA has prosecuted certain sea fishermen for taking migratory salmonids illegally. There have also been numerous instances when the NRA's Coxswain Bailiff on the Ribble estuary has recorded salmon and sea trout being caught and returned, often damaged, by sea fishermen. Under the 1986 Salmon Act, it became possible to introduce byelaws to try and prevent the illegal exploitation of migratory salmonids in estuarine and coastal areas. Such byelaws can only be made by joint agreement between the NRA and the relevant Sea Fisheries Committee. Negotiations between these two bodies in the North West region have recently been concluded with the introduction of new byelaws which allow only sea fishermen who have written authorisation from the Sea Fisheries Committee to fish within a strictly defined area of the Ribble estuary. The new byelaws also state that authorised nets must not interfere with the migration of salmon and sea trout and that if such fish are taken they should be put back into the sea as soon as possible and the nets reset immediately so as to avoid any recurrence. These measures will run for the next four years and will greatly aid the NRA to prevent illegal exploitation of, or interference with, the runs of migratory salmonids in the Ribble estuary.

Future Actions:-

5.4.2 The NRA operates a fully equipped patrol boat in the Ribble estuary. A total of 10 patrols was made in 1991 during which the sea fishery was monitored, though no offences were recorded. The number of boat patrols in 1992 will be increased to a minimum of 36, three times a week from the beginning of July to the end of September when runs of migratory salmonids are at their peak. In addition, regular patrols and observations will be made along the shore of the Ribble estuary and on the beaches north and south of it.

5.4.3 From 1992, two NRA Central Area bailiffs will be cross warranted and will have similar powers to those possessed by Sea Fisheries Officers.

As well as the sea fishery, the presence of a commercial fishery for migratory salmonids in the Ribble estuary, albeit legal, is seen as an actual or potential issue by some anglers.

The Ribble estuary is subject to a Net Limitation Order which allows a total of six drift net licences to be issued. These licences are reissued each year, normally to existing licence holders who have to prove that they were dependent on fishing for their livelihood during the previous year. Net Limitation Orders can last for a maximum of 10 years. The present Ribble Net Limitation Order expires in 1997.

The fishery operates within a defined area and is strictly regulated. The netting season is from the 1st April to the last day of August and fishing can only take place from 6 am on Monday until 6 am on Saturday. The size of the drift net used must not exceed 140 metres in length or be less than 82 mm knot to knot which precludes the capture of all but the largest sea trout. In 1991, the Ribble drift netsmen caught 206 salmon, one of the lowest totals on record (see Figure 1).

Future Actions:-

5.4.4 In the absence of any scientific evidence to suggest that this commercial fishery is having a detrimental effect on salmon stocks in the River Ribble, the Regional Fisheries Advisory Committee recently agreed to ask the Minister to renew the existing Net Limitation Order. The Order has been renewed for a further period of five years. By the time this Order expires it is hoped that sufficient information will be available from the NRA's strategic stock assessment programme to consider the impact of the Ribble drift net fishery on the Ribble and Hodder salmon stocks.

5.4.5 The Ribble salmon drift net fishery will continue to be strictly regulated. Regular patrols by sea and by shore will take place throughout the netting season (see 5.4.2).

5.4.6 The NRA's coxswain bailiff will continue to inspect as many fish as possible caught in this fishery. As well as recording the species and length of each fish examined, a scale example is removed for subsequent age analysis. Efforts will also be made to assess the numbers of microtagged fish caught in the fishery.

Once salmon have passed through the estuary and into the River Ribble they are still subject to exploitation both legally by rod fishermen and illegally by poachers. Some of the issues relating to the exploitation of fish stocks by rod fishermen are discussed in Section 7.

However the issue of illegal exploitation of salmonid stocks within freshwater is of universal concern to game fishermen and will be dealt with here.

The NRA is responsible for preventing the illegal exploitation of fish in inland waters. During recent years, poaching of valuable fish stocks such as salmon and sea trout has generally become more extensive and sophisticated. Consequently, the manpower requirements and costs to control it have increased accordingly. These costs are a heavy burden on the fisheries account of the NRA. Nevertheless, the NRA is committed to combating illegal fishing and NRA, North West have taken the lead in developing both national and regional strategies for the most efficient and effective deployment of bailiff forces. NRA bailiffs are highly trained and equipped with sophisticated communications and night surveillance equipment. Wherever necessary, NRA fisheries staff work in close collaboration with local police forces. NRA, North West has its own Legal Department which contributes to fishery prosecution cases.

Action in 1991:-

5.4.7 For the third summer in succession, there was below average rainfall during early and mid summer in 1991. Consequently, runs of migratory salmonids into the Ribble system appeared to be poor until flow conditions increased during mid September. As a result, in-river poaching activity was minimal and there were no poaching incidents reported to the NRA by the general public. Nevertheless regular NRA anti-poaching patrols were carried out from May onwards but no poaching incidents were detected.

Future Actions:-

5.4.8 Enforcement work will continue to be the major task of the bailiff force during the period June until December. A strategy has been developed for carrying out this work during 1992. At the end of each year, information regarding the numbers of poaching incidents detected, numbers of successful prosecutions and the manpower expended on anti-poaching duties will be made available.

5.4.9 Maximum use will be made of reserve bailiffs to support full time bailiffs in carrying out their enforcement duties.

5.4.10 A register for reporting illegal fishing activities will be set up at the NRA's Central Area Office. This will allow members of the public to inform the NRA, in strict confidence, about potential or actual poaching activities or the handling of fish under suspicious circumstances. Anglers or other river users should never attempt to involve themselves directly with poachers. They should telephone the NRA (0772 39882) if they see or hear anything suspicious.

5.5 Predation and Competition

As well as man, fish have a wide range of predators including mammals such as otters and mink, fish eating birds and of course other fish. On the Ribble, cormorant predation is a major issue that has received widespread publicity. In contrast, the possible effect of brown trout stocking on juvenile migratory salmonid stocks has instigated little if any attention from anglers. However, coarse fish are seen as competitors of game fish in the middle and upper sections of the Ribble and in certain cases, attempts have been made to remove them.

During 1991, cormorants became a major issue on the River Ribble. Many anglers believe that the number of these birds have increased considerably and that they are damaging fish stocks.

Cormorants, goosanders and red-breasted mergansers were all given legal protection under the Wildlife and Countryside Act, 1981. Any control measures relating to these birds have to be sanctioned by the Ministry of Agriculture, Fisheries and Food who can only issue licences to kill birds in cases where it can be demonstrated that serious and significant economic loss is being suffered by a fishery and where all other control measures have failed.

Under the 1989 Water Act, the NRA has duties both to maintain, improve and develop fisheries and to conserve wildlife. Consequently the NRA cannot support calls to control these bird species without scientific evidence that:

i) Fisheries are being harmed.
ii) Any control measures would not adversely effect the conservation status of these birds.

Whereas it is relatively straightforward to assess the past and present conservation status of fish eating bird species, demonstrating their impact on fish stocks is difficult and complex. Not least because of our lack of knowledge about the stock size of different fish species in the River Ribble.

During 1991, the NRA gave anglers an assurance that they would investigate the cormorant situation on the River Ribble. Experts were consulted and negotiations were initiated with the Wildfowl and Wetlands Trust.

Actions:-

Three separate studies are being progressed by the NRA, North West's Conservation Function in response to fishermen's concerns.

5.5.1 The Wildfowl and Wetlands Trust was contracted to prepare a report on the current status and distribution of cormorants, goosanders and mergansers in North West England. This report has been published and the main findings were:

i) There appear to have been significant long term increases in both the numbers and dispersion of both goosanders and mergansers from the early 1960's up to 1982. Since then populations have remained stable.

ii) In contrast, numbers of cormorants have been increasing in recent years. Overall since 1986, cormorant numbers have increased by 18% per annum.

iii) Cormorants also appear to be moving inland more. During February, up to 50% of the numbers counted were found at inland sites.

The other two studies are specific to the River Ribble.

5.5.2 The first is a twelve month survey of the cormorant population in the Ribble catchment to determine where these birds are feeding and in what numbers. The study commenced in February, 1992.

5.5.3 The second is to be a three year study carried out in conjunction with Sir John Moore's University of Liverpool. This will address whether cormorants are affecting fish stocks and/or fishermen's catches on the River Ribble. It is hoped that this research will commence in the autumn of 1992.

Hatchery reared brown trout could also be significant predators upon juvenile wild salmonids and coarse fish. A large number of angling clubs regularly stock hatchery reared brown trout of takeable size into their waters on the Ribble. Little is known about how these fish adapt to their new environment and in particular what they feed upon. The level of predation on other fish may be quite high particularly in heavily stocked waters. Consequently, an NRA national R & D project has been set up to investigate.

Actions:-

5.5.4 Data on the timing and numbers of hatchery reared trout stocked into the Ribble are readily available from Section 30 consents. These data will be collated and the likely impact of these stockings on resident fish populations will be assessed.

5.5.5 The Central Area's Technical Officer is the Project Leader for the National R & D project on the impact of stocked trout on wild fish populations. Significant results from this research will be fed back by way of management recommendations to Ribble fishing clubs and associations..

Another potential issue is the removal of coarse fish.

During the 1960's, large numbers of grayling were removed from the Hodder and more recently, chub have been removed from stretches of the middle Ribble. In both cases, the reason given for removing these species was that they were competing with salmonids for habitat and food. In most cases, the NRA does not have a remit to selectively manage waters for particular fish species, nor to take out fish from a water unless their removal can be justified on sound fisheries management grounds. Consequently, the NRA will not become involved in such exercises which are rightly the prerogative of the riparian owner as long as the relevant laws are complied with.

6. THE NRA'S PROGRAMME FOR FISHERIES IMPROVEMENT AND DEVELOPMENT

6.1 Fish restocking

Fish restocking has been widely employed throughout the British Isles in the belief that it would improve the quantity and quality of catches and have long term beneficial effects on fish populations.

However it is now recognised that there are potential risks as well as benefits associated with stocking.

These risks include:-

i) Changing the genetics of native fish populations.

ii) Causing competition and/or predation between stocked and wild fish.

iii) Introducing disease or parasites.

iv) The fact that stocking may not be successful if adverse environmental conditions exist.

There is therefore a need for more awareness of the possible consequences of stocking both in terms of its effects on wild fish populations and the likelihood of improvement to stocks. There is also a need for much greater planning and assessment of restocking programmes.

The NRA has two fish production facilities in Central Area. Leyland Fish Farm which produces riverine coarse fish and Witcherwell Fish Farm where salmon and sea trout fry and parr can be reared. Since 1988, there has been a joint restocking programme of salmon into the Ribble and Hodder by the NRA and the Ribble Fisheries Association. Most of the salmon parr released during this period were microtagged. In addition many angling clubs on the Ribble regularly restock with takeable brown trout. These fish are supplied by a variety of commercial fish farms. As yet, the NRA has not stocked any hatchery reared coarse fish into the Ribble, and angling clubs have only rarely applied to introduce coarse fish species into this river.

In future, the NRA will adopt a step by step approach to planning and assessing their stocking programme for the Ribble. Restocking, using native stocks where appropriate, will be closely linked to the results from stock assessment, environmental and water quality surveys. The first step in any restocking programme will be to establish whether the existing stock is below optimum size or whether the quality of the stock needs to be improved. If production is thought to be less than the potential of the system, then every effort will be made to find and remove the cause(s) of underproduction before restocking. Where restocking does occur, wherever possible its success will be evaluated.

Actions in 1991:-

6.1.1. A total of 239,500 six week old fed salmon fry was stocked out into tributaries of the Ribble and Hodder during the early summer of 1991.

6.1.2. Some experimental restockings were made into Ribble tributaries which do not contain salmon. These streams were electric fished at the end of the summer and survival rates of the stocked salmon ranged from 9 to 30% which is good when compared to results obtained elsewhere.

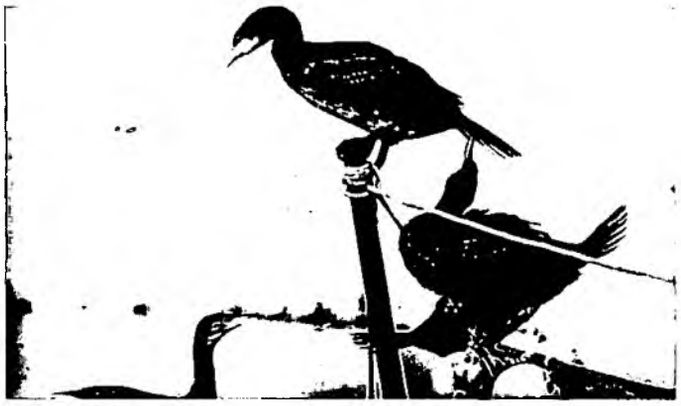
6.1.3. A total of 27,500 microtagged 0+ year old salmon parr was released into the Ribble and Hodder during October, 1991.

6.1.4. A new hatchery building was completed at Witcherwell. This facility will have the capacity to produce up to 50,000 sea trout and 250,000 salmon fry as well as 40,000 0+ year old salmon parr.

6.1.5. A major review of the role of Leyland Fish Farm was carried out. The future production will be chub, dace and barbel for restocking rivers. Priority will be given to restoring fish populations after pollution incidents and to rivers where significant improvements in water quality have taken place.

6.1.6. The NRA monitored and controlled the introduction of fish into the Ribble catchment as empowered by Section 30 of the Salmon and Freshwater Fisheries Act, 1975. In carrying out this duty, the NRA aims to prevent the transfer of disease, safeguard the genetic integrity of wild stocks and ensure that any fish introduced into the river are suitable as regards type and quantity.

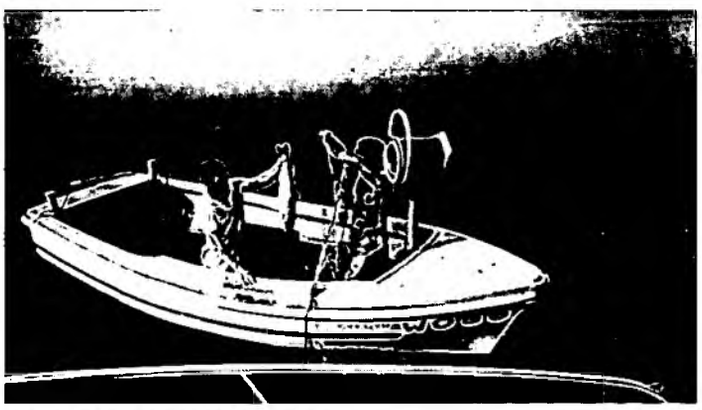
6.1.7. A total of seven microtagged adult salmon were recovered in 1991. These fish were released as parr in 1988 and 1989. Details of how to recognise fin clipped salmon were widely circulated to angling clubs during 1991. Anglers' co-operation in looking out for and reporting any microtagged fish is vital if the NRA is to evaluate fully the benefits of the restocking programme. A reward of £3 is offered for each confirmed report of a fin clipped/microtagged salmon with a further £3 paid if the tag itself is recovered.



(Photograph courtesy of R.S.P.B.)

CORMORANTS

REARING JUVENILE BARBEL



SALMON FISHING IN THE ESTUARY

SALMON BROODSTOCK WITCHERWELL HATCHERY

Future Actions:-

6.1.8. Very little is known about the restocking of coarse fish, particularly into large rivers such as the lower Ribble. To be consistent with the principles outlined above, no restocking of coarse fish will take place into the Ribble until stocks are shown to be low. In the meantime, information will be gathered and a strategy developed for a coarse fish restocking programme should this prove necessary.

6.1.9. The stocking out of salmon fed fry and autumn parr into the Ribble and Hodder is planned to continue each year for the next five years. From 1993, selected restocking of sea trout will also be carried out.

6.1.10. In 1992, for the first time, 10,000 1+ salmon presmolts were released into the Ribble and the Ribble Fisheries Association will contribute a further 10,000 1+ presmolts for stocking out in spring, 1994. Thus in 1991/92 and 1993/94 stocking of salmon fry, parr and smolts will have taken place. This exercise will help identify the relative success of stocking with different life stages.

6.1.11. A trapping facility will be built directly upstream of the fish counter at Waddow Weir during 1992. This trap will be an easier and more effective means of collecting salmon and sea trout broodstock than the present method of netting. The trap could also be used to evaluate the success of the restocking programme by monitoring the number of fin clipped, microtagged fish in the Ribble salmon run and for sampling sea trout as part of a National Sea Trout Management Plan.

6.1.12. A three year experiment to evaluate the effectiveness of different stocking strategies for brown trout will commence in 1992. This work will be carried out on the NRA's own fishery at Mitton using tagged hatchery reared fish. The results from this and other studies will be used to develop recommendations as to how, when and where to restock brown trout into a riverine environment. It is proposed that early in 1993, a one day seminar on this subject will be organised by the NRA, perhaps in conjunction with the North West Branch of the Institute of Fisheries Management. Representatives from all angling clubs presently restocking trout into the Ribble will be invited to attend.

6.1.13. The NRA has received requests to stock grayling into the Ribble. The view of one of Britain's foremost experts on grayling biology, Dr. Gardiner of the Scottish Office Agriculture and Fisheries Department, is that the genetic integrity of this well established stock should be preserved. Consequently, the NRA will not consent to the introduction of foreign stocks of grayling into the Ribble. Any future restocking programme would only be considered if progeny from native Ribble fish were stocked where surveys showed there to be both low stocks and a suitable habitat.

6.2 Habitat enhancement

Fish stocks can be enhanced not only by direct methods such as restocking but also indirectly by habitat enhancement. Generally, restocking has been the favoured method but increasingly it is recognised that habitat improvement can be an efficient, self-sustaining and cost effective means of increasing fish production.

The issue is how, when and where habitat enhancement should be carried out and when such indirect methods should be used.

There are many habitat enhancement methods. The most commonly used include the provision of fish passes, building in-river structures to create pools and holding areas, the creation and maintenance of spawning areas and the planting or clearing of bankside and/or aquatic vegetation. There has been little of this type of work carried out on the Ribble. The notable exception is the building of a fish pass at Stainforth Force, where for the small capital sum of £2,000, 30 km of main river and numerous spawning and nursery areas were made very much more accessible to both salmon and sea trout. Within the NRA's current National R & D programme, research is being carried out both to evaluate previous habitat enhancement projects and to identify and develop the most effective methods of carrying out such work. Results from these studies will become available over the next three years and will be adopted where applicable.

Actions in 1991:-

6.2.1. All partial or total barriers to the upstream migration of fish in the Ribble catchment have been identified.

6.2.2. A short guide to the construction and purpose of selected in-river structures has been produced.

Future Actions:-

6.2.3 The efficiency of Stainforth Force fish pass will be evaluated during the 1992 season. This will be achieved by visually counting ascending fish, recording the distribution and numbers of spawning redds above the falls and by monitoring the distribution and densities of juvenile salmon in the upper Ribble.

6.2.4 A fish pass development programme will be drawn up by April 31st, 1993. This will identify the methods, costs and benefits of providing fish passes at already identified sites. This programme will be implemented when funds become available.

6.2.5 In the light of the findings from the NRA's National R & D project on the success of past habitat enhancement projects, a discussion document will be produced by June 30th, 1993 to consider what work of this nature could be carried out on the Ribble system. It is suggested that with the NRA's help and advice, fishery associations, clubs and riparian owners may wish to become involved in this work.

6.3 Mitton Fishery

The NRA holds the fishing rights on the left bank of the Ribble, downstream of Mitton Bridge as far as Calder Foot, and the right bank of the Calder from Mitton Wood to Calder Foot.

The main Ribble provides a salmon, sea trout and brown trout fishery, with several recognised holding pools for migratory fish. Fly-fishing only is permitted upstream of Hodder Foot unless the water exceeds a given level, when spinning is allowed.

Coarse fishing is permitted downstream of Hodder Foot, providing a mixed fishery and the Calder is fished for coarse fish only, with chub, dace and roach the predominant species.

Fishing is on a day ticket basis, with separate permits for coarse, trout and salmon fishing. These are available either from Mitton Farm or from the NRA's Central Area Office.

Future Actions:-

6.3.1 The NRA is committed to providing a fishery of the highest possible standard at Mitton. Recent work has been undertaken to improve access to the fishery, including improvements to footpaths and bridges as well as general maintenance work and the provision of new signs.

6.3.2 Mitton Fishery is to be used by the NRA as a representative fishery for research into stocking levels and the effects of different timings of stock introductions (see Section 6.1.12). A staggered stocking policy, using tagged indigenous brown trout, has been introduced this season. It is hoped that spreading the introduction of fish will help to provide more consistent catch returns throughout the season. Catch return forms with pre-paid return envelopes are provided for all anglers. A small reward is also given for the return of recovered tags from introduced fish. These measures allow the stocking policy to be closely monitored and adjusted if required. The Prince Albert Angling Society has made a financial contribution towards this stocking programme.

6.3.3 All policies and regulations relating to the fishery will be reviewed by December 31st, 1992 and if necessary a new management strategy implemented during 1993.

6.3.4 Regular bank patrols of the fishery are carried out by an NRA bailiff. This allows the condition of the fishery to be monitored and maintenance to be carried out on a regular basis, as well as for routine licence checks to be made.

6.4 The Section 142 Charging Scheme and the development of private fisheries

At present, fishery owners and occupiers pay fishery rates to Local Authorities and none of this money is used for fisheries purposes. Section 28 of the Salmon and Freshwater Fisheries Act, 1975, now contained in Section 142 of the Water Resources Act, 1991, allows for the introduction of an Order whereby fishery owners can contribute towards fisheries expenditure in their area. If such an Order is in place, the so called "Moran amendment" to the Local Government Finance Act 1988, means that fishery owners will contribute towards the Section 142 Charging Scheme instead of paying Local Authority rates. In principle most fishery owners welcome the idea of the Section 142 Charging Scheme and their money being used to improve and develop fisheries.

The NRA is actively developing a Section 142 Charging Scheme. Any such scheme must have broad based support amongst the fishery owners concerned. Consequently, it is planned to hold a period of public consultation during summer, 1992, when fishery owners will have an opportunity to express their views on the possible mechanisms by which a charge may be calculated. Clearly the development of a Section 142 Charging Scheme will have important resource implications for future fisheries management in the Ribble catchment.

In the meantime, the development of strategic work programmes is inevitably resulting in less resources being available for non-emergency fisheries management requests from the general public. All such requests are considered, however priority is given to those situations where the most public good can be achieved. From April 1st, 1992, a fisheries management job advice note will be produced for each written request received, stating whether or not the NRA can provide direct assistance and, if so, by what means. Wherever appropriate, angling clubs or individuals are being encouraged to participate in developing their own fisheries. This can often be facilitated by the NRA giving advice and through its equipment loan scheme.

7. THE RIBBLE, A RESOURCE

The Ribble is a resource used for a wide variety of purposes. The last section of this plan looks at how the NRA, through its planning liaison system, monitors developments that could affect fisheries and the role fishermen can play in developing their resource.

7.1 Planning liaison

The NRA Fisheries Function has an important role to play in planning liaison and regulation in the Ribble catchment. To allow the NRA to fulfill its statutory duties to maintain and improve the quality of the water environment, all planning applications are forwarded to the appropriate NRA Regional Office Planning Department for comment and/or objection.

Any planning applications with potential fisheries implications relating to the Ribble catchment are passed on to Central Area Fisheries Technical staff to be reviewed. Any NRA comments and objections are then relayed back to the County or District Council dealing with the application.

Similarly, all land drainage consent applications, abstraction applications and discharge consent applications are also commented upon.

Through this system, any development relating to a watercourse, whether directly or as a result of groundwater or land drainage implications, will be commented on by the Area Fisheries Function.

These comments can range from a technical enquiry to a complete objection to the proposal. Typically, these concern the timing of works to be carried out and the need to control in-river works so as to minimise their impact on the water quality, quantity and the fish themselves.

7.2 The role of Ribble fishermen and other recreational users.

Other River Users

This fisheries management plan is targeted mainly at anglers. However the Ribble is a resource used by many other groups of people including canoeists, walkers and naturalists. Furthermore the NRA has statutory duties that relate to these activities. The 1989 Water Act imposes upon the NRA not only a duty to make available for recreation the waters and associated lands to which it has rights but also to promote the use of other waters for recreational purposes. Similarly, the NRA has a duty to conserve and enhance wildlife, landscape and archaeological features associated with waters under its control. It is not proposed to discuss these other duties within this plan other than to mention briefly the issue of canoeing.

The widespread use of rivers for canoeing has developed relatively recently and has led in certain instances to conflicts arising between canoeists and anglers/fishery owners. The NRA has no direct powers to control the activities of canoeists who are subject to the rights of navigation and access. However, the NRA can play a role in guiding canoeists as to how they can responsibly and legally pursue their sport and in doing so prevent conflict with other river users such as anglers. Consequently, the NRA has produced a leaflet giving simple guidelines for river canoeists. These guidelines include advice about how to avoid disturbing anglers and having respect for the interests of both fisheries and nature conservation. Initiatives such as this are vital if rivers are to be used for a wide variety of activities without conflicts of interest arising.

The role of Ribble fishermen

Lastly, there is the role of the fishery owners, managers and anglers whose resource is the Ribble. As clearly stated in the introduction to this plan their role is vital if Ribble fisheries are to be improved. Some of the ways in which these groups can contribute to their fishery have already been clearly identified.

Anglers can provide information about their catches by:-

- Providing full and accurate catch returns.
- Participating in the Log Book Scheme and providing detailed information about both their angling effort and catches of salmonids and/or coarse fish.
- Participation in creel and match censuses.
- Reporting any microtagged or externally tagged fish they catch.
- Allowing their catch to be examined and sampled for biological information.

Anglers can act as "watch dogs" of the water environment by:-

- Reporting immediately pollution incidents and fish kills.
- Supplying information regarding actual or potential illegal fishing.
- Helping to prevent the trading of illegally caught salmon or sea trout by immediately notifying the NRA of anyone handling these fish under suspicious circumstances.
- Reporting the illegal introduction of fish into waters.

With the advice and help of the NRA, fishery owners, clubs and associations can become actively involved in fisheries improvements.

Through the establishment of the Ribble Fisheries Management Plan, a new forum has been created for anglers and their associations to put forward their views as to how they wish to see their fisheries improved.

Many of the other ways in which anglers can contribute both to their sport and to the fisheries resource are summarised in "The Game Angling Code" which was recently produced by the Salmon and Trout Association in conjunction with a wide range of other fisheries organisations. Copies of the Code are freely available, however it is worth mentioning certain of its key principles here.

Conservation measures

The point is clearly made within the Code that where there is any danger of over-fishing, owners and managers of fisheries should control catches by adopting some or all of the following measures:-

- By limiting the use of certain baits or methods of fishing.
- By voluntarily reducing the number of days fished.
- By introducing catch limits daily, weekly, or annually.
- By discouraging the sale of rod caught fish by anglers.
- By limiting the number of rods or fishing effort.

Anglers sometimes overlook that they too are exploiters of the migratory salmonid resource and that if stocks are declining they have a role to play in ensuring that sufficient fish are allowed to spawn. Recently on the River Torridge in Devon, concern about declining salmon and sea trout stocks was such that anglers agreed to a mandatory bag limit for rod fishing. The need for further conservation measures on the River Ribble, whether introduced voluntarily or compulsorily by means of NRA byelaws, needs careful and ongoing review in the light of the results from both the stock assessment programme and future catches.

Coarse anglers do not generally kill and remove their catch. However, this does not mean their activities have no effect on coarse fish stocks. Keep nets are used by the majority of coarse fishermen for the retention of fish after capture until the end of the fishing session when they are returned alive to the water. The National Federation of Anglers is already sponsoring a scientific investigation into whether the retention of fish in keep nets is harmful. When available the results from this study may influence the use of keep nets in the future.

In the meantime, keep nets should be of a suitable material and size. In NRA, North West Region, byelaw No. 20 specifies the dimensions and method of construction for keep nets. Anglers will contribute to the conservation of coarse fish stocks by strictly complying with this byelaw and by ensuring that the removal of fish from keep nets for weighing is carried out speedily and in such a way as to minimise any physical damage to fish.

Fishing Conduct

The future of angling as of any sport depends a great deal on the conduct of those who participate in it. Anglers need to be well informed about the laws governing their sport:-

- All anglers need permission to fish from the fishery owner or angling club which owns or leases the fishing rights on the water in question.
- Every angler over the age of 12 years old requires a valid NRA national rod licence. This licence should be carried by the angler whenever he/she is fishing and shown to any NRA bailiff on request.
- Anglers should comply fully both with the rules of the water and the relevant NRA byelaws (copies of which are freely available from the NRA's Central Area Office).
- Fishing without an NRA national rod licence or contravention of any NRA byelaw may result in prosecution.

In addition, anglers need to consider not only fellow sportsmen but also all those who use the River Ribble and the land adjacent to it for other leisure activities or their livelihood. Moderation, courtesy and consideration for others are the marks of a sporting angler.

ACKNOWLEDGEMENTS

This plan was prepared by the NRA's Central Area Fisheries Team with the assistance of their colleagues in the other NRA Functions of Environmental Quality, Water Resources, Conservation and Flood Defence.

APPENDIX 1

USEFUL INFORMATION

For any general fisheries enquiry or to report a fish mortality, pollution incident or illegal fishing activity in the Ribble catchment area contact:

NRA, North West, Fisheries Function, Lutra House, Dodd Way, Off Seedlee Road, Walton Summit, Bamber Bridge, Preston PR5 8BX. Tel. **0772 39882**

(N.B. Out of hours your call will be diverted automatically to the Regional Communications Centre in Warrington).

Also available free on request from Lutra House are:- The NRA, North West Region's Year Book and News Stream, its biannual newspaper, The River Ribble Fact File, copies of the fishery byelaws and angling log books.

Data on the NRA's Public Registers are available for inspection at our Regional Headquarters in Warrington Tel. 0925 53999 for details.

Other important names and addresses include:-

English Nature (North West)
Blackwell, Bowness-on-Windermere, Cumbria, LA23 3JR. Tel: 0966 25286

H.M. Inspectorate of Pollution
Mitre House, Church Street, Lancaster, LA1 1BG. Tel: 0524 382040

Institute of Fisheries Management (North West Branch)
Hon. Secretary, Mr H. Stopforth, Richard Fairclough House, P.O. Box 12, Knutsford Road, Warrington, WA4 1HG.

Lancashire Fisheries Consultative Association
Hon. Secretary, Mr. A.G.R. Brown, 10 Dale Road, Golborne, Warrington, WA3 3PN.

Ministry of Agriculture, Fisheries and Food (Northern)
Block 2, Government Buildings, Lawns Wood, Leeds, LS16 5PY. Tel: 0532 611222.

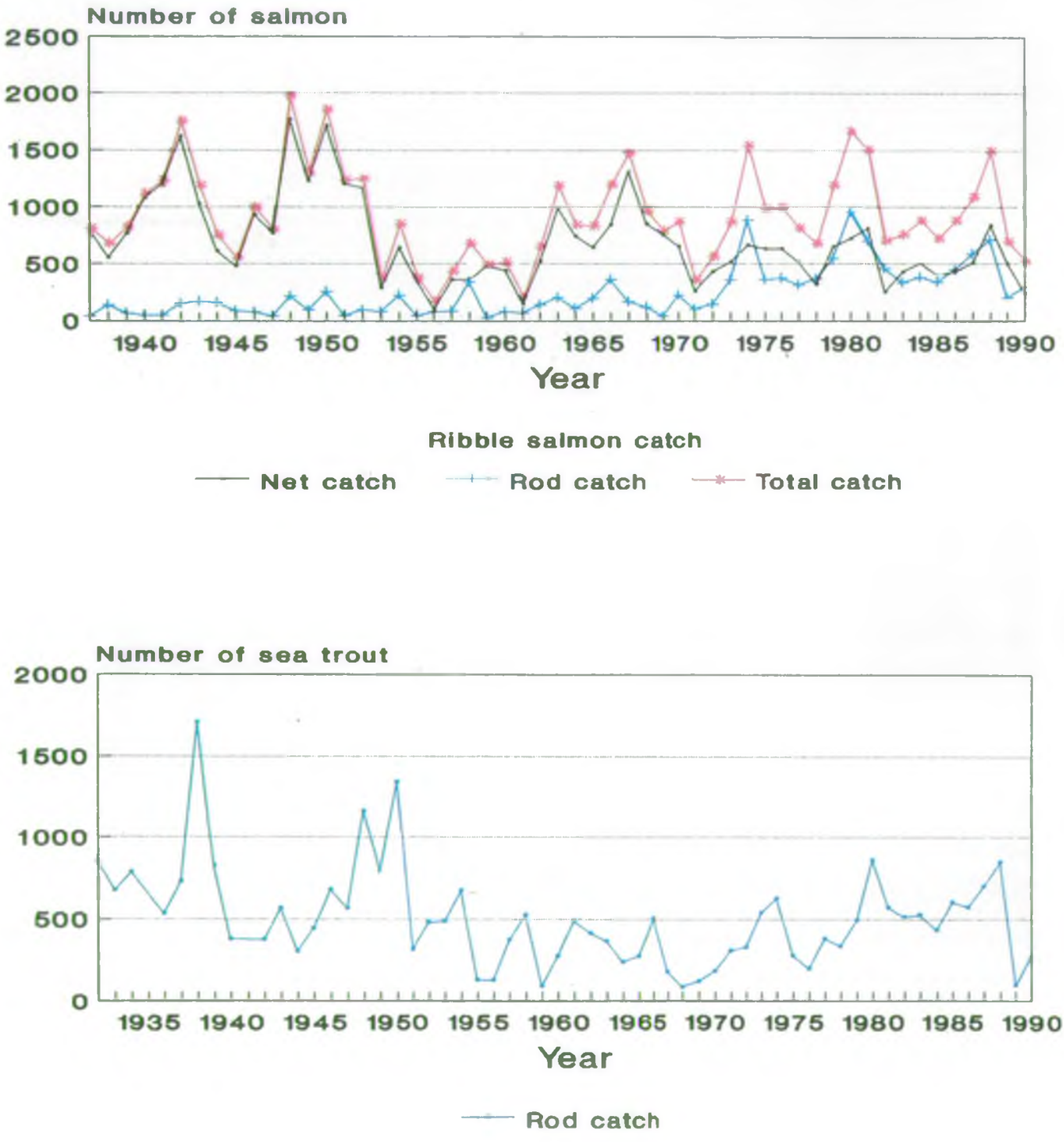
National Federation of Anglers (North West Region)
12 Wincombe Street, Rusholme, Manchester, M13 7PF. Tel: 061-225-9768.

North West Water plc
Dawson House, Sankey Street, Great Sankey, Warrington, WA5 3LW. Tel: 0925 234000

Ribble Fisheries Association
Hon. Secretary, Mr. K.B. Spencer, 36 Hemp Street, Burnley, BB10 1RL.

The Salmon and Trout Association
Fishmongers Hall, London Bridge, London, EC4R 9EL. Tel: 071-283 5838

FIGURE 1 **RIBBLE SALMON AND SEA TROUT CATCHES**



Salmon and sea trout catch data includes the River Hodder

THE RIBBLE CATCHMENT.

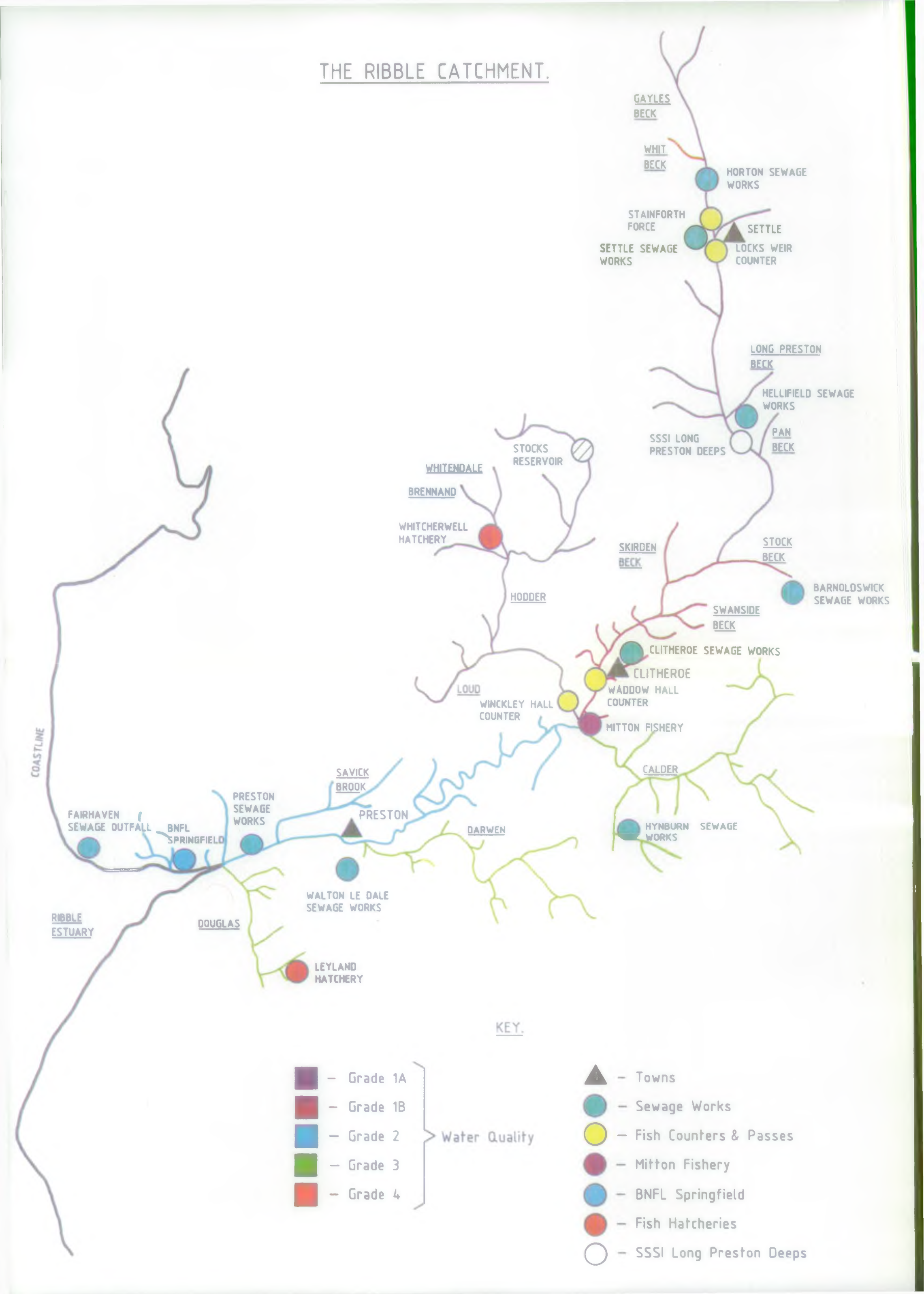
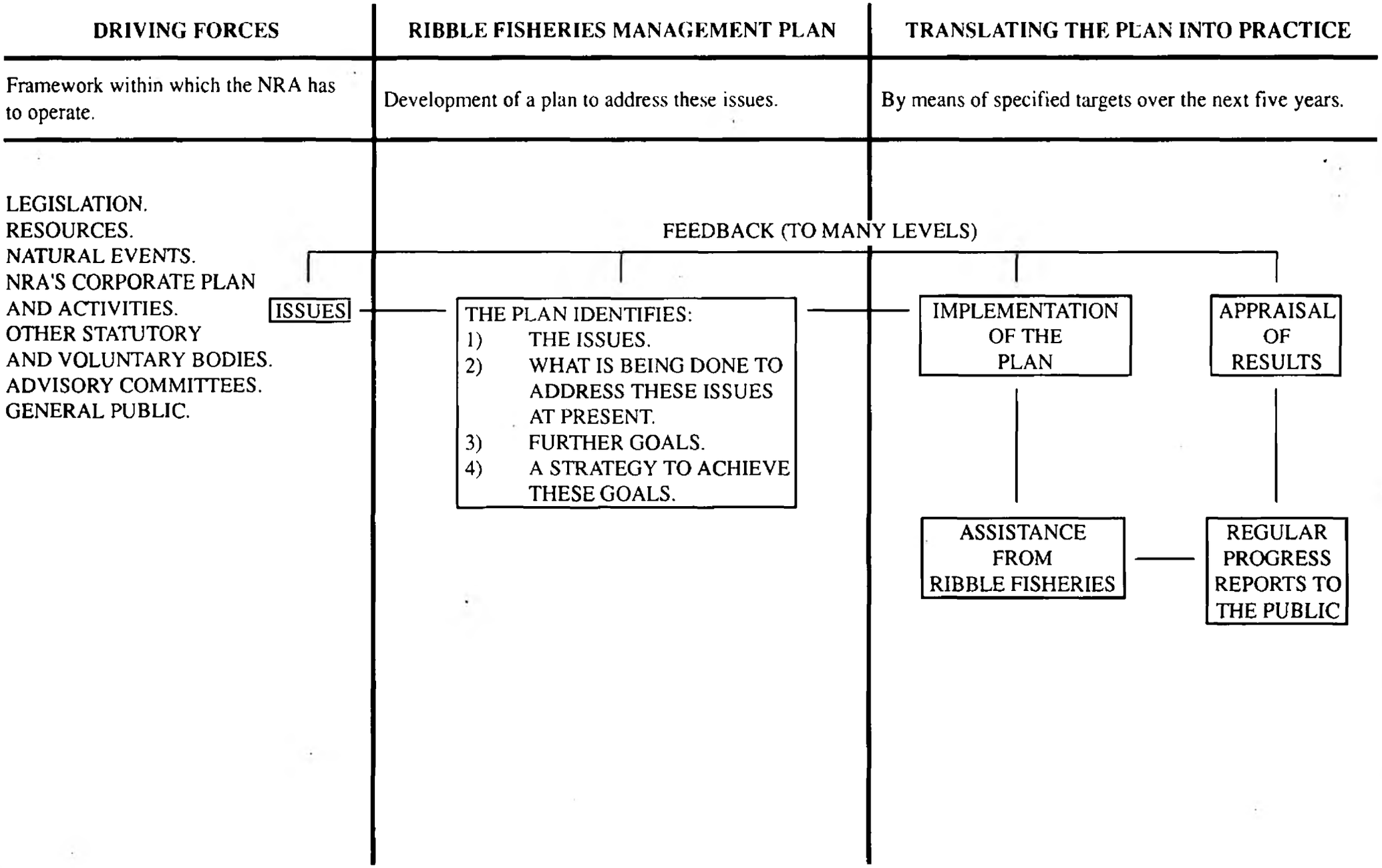


FIGURE 2 MAP OF THE RIBBLE CATCHMENT

FLOW DIAGRAM OF HOW THE RIBBLE FISHERIES MANAGEMENT PLAN HAS BEEN DEVELOPED AND WILL BE IMPLEMENTED



RIBBLE FISHERIES MANAGEMENT PLAN

TARGETS

Section	Target	Timescale
3.4	A review of the historical catch record for salmon and sea trout	By December 31st, 1992
3.5	Operation of a log book scheme for game and coarse anglers	From 1992
3.6	Collection of coarse fish catch data through creel and match censuses	From 1992
3.7	Monitoring of the Ribble salmonid and sea fish drift net fisheries	Ongoing
4.5	Review of past electric fishing surveys carried out in the Ribble catchment	By December 31st, 1992
4.6	Three year programme of strategic stock assessment surveys	1992 - 1995
4.7	Construction of Waddow fish counter and trap	Summer 1992
4.8	Installation of new Logie type counters at Locks and Winckley Weirs	Summer 1992
4.9	Experiments to find practical methodologies for surveying coarse fish in Lower Ribble	From 1992
5.1.10	Fish and invertebrate surveys on Swanside and Ings Becks	Summer 1992
5.1.11	Attendance at fish kills by NRA fisheries staff within two hours during daylight hours	Ongoing
5.1.13 and 5.1.14	Continued efforts to trace the source of salmonid tainting on River Ribble	Ongoing
5.1.15	Monitoring of *Cladophora* spp	Ongoing

RIBBLE FISHERIES MANAGEMENT PLAN

Section	Target	Timescale
5.2.4 and 5.3.7	Radio and acoustic tracking of up and downstream migrating salmonids in the estuary and river	Recommended for the future
5.3.5	Examination of water bank releases from Stocks Reservoir	From 1993
5.4.1	Provision of data regarding salmon high seas fisheries	From 1992
5.4.2 and 5.4.5	Operation of NRA patrol boat in Ribble estuary and patrolling of shore and beaches in its vicinity	Ongoing
5.4.4	Enforcement of Net Limitation Order in Ribble estuary	Ongoing
5.4.6	Inspection and sampling of Ribble salmon drift net fishery catch	Ongoing
5.4.8	In-river protection of salmon and sea trout	Ongoing
5.4.9	Increased deployment of reserve bailiffs	From 1992
5.4.10	Setting up of register to record reports of illegal fishing activities	From April 1st, 1992
5.5.2	A survey of cormorants, goosanders and mergansers in the Ribble catchment	From February 1992
5.5.3	A study to assess the impact of cormorants on fish stocks in the River Ribble	From autumn 1992
5.5.4	Collation of data on the timing and numbers of hatchery reared trout introduced into the Ribble and an assessment of their likely impact on wild fish populations	By March 31st, 1993
6.1.8	Development of a coarse fish restocking strategy for the Ribble	By April 1st, 1993

RIBBLE FISHERIES MANAGEMENT PLAN

Section	Target	Timescale
6.1.9	Stocking of salmon and sea trout fry and parr into the Rivers Ribble and Hodder	Ongoing
6.1.10	Stocking of salmon pre-smolts into the Ribble and Hodder	Spring 1992 and 1993
6.1.11	Operation of trapping facility at Waddow Weir to collect broodstock and evaluate restocking programme	From autumn 1992
6.1.12	Evaluation of brown trout stocking strategies	May 1992 to September 1994
6.2.3	Evaluation of Stainforth Force Fish Pass	1992 - 1994
6.2.4	Fish pass development programme	Ongoing
6.2.5	Production of a discussion document on proposed habitat enhancement work	By June 30th, 1993
6.3.3	Review of policies and regulations relating to Mitton Fishery	By December 31st, 1992

RIBBLE FISHERIES MANAGEMENT PLAN

COMMENTS

We have included this sheet for comments you may wish to make about any aspect of the Ribble Fisheries Management Plan.

Your Name and Address (optional)

Comments

Please return by October 31st, 1992 to: NRA, North West, Fisheries Function, Lutra House, Dodds Way, Off Seedlee Road, Walton Summit, Bamber Bridge, Preston, PR5 8BX.