

ENVIRONMENT AGENCY WALES

**Measures for the Conservation of Salmon on the
River Wye**

**A Proposal for Further Byelaws to Regulate the Rod
Fishery**

Submission to the National Assembly for Wales

March 2002

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Environment Agency Wales

Wye Salmon Conservation Measures. Proposals March 2002

In recognition of the continued failure of the Wye salmon fishery to meet its conservation target the Agency intends to submit the following proposals for consideration by the National Assembly for Wales.

Considerable public consultation with fisheries interests has resulted in a large measure of agreement for these additional measures to secure more salmon within the spawning population.

A number of measures are proposed as amendments to the Agency's code of byelaws whilst the measure to increase release of rod caught fish will be promoted by the Agency and fishery owners on a voluntary basis.

There will be an economic impact on some fisheries as a result of new regulations. In the short term the number of anglers may decrease as a result of the prohibition of bait fishing but in the long term angler numbers are expected to increase in response to increased numbers of adult salmon returning to the fishery. As a means to mitigate for this negative impact and to increase the level of support for the package of proposals amongst individual anglers the Agency has agreed to relax the current prohibition of spinning during the early part of the season when all angling is subject to compulsory catch and release.

To ensure that the requirements of the Habitats Directive in relation to the general duty to restore the conservation status of interest features are complied with, the Agency has consulted with both the Countryside Council for Wales and English Nature to examine the impact of these proposals.

A number of papers are submitted herewith in support of the proposed measures.

1. **Proposals For Additional Measures To Conserve Salmon On The River Wye**
A paper giving the technical reasons supporting the proposals.
2. **Decision Structure to Aid the Council and Commissions of NASCO and the Relevant Authorities in Implementing the Precautionary Approach to Management of North Atlantic Salmon Fisheries**
A paper describing the adoption of the precautionary approach with respect to the River Wye as recommended by the NASCO to its member governments.
3. **Salmon Byelaw Proposals. – Memo to Wye Local Fisheries Group**
A paper submitted to the local consultative group as part of the consultation process.
4. **Notes On Wye Bye-Laws Meeting, Monmouth Office, 27th September 2001.**
A paper supporting paper 3.
5. **River Wye Salmon Rod Fishery - Proposed Regulatory Amendments 2001**
A paper supporting paper 3

Environment Agency Wales

PROPOSALS FOR ADDITIONAL MEASURES TO CONSERVE SALMON ON THE RIVER WYE

1. INTRODUCTION

In 1995, against a background of declining salmon abundance, byelaws were introduced to further regulate rod fishing for salmon on the Wye, Usk and Dee. These were principally intended to reduce the level of exploitation of the increasingly vulnerable spring component of the stocks. They have achieved the objective to some extent (assessment of data from the Welsh Dee suggests that rod exploitation of Jan-May fish may have decreased from 26% to 19%. Data from Dee Stock Assessment Programme provided by National Salmon and Trout Centre).

Declining salmon stocks are not unique to the Wye being apparent on both a national and international scale and recently concern has been expressed by the scientists acting on behalf of the international community. The International Council for the Exploration of the Sea (ICES) presents an annual report to the North Atlantic Salmon Conservation Organisation (NASCO) that includes an assessment of the status of wild salmon stocks and recommendations on their exploitation and conservation.

In recent years, ICES has advised NASCO that the grilse stock is close to its safe biological limit and great caution should be exercised in its management. The advice regarding stocks of larger, multi-sea winter salmon is that they are dangerously low, either outside or close to safe biological limits and extreme caution should be applied in their management. It was suggested that the decline may be due to changes in ocean climate. NASCO has recently set the lowest ever quotas for the Greenland and Faroese fisheries, whilst contracting parties of NASCO (including the European Union) agreed to examine homewater measures that could achieve a significant reduction in the exploitation of larger salmon - see Appendix 3.

In response to this advice the Agency sought the views of RFERAC's, and the Government asked the Agency to propose appropriate measures to reduce exploitation for implementation as soon as possible. Following further consultation with RFERAC's in October 1998, the Agency proposed the following package of measures:

- Promotion of national baseline byelaws for 1999
- Enhanced promotion of voluntary catch and release and release of late season salmon by anglers
- River by river measures: continued development during 1999 and beyond.

1.1 National Baseline Byelaws, 1999

Following extensive consultation, MAFF and Welsh Office Ministers confirmed the introduction of new national byelaws. However not all the measures proposed by the Agency were accepted.

The measures introduced on the 15th April 1999, along with their impact on the Wye were:

- **Delay commercial fishing season until 1st June for salmon and sea trout**

This initiative has since been superseded by the buyout of local commercial interests.

- **Mandatory catch and release of all rod caught salmon before 16th June**

The introduction of mandatory catch and release of all rod caught salmon prior to the 16th June has the advantage of allowing fishing to continue whilst making a contribution to the conservation of the spring and summer MSW salmon stock components. This measure is aimed at addressing the decline in early-running and large salmon and should be accompanied by a continuing angler education programme to promote good practice and ensure maximum survival of fish.

- **Fly and spinner only for salmon fishing before 16th June**

Byelaws introduced to the Wye in 1995 restricted fishing to fly only until the 1st May, then allowed the use of fly and spinner only until the 1st June. After the 1st June other baits were permitted. The intention of this measure was to protect the early running MSW fish. This new national proposal introduced similar controls elsewhere, however it is important to note that the ban on spinning prior to 1st May in the Wye remained. Essentially, for the Wye this measure resulted in a 16 day extension to the period when the use of baits is prohibited.

1.2 Wye Byelaw Review, 1998.

In May 1998 internal consultation regarding amendments to the Wye byelaws commenced in an attempt to address the decline in stocks and ensure the sustainability of the fishery. A variety of options were proposed for consultation with the fishery interests on the Wye. However this process was superseded by the national byelaw review, and as result progress with the Wye specific measures was postponed.

1.3. Wye Byelaw Review, 1999.

During the National byelaw process it was recognised by Government that there may be specific rivers with particular problems meriting further controls. This was an important driver for the resumption of the Wye specific byelaw process. A new round of consultation began in May 1999 with a view to establishing further restrictions on the Wye rod fishery with a suite of measures designed to complement the National (baseline) byelaws. This was justified because of the particularly serious decline in all components of the Wye salmon stocks as evidenced by rod catches, fish counter data and juvenile and redd count monitoring programmes. Proposed byelaws were advertised in May 1999 but withdrawn following substantial objections from fisheries interests groups and anglers to allow further consultation.



2. STATUS OF THE WYE SALMON STOCK

The Wye is a candidate Special Area for Conservation with one of the features for selection as listed in the EC Habitats and Species Directive being the Atlantic salmon. In the opinion of the statutory conservation bodies, CCW and English Nature, the status of the species is "unfavourable, declining". (A Conservation Strategy for the River Wye Sites of Special Scientific Interest, March 2001)

2.1 Rod catch - recent trends

Periods of high and low salmon abundance are evident throughout the 20th century. Relatively low catches in the early part of the century increased during the 1930's, declined in the 1940's then increased again through the 1950's. Catches peaked in the late 1960's and 1970's when the annual declared catch often exceeded or was at a level close to the long-term average of 3600 fish.

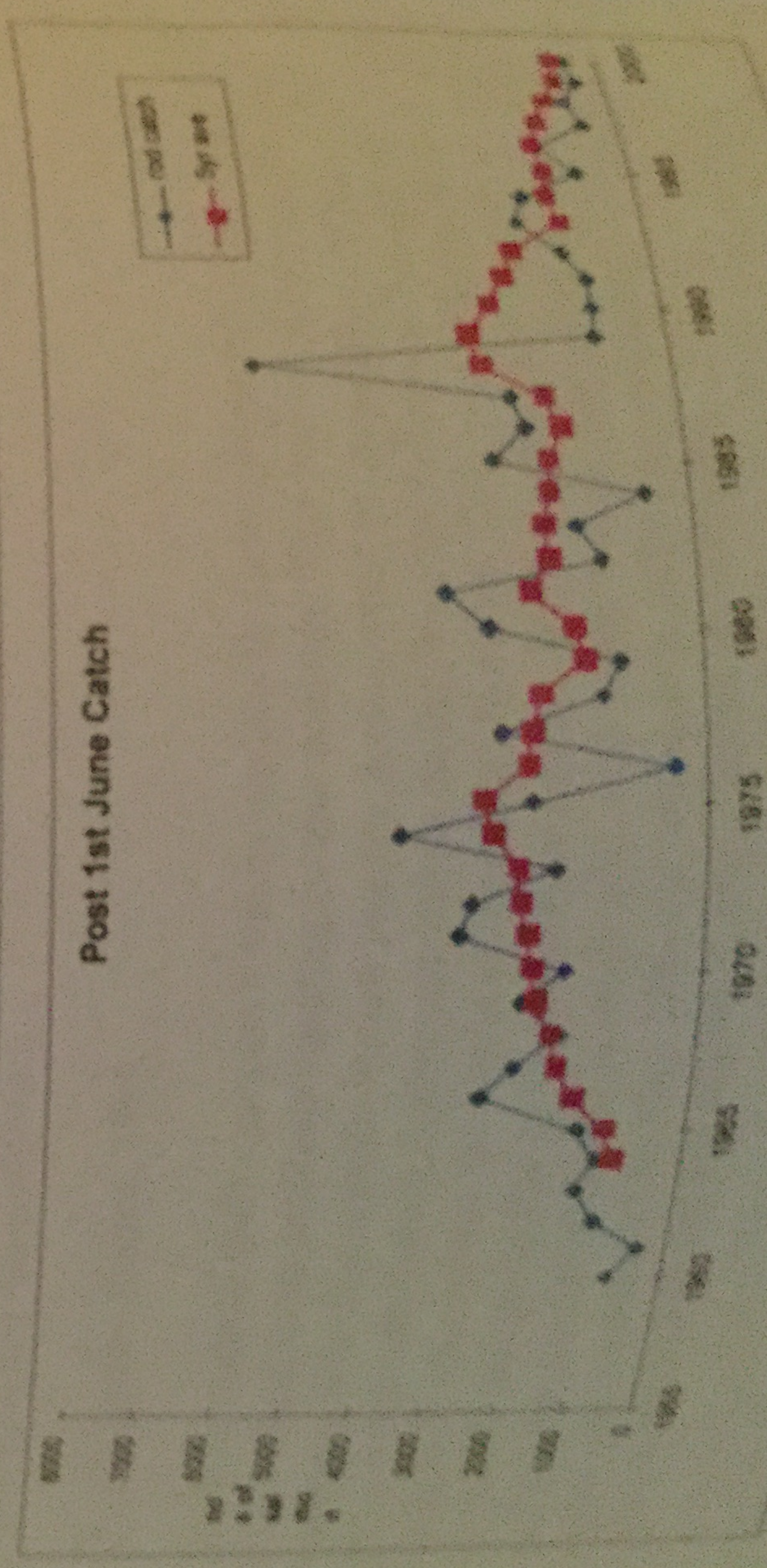
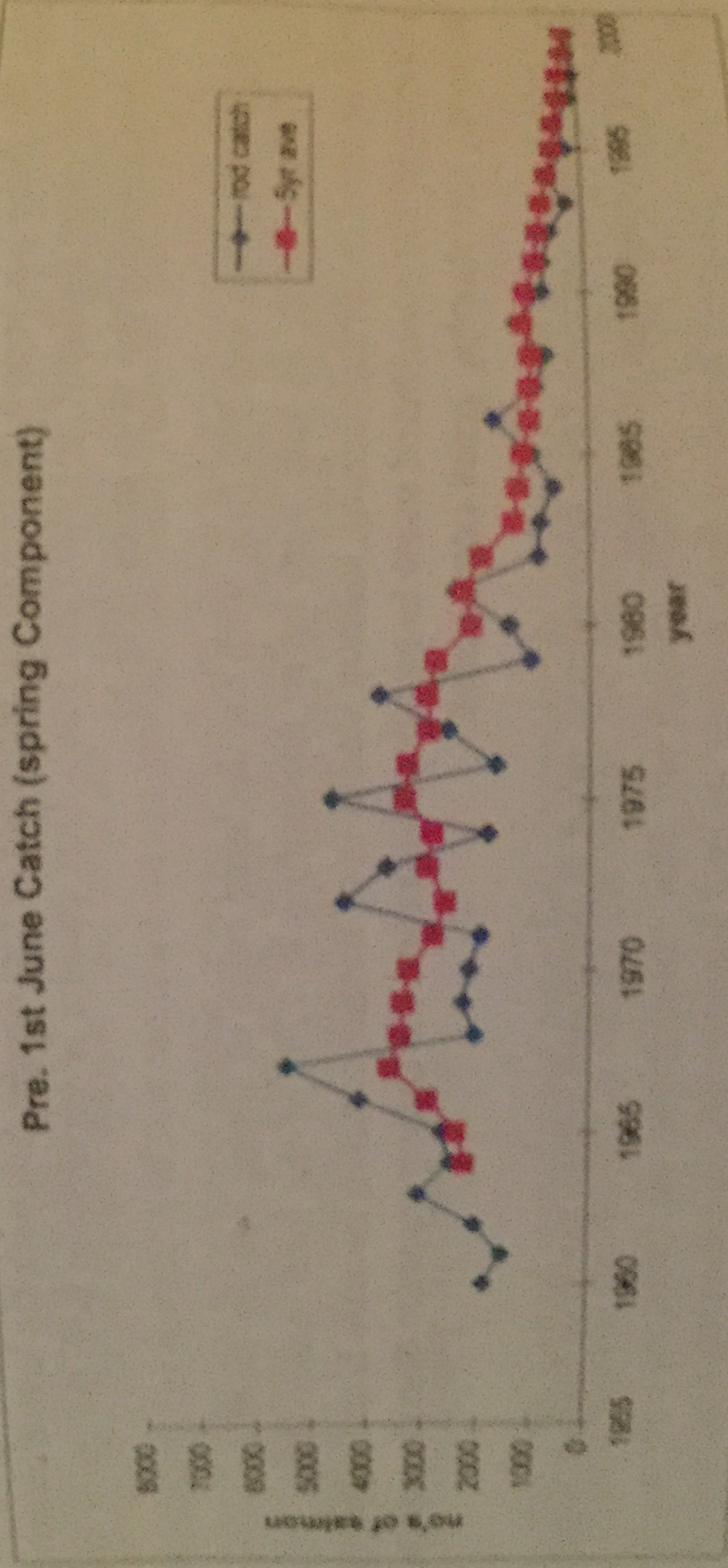
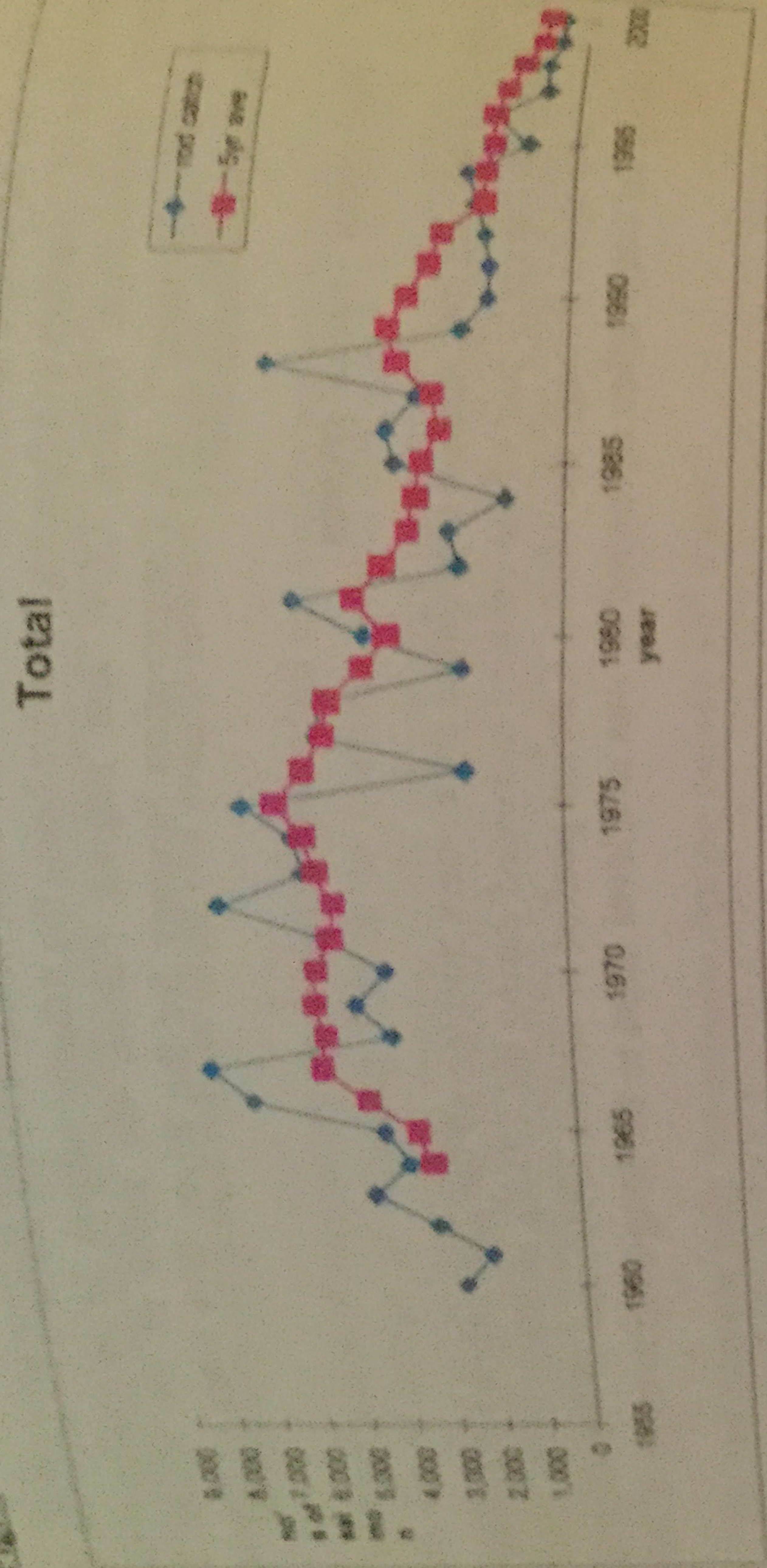
Since 1981 there has been a decline in the numbers of rod caught fish with the lowest recorded catch for 90 years declared in 1999 (567 fish). This decline is apparent in both the spring and grilse components of the Wye stock (Fig.1).

In 2000 the rod catch was 592 fish, with the declared catch of spring fish the worst on record. Prior to 1st June 2000, 68 fish were taken amounting to 12% of the total season catch. This downward trend in spring running salmon stocks is of further concern because historically this run component has contributed more to egg deposition and the fishery resource than the smaller, less fecund, later running grilse component.

More detail on the status of the Wye salmon stock is contained within the Wye Salmon Action Plan and its consultation document.

River Wye Salmon Rod Catch (Owners Returns)

Fig. 1.



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2.2 Spawning Target and Compliance

The application of Conservation Limits to salmon rivers is fundamental to all Salmon Action Plans currently being developed by the Agency. The approach seeks to provide an objective standard against which to assess the status of a river's salmon stock. It does this by defining optimum spawning levels expressing the number of eggs which should be laid on average each year to ensure the long term sustainability of the river's stock of fish. The Egg Deposition Target (Edt) is derived from an assessment of the amount of accessible area within the catchment containing habitat of suitable quality.

The Agency has adopted conservation limits recommended by NASCO which define from a Stock Recruitment curve that level of spawning which maximises total catch. This is termed the Minimum Biologically Acceptable Level (MBAL). Stock-recruitment curves are not available for most salmon rivers but following a long term study, such information does exist for the River Bush in Northern Ireland. Using local information about the quantity and quality of freshwater habitat this Bush Model has been applied to the Wye to produce its conservation limit. Whilst there are risks in adopting this approach the Agency believes it represents best practice to define meaningful conservation limit for the river.

On the Wye, four targets have been calculated because a substantial part of the catchment is not available to migrating salmon. The details of all 4 targets are summarised in Table 1 below.

The Long Term Target (LTT) includes all of the accessible catchment except areas above natural waterfalls, areas upstream of Caban Coch dam on the Elan and the length of river below Bigsweir that is tidal. It also assumes that only 5% of the river below Hereford can be defined as useable habitat. This results in a useable and accessible area of 976 hectares available for spawning. The predicted Edt has been estimated at 46.5 million eggs. This level of egg deposition would be expected from a spawning stock of 13,230 fish.

Two further Interim Targets (IT1, IT2) have been derived to assess the effect of removing man-made barriers to migration on the Monnow (IT1) and Lugg/Arrow systems (IT2). In IT1 the area of the Monnow catchment upstream of Osbaston weir is excluded. This reduces the accessible spawning area to 899 hectares and the Edt to 41.4 million eggs and equates to a spawning stock of 11,803 fish.

IT2 excludes areas of the Lugg and Arrow systems upstream of man-made structures that are impassable to salmon. This reduces the accessible spawning area to 805 hectares and the Edt to 35.3 million eggs and equates to a spawning stock of 10,055 fish.

The Short Term Target (STT) was proposed to take into account the problems of acidification in areas of the upper catchment, that were likely to remain unresolved for the foreseeable future. Excluding these areas reduces the available spawning area to 765 hectares and the Edt to 34.5 million eggs to be deposited on average each season. This level of egg deposition would be expected from a spawning stock of 9,825 fish, of which about two thirds would be multi-sea-winter fish. This is accepted as the most realistic figure and has been used as the target against

which performance of the river has been assessed in the SAP.

Table 1. Summary of R. Wye egg deposition targets.

	Accessible spawning area (hectares)	Egg deposition target (Edt) x 10 ⁶	Spawning stock equivalent to Edt
Long term target	976	46.5	13230
Interim target 1	899	41.4	11803
Interim target 2	805	35.3	10055
Short term target	765	34.5	9825

2.3. Rod Catches.

How well the Wye is performing against the egg deposition target is assessed by estimating the number of adult salmon surviving to spawn in each year enabling an estimate of the number of eggs laid to be made. On the Wye the established rod catch records made by fishery owners have been used to derive this. Analysis of catch records from the recent past shows that the Edt has not been achieved since the mid to late 1980's (Fig. 2) and since 1996 has declined further (Table 2). It is likely that, given changes in angling effort and effectiveness in recent seasons particularly following the 1999 byelaw measures, these figures will have underestimated the level of spawning compliance.

Table 2. Estimate of Edt derived from rod catch data.

	Declared rod catch	Estimated N° eggs deposited (x10 ⁶)	Egg deposition target (Edt) x 10 ⁶	Compliance against target (%)
1996	1838	19.22	34.5	56
1997	652	7.82	34.5	23
1998	776	5.4	34.5	16
1999	567	6.31	34.5	18
2000	592	4.98	34.5	14.5

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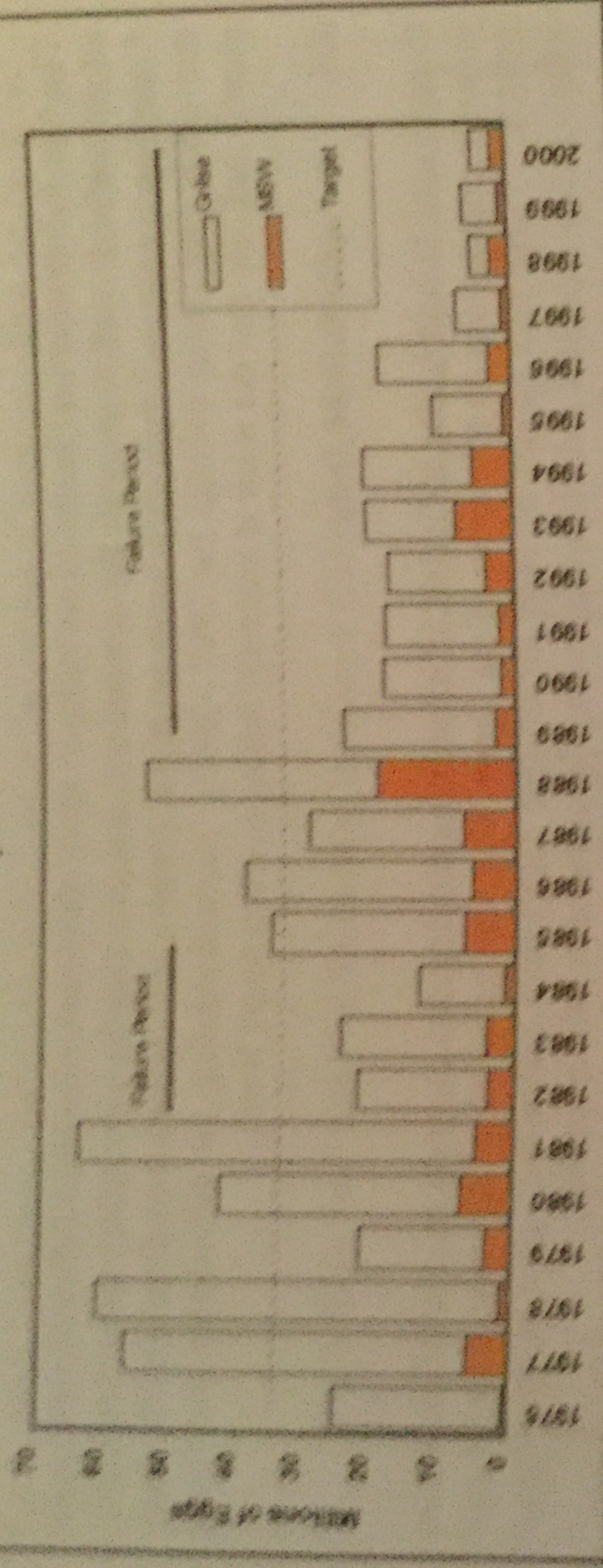
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Fig 2. Temporal Trends in Egg Deposition by Salmon and Grilse; River Wye 1976-2000.



2.4. Acoustic Counter Data

The acoustic fish counter in the lower Wye provides a method for estimating spawning escapement in the catchment that is not reliant on catches. The counter has been successfully trialled and technical developments to refine its operation are continuing to provide more robust information for stock management.

Data from the counter suggest that salmon stocks are performing better than rod catches would indicate, with an average level of compliance against the target spawning stock for the period 1997 - 2000 of 57% (the figures for each year are summarised in Table 3). However, derivation of compliance estimates against the Edt require more complex modelling, taking into consideration a number of factors, and estimates of compliance against the Edt using counter data have not yet been calculated. Further work is required before the counter data can be used in this way.

Table 3. Estimate of Edt derived from acoustic fish counter.

Year	Validated fish count (No's of fish) ¹	Estimated Spawning Escapement (No's of fish) ²	Spawning stock equivalent to Edt	Compliance with target spawning stock (%)
1997	7039	5914	9825	60
1998	7649	6509	9825	66
1999	4217	3461	9825	35
2000	6987	5964	9825	62

¹ Counter data corrected for count efficiency

² Validated count minus upstream rod catch and estimated natural mortality

Target Compliance Comparison

2.5. Target Compliance Comparison
The two independent estimates of compliance show some understandable differences because of the methods used to generate the assessments, and care must be taken when comparing them. Compliance estimates from the counter are higher (approx 30% higher) than those derived from rod catch data (using average for 1997-2000). Notwithstanding the differences, they both clearly indicate that the stock is currently failing to reach target levels.

Juvenile Salmon Data

2.6. Juvenile Salmon Data
Compliance failure is also indicated by juvenile monitoring that suggests an overall decline in juvenile populations on tributaries of the Upper Wye since monitoring commenced in the mid 1980's. These data cannot be used for discrete compliance assessment, as it is not known whether they represent reductions in spawner abundance or habitat quality.

MANAGEMENT OBJECTIVES

3. The immediate objective for the Wye is to achieve compliance with the short-term spawning target (34.5 million ova) by securing an annual average of 9,825 adult salmon on the spawning grounds. In the longer term the aim will be to manage stocks to maintain at least this level of abundance.

The conservation agencies (CCW, English Nature and Environment Agency Wales) in their Conservation Strategy for the River Wye SSSI's have agreed a set of management objectives including the following:

- to meet the agreed spawning target for salmon as defined by the SAP; and
- to encourage sustainable exploitation.

MANAGEMENT OPTIONS

4.1 Control of the Commercial Fisheries in the Severn Estuary.

4.1.1 Goldcliffe Putchers: - operating under a certificate of privilege the number of these putchers has been reduced from 1800 to 700 in recent years representing a decrease in effort of approximately 60% and are now subject to an agreement not to fish until the 2005 season.

4.1.2 Slyme Road Putchers: - the Environment Agency has closed this fishery.

4.1.3 Usk Drift Nets: - the six licensed nets are now the subject of a buy out brokered by the

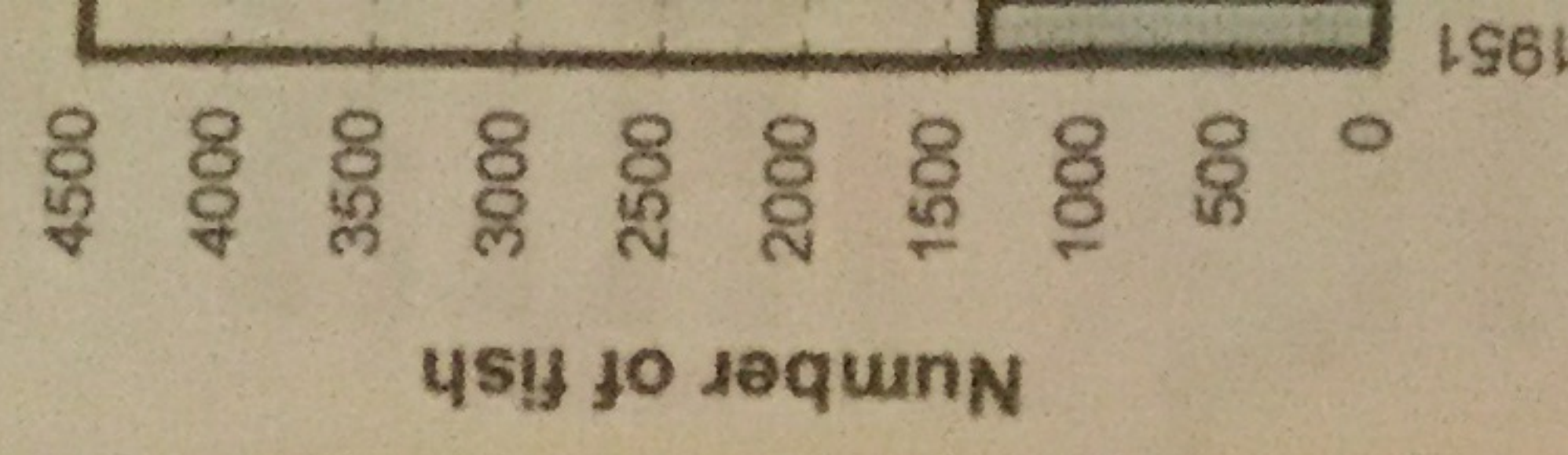


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Wye Foundation and its full closure may be facilitated under a new byelaw, currently the subject of consultation under the Severn Estuary SAP.

4.1.4 Wye Lave Nets: - there is no upper limit on the number of licences which can be issued but the fishery is in the ownership of the Agency which limits the number of permits available. It has reported an average annual catch (1991 -2000) of only 6 salmon. The Severn Estuary SAP consultation will consider whether additional controls are required.

Fig 3. Wye and Usk Net Fisheries; Declared Catches (1951-2000).

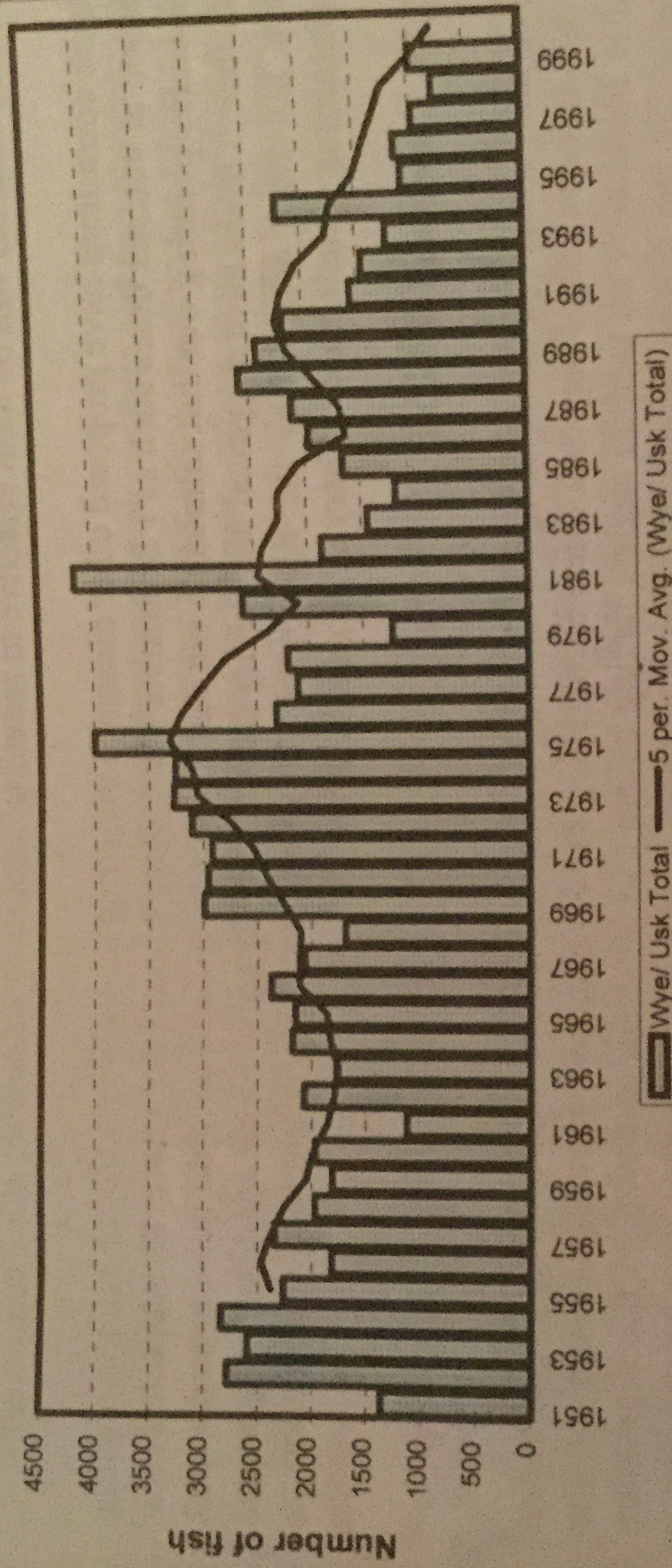


Fig 3 includes data from Wye lave nets, Usk drift nets and Goldcliffe putchers. Slyme Road putcher data are not included.

4.2 Control of the Rod Fishery in the River Wye.

There is a very real requirement to heed the advice from NASCO/ICES in providing further protection to vulnerable components of salmon stocks, particularly as all components of the Wye salmon stock are in serious decline, with the most significant decline in rod catch coming in each of the past 4 years. Indeed previous measures imposed on the rod fishery have probably served to reduce catches in recent years, thus making the decline appear more marked, but the overall trend is downwards.

Without further controls there is a risk that the decline will continue or accelerate. However, home-water exploitation controls in isolation will not be enough and must be seen as one facet of any strategy to improve Wye salmon numbers. Measures have already been put in place to

restrict local commercial fisheries, so it is imperative that any protection of Wye salmon afforded by these measures is not immediately undone by exploitation of these 'saved' fish by the rod fishery.

There is a range of statutory and voluntary measures which can be considered to bring about a reduction in the exploitation of salmon.

4.2.1 Bye-law Regulations.

The measures proposed for additional controls on the take of wild salmon are discussed in Section 5. If introduced these will be effective in increasing spawning escapement. When combined with the increasing uptake of catch and release amongst anglers, it is believed that this suite of controls will be most effective in reducing catches of vulnerable stock components.

Some consultees have proposed other measures including an earlier end to the salmon angling season at various times such as 1 September and 1 October but others have not supported such measures pointing out that salmon do not reach upper river fisheries until late September and October. Others have suggested that fishing should be by fly only. These additional suggestions have not been adopted by the Agency on the grounds of their continued contribution to maintaining a sustainable fishery in economic terms.

4.2.2 Catch and Release.

Catch and release has the advantage of allowing angling to continue whilst making a contribution to the conservation of the stock hence encouraging the development of sustainable exploitation and is mandatory on salmon anglers fishing before Jun 16th. An extension of this regulation throughout the fishing season has been considered but fisheries interests have argued that it would not be acceptable to anglers and would undermine their acceptance of the prohibition of bait fishing. The Agency has acceded to this point and has agreed to promote a campaign of angler education with the major fisheries on the river. Such a campaign will seek to secure voluntary targets and an annual review in which targets for an increasing proportion of released fish will be set.

The adoption of suitable approaches and controls in the application of catch and release will maximise its benefits through the minimising of mortalities. Anglers often fail to recognise the limitations of catch and release, and the crucial need for careful handling of fish, because they see that most fish successfully swim off after capture. However we are aware that, although a high proportion survive initially under certain conditions, at other times a significant proportion die after a period of 2 to 3 weeks. Some of the factors influencing their survival are summarised below.

4.2.2.1. Water Temperature.

High water temperatures are known to contribute to elevated mortality rates amongst salmon caught and released. A study on a southern chalkstream recorded 100% mortality amongst salmon caught and released when ambient water temperatures exceeded 21°C

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Such temperatures are regularly encountered on the lower Wye, although in its physical and chemical nature the river is very different from a chalkstream. Removal of rod caught Wye fish to Greenbottom hatchery has revealed significant mortality amongst fish caught whilst the water temperature approaches 20°C.

4.2.2.2. Angling Methods.

Perhaps of equal importance is the way fish are hooked, played and released. The method used to catch fish is important with the greater chance of post release survival achieved when small, single, barbless hooks and techniques relying on hooking the fish in the jaw are used. Larger barbed hooks or bait fishing which can result in stomach hooking and consequent damage to fish are incompatible with catch and release.

4.2.2.3. Fish size/ Time of Year.

During the autumn period fish are more robust (water temperature and fish physiological changes combine to protect fish) hence they are better able to survive the stress of rod capture. Similarly, grilse have been shown to be more robust than MSW fish when caught and released, perhaps because the smaller grilse take less time to be played out and hence stress levels are lower.

4.2.2.4. Angler Experience.

In 1993 some 10% of salmon caught in England and Wales were released by anglers. More recently there has been a steady increase and figures for 1997 indicate that 24% of salmon caught were released. Anglers on the Wye have generally responded more slowly than the national trend, and in 1997 only 12% of fish were returned, half of the national average. The 1998 figures show a slight improvement with 31% of fish returned throughout England and Wales whilst the equivalent figure for the Wye was 24% (Licence return data). Data for 1999, show a more pronounced improvement particularly on the Wye (52%) but also nationally (43%). In 2000, the return rate nationally was similar at 42% but reduced to 36% on the Wye. It is to be expected that as catch and release increases in popularity angler education and experience will increase, leading to better survival rates amongst released salmon.

4.2.3 Closure of the Rod Fishery.

This is not considered to be a viable option due to the commercial value of the fisheries themselves and their contribution to the local economy. Many are operated as a source of revenue whose owners would be expected to mount substantial objections to their loss of income. A number of jobs, such as those of gillies, depend directly on the existence of the fishery that plays an important role in many rural communities. The challenge therefore is to introduce measures which increase the spawning stock of the river whilst allowing the associated economic activity to continue. Closure would not meet the objective of encouraging sustainable exploitation

4.3. Other Management Initiatives.

It is recognised that the failure of the salmon to reach its conservation target cannot be remedied by regulatory actions alone and a Salmon Action Plan involving the EAW and other bodies has been produced. These partners are actively undertaking initiatives to address and ameliorate the salmon's decline including the following.

4.3.1 Juvenile Stocking.

A hatchery has been operated by the Wye Salmon Hatchery Company Limited in the lower Wye area since 1995 and is seen as an important element of salmon management by many salmon anglers on the river. The Agency has supported the hatchery since its inception believing that its activities could be sustainable and that they will contribute to salmon rehabilitation on the river. In practical terms the net contribution from the hatchery to salmon recruitment on the Wye has been small. Following a review of its performance, agreement was reached early in 2002 on an Action Plan setting targets for production and the contributions expected of the main partners in its operation.

4.3.2 Habitat Improvements

The Wye Habitat Improvement Project (WHIP) is a European funded collaborative project lead by the Wye Foundation. Other partners include EA Wales, Countryside Council for Wales, Radnor and Brecknock Wildlife Trusts, Farmers Union of Wales and Cardiff University. The project aims to improve incomes to riparian owners in rural areas by improving the prospects for brown trout angling in four tributaries of the upper Wye. The project has so far fenced and coppiced more than 30km of these tributaries to improve rearing habitat for young trout as well as benefits to wider assemblages of wildlife. It is due to finish in March 2002.

The Wye Foundation (a charitable trust) and the River Wye Gillies Association have together been responsible for access improvement works in a number of tributaries within the upper Wye catchment. Efforts to clean compacted spawning gravels and to clear temporary obstacles to migration have increased the availability of spawning areas. Moreover the WF has provided fish passes and fish easements at about five partial obstacles to migration serving to improve access for salmon to upstream spawning areas. Recently WF has progressed riparian habitat improvements to several km of the river Duhonw in association with CCW. These works take advantage of management agreements available to riparian owners within areas designated as SSSI's under Section 15 of the Countryside Act (1968).

A substantial application has recently been submitted by the WF (fronting a broad based partnership of interested organizations) seeking funding under Objective 2. The project has three main objectives together aiming to restore fisheries in the Wye and hence benefit the rural economy. It will deliver this overall aim by improving riparian habitat, ameliorating acidification and by improving the marketing of fishing in rural areas.

In the summer of 1997 the Agency designed and built a fish pass on the Garth Dulas,

substantial tributary of the Irfon, which opened up some 10km of high quality salmon spawning area.

4.3.3 Research and Development

Several projects including the following, have been implemented recently including:

- Assessment of spawning habitat quality in the Ithon (in collaboration with University of Southampton).
- Investigation of sediment sources, pathways and impacts on spawning habitat (proposed future collaboration with University of Gloucestershire)
- AMP (water company Asset Management Plan) project to model and apportion nutrient sources to the catchment (EAW in collaboration with Welsh Water)
- Assessment of nutrient (phosphate) dynamics and sediment sources in a collaborative project by EA, DEFRA and English Nature.
- Study of the impact of predatory birds and options for their management – a study under the auspices of the Wye Management Advisory Group.

5. PROPOSED ADDITIONAL WYE MEASURES

5.1 Delay the opening of the season until 3rd March.

Reduces the length of the rod season by 36 days and harmonises the opening date with the neighbouring R. Usk. It has little impact on the catch of salmon but will ensure that should an early season run of salmon be re-established it will be given protection from exploitation.

There is evidence from fishery owners and gillies that very few anglers currently fish the river during January and February.

5.2 Prohibit the use of worm, prawn and shrimp as baits for salmon at all times of year

The use of worm is known to be very effective in catching fish at certain times of year when other methods are ineffective. It is usually the case that this technique causes sufficient damage to the fish to be incompatible with catch and release. Although a proportion of fish saved as a result of this measure will inevitably be caught by other methods, it is unlikely to be a significant number.

Observations in recent years have shown a marked increase in the catch of larger fish immediately following the beginning of the bait-fishing season on 16 June resulting in many fish which had been protected by the fly and spinner only rule being taken and removed from the stock. Prohibition of these baits will assist the continued protection of these fish.

5.3 Voluntary use of barbless hooks for salmon at all times of year

Section 4.2.2 discusses the merits of release of fish after capture and shows that maximising the

survival of such fish depends on a range of factors, including that of handling, immediately following capture. Whilst no scientific evidence is available to prove the benefits of using barbless hooks, angler experience shows that fish can be released more quickly, with less damage and with no, or minimal, impact on numbers caught.

It is the Agency's aspiration to prohibit the use of barbed hooks under byelaw but until evidence is available on the potential cost of such a measure, it will be actively promoted as a voluntary measure alongside catch and release in a joint campaign with the Wye Salmon Fishery Owners Association (WSFOA).

5.4 Voluntary catch and release of all rod caught salmon after 31st August

This proposal promotes the catch and release of all salmon and grilse after the end of August and recognises the scientific advice that greater protection needs to be afforded to grilse. This measure would be facilitated by a continuing angler education programme in conjunction with the fishery owners and the WSFOA to promote good practice amongst anglers.

5.5 Allow spinning from 3 March to 30 April

The WSFOA has advised that this measure will both facilitate the acceptance of the prohibition of bait fishing and will ameliorate its economic impact of reduced catch. It is therefore proposed to remove the prohibition of spinning during the period of compulsory catch and release.

6. SUMMARY OF THE IMPACT OF PROPOSED ADDITIONAL MEASURES

For each measure the impact in terms of predicted numbers of fish 'saved' and on the number of eggs deposited have been estimated using data collected from the fishery since 1995 and are shown in Table 4 below. However for the full assessment and supporting information, see Appendix 1.

TABLE 4. SUMMARY OF IMPACT.

	Impact - N ^o fish 'saved'	Impact - additional number of eggs deposited
5.1	1	7278
5.2	151	444,510
5.4	70	220,118
5.5	-12	-61863
Total	210	610043

The impact of delaying the opening of the angling season would result in an additional benefit to the spawning stock of 1 salmon, that would realise a further 7300 eggs.

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The impact of prohibiting bait fishing would be an additional benefit to the spawning stock of 151 salmon, that would realise a further 444,500 eggs.

The impact of a voluntary catch and release programme would allow 156 salmon to be caught, all of which would have to be returned. Previously a number of these (78) have been sent to the hatchery at Greenbottom or released voluntarily so this has been factored into the potential benefit estimate. If all the remainder (78) were released by anglers some 70 would be expected to survive equivalent to a benefit of 220,100 eggs.

Whilst it is difficult to estimate the full impact of allowing additional spinning it is accepted that an additional number of multi-sea winter fish would be taken and returned under the compulsory catch and release regulation. A crude estimate has been determined showing that on average 12 fish per year representing a potential 62,000 eggs might be expected to be lost as a result.

The overall impact is expected to result in an increase of approximately 610,000 eggs.

7. FUTURE COMPLIANCE AND CONTINGENCY MEASURES

It is important to note that if these further measures had been in force in earlier years, the egg deposition target would probably still not have been achieved because the current status of the stock is considerably depleted. Total escapement of the run of fish to spawn would also not have achieved the target in the short term.

It is inevitable that the return of the Wye stock to target levels of abundance will take time. It has been estimated that, in the absence of further pressure from a range of adverse factors outside the catchment and home waters, even a total moratorium on angling would not result in a return to target levels. Such an angling moratorium would have a huge economic impact from the closure of all salmon angling and would not result in achieving the target of sustainable exploitation.

It is feasible that the national bye-laws and proposed further measures may not achieve the required increased spawning escapement. Numbers of salmon may well increase or decrease due to factors other than the byelaws, making it difficult to isolate their effects. Continued counter operation and the establishment of a longer time series of data, will help to detect any improvement. It is also anticipated that advances in the science of calculating spawning targets and assessing compliance will be achieved.

In recognition of these various factors it is therefore proposed that these regulations should be re-assessed at the same time as the proposed review of the national byelaws. If recovery is not evident at this review period, then further controls on rod exploitation will need to be considered.

Options include :-

- prohibition of fishing at times when catch and release is found not to work,
- imposition of fly only regulation at all times of the year,
- closure of the fishery.

However if the review reveals that the stock has achieved target levels it will be appropriate to amend the byelaws in order to permit increased exploitation, whilst continuing to carefully monitor stock abundance.

8. CONCLUSIONS.

1. The Wye salmon stock amongst the spring salmon failing to achieve its egg
2. The national (baseline) The judgement included on a discrete river by river numbers. There is power
3. Available information justified in order for the controls there is a risk that exploitation controls in its strategy to improve Wye
4. On the basis of the assessment deposition by an average
5. None of the options will future and full recovery
6. Economic factors are important. Without improvements to the rod fisheries will continue to byelaws) in the short term
7. A review of the impact of period of five years. Any ad

8. CONCLUSIONS.

1. The Wye salmon stock has shown a considerable decline in recent years particularly amongst the spring salmon component. Currently, best estimates suggest it is consistently failing to achieve its egg deposition target.
2. The national (baseline) byelaws enacted in April 1999 improved the protection of salmon. The judgement included ministerial guidance supporting the provision of enhanced protection on a discrete river by river basis where there were particular concerns regarding salmon numbers. There is powerful evidence suggesting that the Wye is a special case.
3. Available information indicates that further reductions in the level of exploitation are justified in order for the stock to begin to return to target levels of abundance. Without further controls there is a risk that the decline will continue or accelerate. However, home-water exploitation controls in isolation will not be enough and must be seen as one facet of any strategy to improve Wye salmon numbers.
4. On the basis of the assessments in this paper the proposed regulations would increase egg deposition by an average of 610,000 eggs annually.
5. None of the options will lead to a return to target levels of abundance in the immediate future and full recovery may take many years.
6. Economic factors are important and are recognised by the Agency (see Appendix 2). Without improvements to the numbers of adult salmon returning to spawn the value of the rod fisheries will continue to decline and a negative economic impact (as a result of further byelaws) in the short term may yield a sustainable economic recovery in the future.
7. A review of the impact of the 1999 national byelaws has been promised in 2004 after a period of five years. Any additional Wye byelaws will be subject to review at the same time.

APPENDIX I

Summary of the impact of current byelaw controls and proposed measures on the River Wye.

Current rod and line fishing byelaws for salmon and sea trout on the R. Wye including the Wye specific byelaw restrictions introduced in 1995 and the 1999 national byelaw measures.

- Season commences on 26th January and finishes on 17th October downstream of Llanwrthwl Bridge (25th October upstream of Llanwrthwl Bridge).
- Fly only from 1st September to 30th April.
- Fly and spin only 1st May to 15th June.
- Fly, spin and bait fishing 16th June to 31st August.
- Release of all salmon (with minimum injury) caught before 16th June.

The above measures represent the baseline position currently in force on the Wye.

The further Wye specific amendments to the above byelaws proposed are:

- delay the opening of the season until 3rd March;
- prohibit the use of worm, prawn and shrimp as bait at all times of year;
- allow spinning during from 3 March until 31 August; and
- voluntary catch and release of all salmon after 31st August;
- voluntarily use of barbless hooks at all times of year.

In calculating the impact of these measures certain assumptions have been made as follows;

C&R survival rates;

50% survival of spring caught fish i.e. before 1st June (Wye radio-tracking data 1995/6),
30% survival of summer caught fish i.e. between 1st June and 31st August (variety of sources including Wye),
90% survival of autumn caught fish i.e. after 1st September (Wye radio-tracking data and data from a variety of other sources).

Natural mortality rate has not been considered.

Figures have been calculated using mean rod catch data from Wye owners returns for the period 1995-2000 i.e. since the introduction of the 1995 Wye byelaws and in some instances for the period 1999 - 2000 i.e. since the introduction of the 1999 National byelaws.

Figures have not been adjusted to consider non-reported catch.

Voluntary C&R estimates have been considered in the calculations in this paper.

No allowance has been made for fish being taken by another method in place of one being using bait after

The 'saving' in
Grilse: 87×0.3
 33×37

MSW: 64×0.6
 44×72

The total number of fish

3. Measure 5.1 - Delay the opening of the season until 3rd March

Calculations.

1. Measure 5.1 - Delay the opening of the season until 3rd March

Year	<8lb	8lb and >8lb	Total
1995	1	1	2
1996	0	0	0
1997	0	1	1
1998	0	2	2
1999	0	1	1
2000	0	0	0
Mean	0	1	1

The impact of this measure is minimal in terms of fish numbers (1). Assuming this was a female then it would lead to an additional 7278 eggs being deposited.

2. Measure 5.2 - Prohibit the use of worm prawn and shrimp as bait at all times of year

Year	<8lb	8lb and >8lb	Total
1999	50	64	114
2000	124	63	187
Mean	87	64	151

Only data from 1999 and 2000 has been used as the introduction of the new national byelaw (fly and spin only before 16th June) means that worm (and other bait) fishing can only now occur after 16th June.

The 'saving' from implementation of this measure is the number of fish previously caught

using bait after 16th June = 151 salmon. Of these 87 are grilse, and 64 MSW.

The 'saving' in terms of eggs deposited:

Grilse: $87 \times 0.379 = 33$ hen fish
 $33 \times 3766 = 124,278$ eggs.

MSW: $64 \times 0.687 = 44$ hen fish
 $44 \times 7278 = 320,232$ eggs.

The total number of additional eggs deposited would be 444,510.

3. Measure 5.4 - Voluntary C&R of all salmon after 31st August

Total catch after 31st August

Year	Number of Fish Caught		
	Total	Grilse	MSW
1995	225	96	129
1996	323	132	186
1997	67	30	37
1998	199	124	67
1999	74	14	56
2000	49	24	25
Mean	156	70	83

Number of fish sent to the hatchery or released voluntarily

Year	No. returned or sent to hatchery		
	Total	Grilse	MSW
1995	93	31	62
1996	130	36	89
1997	19	6	13
1998	140	82	50
1999	56	7	44
2000	32	11	21
Mean	78	28	47

Remainder of total catch that would be subject to further C&R after 31st August assuming full

Year	<8lb	8lb or >8lb	Total
1995	65	67	132
1996	96	97	193
1997	24	24	48
1998	42	17	59
1999	7	12	18
2000	13	4	17
Mean	41	37	78

C&R survival rate at this time of year = 90%
 Therefore for grilse ($<8\text{lb}$) $90/100 \times 41 = 37$.
 MSW ($>8\text{lb}$) $90/100 \times 37 = 33$.

The 'saving' from implementation of this measure is the additional number of fish caught that may released voluntarily allowing for donations to the hatchery after 31st August ie 70 salmon of which 37 are grilse, and 33 are MSW.

The 'saving' in terms of eggs deposited:

Grilse: $37 \times 0.379 = 14$ hen fish
 $14 \times 3766 = 52,724$ eggs.
 MSW: $33 \times 0.687 = 23$ hen fish
 $23 \times 7278 = 167,394$ eggs.

The total number of eggs deposited would be 220,118.

4. Measure 5.5 – Allow spinning in March and April

The number of fish likely to be caught following the relaxation of controls on the use of spinning during March and April is difficult to estimate, as the technique has been prohibited since 1995 and the exploitation rate is unknown. Whilst spinning was allowed prior to 1995, the number of fish available to be caught at that time were somewhat greater than those available today, so it is not possible to make direct comparisons.

A crude approach has been adopted in which an annual exploitation rate (estimated from the annual catch and counter data) has been applied to monthly counter data (ie the estimated availability of fish in each month). There are clearly inaccuracies in this method since an annual exploitation rate has been applied to selected months and a discrete component of the stock. The estimate of the number likely to be caught can therefore be used as a rough guide only.

Calculation of Rod Exploitation Rate.

Data	1997	1998	1999	2000
Counter (a)	7039	7649	4217	6987
Catch d/s counter (b)	231	367	196	234
Catch u/s counter (c)	421	409	371	362
Exploitation Rate ¹	9.0%	9.7%	12.9%	8.3%

¹b+c.100/a+b

The mean exploitation rate (9.98%) has been rounded up to 10% in the following calculations to determine the estimated annual catch if spinning had been permitted in March and April.

Estimation of the Numbers of Fish Caught by Spinning in March and April

Year	Validated Counter Data		Declared Catch		Estimated Extra Catch if Spinners Had Been Used	
	March	April	March	April	March	April
1997	79	374	4	5	4	32
1998	42	20	5	1	0	1
1999	167	240	7	9	10	15
2000	28	325	6	4	0	29

The estimated number of eggs that would have been lost if spinning had been permitted has been calculate assuming a 50% catch-and-release survival to spawn, and that 70% of the fish were female.

Year	Potential Extra Catch	Number of Fish Lost to Spawning Stock	Number of Females Lost	Number of Eggs Lost
1997	36	18	13	94,614
1998	1	1	1	7,278
1999	25	13	9	65,502
2000	29	15	11	80,058
Average	23	12	9	61,863

The estimated annual average number of early season fish likely to be lost to the spawning population if spinning were to be permitted prior to May is 9 females. These would have

yielded an annual average of 61,863 eggs.

Summary of Savings and Losses From All Measures

The potential savings and losses estimated to arise from the introduction of all the measures are:-

Measure	Reference Number	No. of grilse	No. of MSW	Total	No. of eggs
Season change	5.1	0	+1	1	7,278
Bait ban	5.2	87	+64	151	444,510
Voluntary Use of Barbless Hooks	5.3				
Voluntary C&R of fish	5.4	37	+33	70	220,118
Early spinning	5.5	0	-12	-12	-61,863
Total		124	86	210	610,043

The overall 'saving' that would accrue from the introduction of 4 measures is 210 fish with a potential to produce an additional 610,000 eggs annually. There would be a further unquantifiable increase in survival of C&R fish due to improved handling resulting from the use of barbless hooks.

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APPENDIX 2. COST AND BENEFIT CONSIDERATIONS

The proposed measures are put forward in recognition of the economic impact on local communities who derive a commercial benefit from salmon fishing.

ECONOMIC IMPORTANCE OF THE FISHERY

A number of fisheries on the River Wye are operated on a commercial basis with rods being let in return for a rental charge which accrues to the owner. Such fisheries, and a number of private ones too, have traditionally employed staff known as gillies whose job is to advise and assist the anglers using the fishery. The number employed continues to decline as a result of the declining success of the fishery, indeed 2 further redundancies were announced in 2001.

Several communities within the catchment provide accommodation for visiting anglers and a number of fishing tackle and other service outlets derive a benefit from the sport.

It is clear from anecdotal information from fishery owners, gillies and anglers that declining salmon catches are adversely impacting on the number of anglers fishing. As this number reduces so too does the rental and capital value of the rod fisheries, the amount spent locally declines and the number of people employed falls. For instance there are now only seven men employed as gillies compared to more than thirty at the height of the river's production (anecdotal information).

There is therefore a clear economic impact of the decline in the salmon population although there are no studies to quantify its magnitude.

IMPACT OF THE MEASURES

A continued decline in the stock, and subsequently rod catch, of salmon will continue to have a negative economic impact locally. It is likely that if this decline remains unchecked the population of salmon in the Wye will decline to such an extent as to make the fishery uneconomical, will cause more unemployment and will result in the loss of capital value worth several million pounds.

The proposed measures incorporating voluntary catch and release are designed to have a significant positive impact on the number of salmon reaching the spawning tributaries whilst at the same time allowing fishing to continue. Anglers will still be able to pursue their sport, so maintaining economic activity at about the same level, whilst in the long term stocks are expected to increase to a level which will allow angling exploitation to be increased and an improved economic benefit generated.

It is recognised that some anglers will disapprove of the concept of catch and release and may prefer not to fish as a result of its introduction. However informal discussions have indicated that this number will be small and may not have a significant economic impact compared to that

which would occur were further protection measures not introduced.

CONCLUSION

Whilst there are no quantitative estimates of the cost of introducing and enforcing new measures nor of their precise economic impact, it can be seen that a continued decline in catch will continue to have a negative economic impact but may be arrested by implementing new regulatory controls on the exploitation of the stock.

A continuing programme of angler education will be maintained to promote the uptake of the release philosophy. Discussion will also be initiated with the major fisheries on the river to seek to introduce a marketing strategy to improve fishing revenues and enhance conservation of the stock.

which would occur were further protection measures not introduced.

CONCLUSION

Whilst there are no quantitative estimates of the cost of introducing and enforcing new measures nor of their precise economic impact, it can be seen that a continued decline in catch will continue to have a negative economic impact but may be arrested by implementing new regulatory controls on the exploitation of the stock.

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APPENDIX 3

From: Report of the ICES Advisory Committee on Fishery Management to
North Atlantic Salmon Conservation Organisation,
NASCO Council Paper CNL(01)11; May 2001. 71pp

Section 2.5 Catch Options or Alternative Management Advice:

Southern European ISW stocks: The spawning escapement for the whole stock complex has fallen below the conservation limit throughout the past 10 years. Moreover, recruitment of maturing ISW salmon in the Southern European stock complex has been below any previously observed value throughout this period. In both 1999 and 2000 recruitment before exploitation was below the spawning escapement reserve. ICES considers that reductions in exploitation rates are required for as many stocks as possible and that mixed stock fisheries present particular threats to conservation.

Southern European MSW stocks: The PFA of non-maturing ISW salmon from Southern Europe has been declining steadily since the 1970s and the spawning escapement for the whole stock complex has been close to or outside safe biological limits throughout much of this period. The upper 95% confidence limit for PFA of spawners has been below the spawner escapement reserve for the past four years. Qualitative projection of these estimates suggests that the PFA is likely to remain below this reserve in 2001. ICES considers that further reductions in exploitation rates are urgently required for as many stocks as possible and that mixed stock fisheries present particular threats to conservation.

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To: Members of the Wye Local Fisheries Group

Dyddiad/Date 16 November 2001

Subject: Salmon Byelaw Proposals.

You will be aware that the Agency had advertised a number of options for further regulation of the salmon rod fishery to achieve a greater escapement of adults to increase the number in the spawning population. It was clear from the consultation process that there was a large measure of disagreement over the suggested options and that any submission to the NAW would be strongly opposed by a number of fisheries interests.

In order to minimise the objections and maximise support for an agreed submission I asked the proprietors of the top ten fisheries, based on catch returns, to join the Agency's officers to seek a consensus on the proposals to be submitted. Unfortunately we were not able to reach a consensus position but there was a substantial majority in support of the options in the attached appendix.

I have also attached a copy of the notes of our meeting for your information.

I should like to extend my thanks to those who were able to attend and particularly Dr. Madeleine Havard, chair of WyeMAG who so ably acted as an independent chair for the meeting.

JOHN GREGORY

Fisheries, Ecology and Recreation Manager; SE Wales

Attendees:

Madeleine Havard (MHa), Chairman
Warwick Turner (WT), Holme Lacy No 3
David Huntbatch (DH), Holme Lacy No 2
Ian Astley (IA), Hereford and District AA
Maj Gen Hopkinson(JH), Chairman WSFOA, Bigsweir
Phil Jordan(PJ), Garnons Estate
Michael Taylor(MT), Red Lion
Maurice Hudson(MH), Upper Bigsweir
Baden Dummett (BD), Duke of Beaufort
Dr Stephen Marsh Smith(SMS), Gromain, Wye Foundation
Nigel Mott(NM), Holme Lacy, Symmonds Yat, Sellack

Bill Purvis(BP), Steve Barker(SB) and John Gregory(JG) EA Wales.

1. Introduction.

Each delegate introduced themselves to the Chair and indicated who they were representing in attending the meeting (given above in parentheses).

2. Background.

JG explained that the meeting had been called to obtain a consensus view from some of the key rod fisheries interests on a new suite of rod bye-laws for the river Wye. JG outlined the current situation affecting salmon and put the proposed bye-laws into context. JG outlined his vision for the Wye as a no-kill salmon fishery and suggested that to facilitate management the Wye SAP egg deposition target (edt) be adopted as the level below which there were no salmon stocks to exploit on. He then gave specific details of the suite of bye-laws proposed. The overheads used in the presentation have been reproduced and are attached. MHa then opened the floor for feedback and discussion of the Agency's proposals.

3. Feedback and Discussion.

SMS was critical of the edt suggesting that it was an underestimate. He made the point that the bye-laws needed to be seen in the context of not discouraging contributions to the WF from Wye riparian owners and anglers already under pressure. Otherwise the benefit of the works they (WF) do would be lost. MHa recognised that other things were going on to improve things but urged today's discussion to concentrate upon rod fishing.

NM made the case that at current levels of exploitation (rod and within headland netting) previous reductions in exploitation had not reversed the trend. SMS countered that such

measures had always been taken too late. He argued that recently the Usk rod catch had rallied and this could be due to reductions in the exploitation by Usk drift nets and putchers in the estuary.

NM said EA Midlands data suggested that Severn redd counts were high and rising although the rod catch was low. This was at odds with the Wye... why was this?

WT suggested that the Wye's problems went back to the effects of UDN. He was opposed to C&R because of the high mortality rates. He supported his position with anecdotal evidence of several corpses found in the early summer on his beat. He believed that the bye-laws should be amended to include the finishing of the season at the end of August.

JH was scathing about the Wye becoming a "no kill river" saying that it would not be acceptable to owners and rods to make it illegal to keep any rod caught fish. He argued that the river had reached the stage where fisheries were not being fished and lettings had dropped considerably. He did favour a worm ban because the method precludes successful release and was responsible for fish being caught later in the season which had been "saved" by early season restrictions. He was concerned about the impact of the Irish drift net fishery. He too drew the parallel between the need to achieve a balance between maintaining contributions to WF etc. for their improvement work and the need to curb exploitation. He would prefer the introduction of voluntary catch and release at the end of the season. He thought that if it was mandatory at this time then every salmon caught between June 16th and August 31st would be killed.

MH said that the biggest change on the river was the loss of the 3SW fish which dominated catches during the halcyon days, 2SW runs had held up quite well and grilse runs always had been capricious. The 3SW fish entered Wye in March and were the main stay of the substantial April and May catches in middle beats of the river. He also wondered whether the decrease in this component was associated with UDN in the late 1960's.

PJ was instructed to put the Garnon's beat case for the continuation of the status quo. Because they do not have fly water, all of their fish have been caught on worm this year. Spinning is not possible in most years from May because of weed growth. This view was echoed by other "mid-river beats" represented at the meeting.

MT suggested that the affects of changes to the river hydrograph (improved field drainage and greater levels of abstraction) had profoundly influenced salmon catches in the middle river beats. He also asked if there should not be restrictions put in place to protect larger fish only.

JH was against any size limit on catch and release. He reiterated SMS comment from earlier that the edt was not based on the current rearing environment.

BD wondered why the season start should be delayed, surely it would be better to shorten the season by reducing the "back end". JH countered that reducing the season would send a good

“conservation” message and that it would be completely painless in terms of fishery returns to “lose” February.

JG in response to a claim that new bye-laws were a no-cost option for EAW said that it will cost to promote them and a public inquiry would be a major financial undertaking, hence the desire to achieve a consensus with Wye interests before then.

NM revealed during the discussion about the potential for these restriction to hurt Wye salmon fisheries that he no longer had any tenants and that the changes couldn't do “much to me”.

SMS raised the idea that in exchange for the removal of all baits those beats which would particularly suffer (mid river) could be given the opportunity to recoup some advantage by being allowed to spin in March and April (a time when their beats do hold some fish). MT supported this approach saying that it would give his anglers a chance to fish for salmon with a more realistic chance of catching at a time when C&R would protect some fish.

IA speaking for H&DAA said that at a recent meeting they had agreed to support all of the proposals tabled by EAW except for the “no-kill river” position.

The inclusion of a barbless hook bye-law was discussed. JG informed the meeting that EA had received counsel's opinion that there was a risk that such a measure would lead to claims for compensation under the Water Resources Act. He asked if any of the delegates would consider seeking compensation from the Agency because this would materially affect the Agency's position in promoting such a bye-law. In response to a specific enquiry from JG, NM reserved his position on this matter.

JG asked for agreement on the proposal to ban worm, DH and WT were against such a restriction coming in.

There followed further discussions about the various options. After much debate it was established that there was majority support (encompassing representatives from all “parts” of the river) for the following changes to current salmon rod fishing restrictions:

- A bye-law to ban the use of barbed hooks
- Lifting the current spinning restrictions during March and April to bring the river in line with the National Spring Fish Byelaws
- Putting back the start of the season to 3rd March
- A ban on all baits (ie. Worm, prawn and shrimp)
- A voluntary C&R programme promoted by the Agency, WSFOA and other Wye fishery interests.

However, not all of the delegates were supportive of all of these measures specifically NM, DH and WT who were not in favour of the total bait ban. Similarly, PJ (on behalf of Gurnea's estate) was unable to support the suggested package requiring the status quo to be maintained

River Wye Salmon Rod Fishery

Proposed Regulatory Amendments 2001

1. Delay opening of season to 3 March.
2. Amend byelaw to allow spinning in addition to fly fishing from 3 March to 31 August.
3. Prohibit use of worm prawn and shrimp bait for salmon at all times.
4. Introduce new byelaw to require the use of barbless or de-barbed hooks when fishing for salmon.
5. Catch and release after 15 June on voluntary basis only.