

Salmon and Freshwater Fisheries Review





Cynulliad Cenedlaethol Cymru
The National Assembly for Wales

Salmon and Freshwater Fisheries Review

Foreword

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8 February 2000

On April 8 1998 I was appointed by the then Minister of Agriculture, Fisheries and Food and Secretary of State for Wales to chair a group to review salmon and freshwater fisheries policies and legislation in England and Wales. The results of that review are presented here.

The Group used its Terms of Reference as a basis for developing a number of principles to underpin our discussions. These principles, which are explained in Chapter 2, have led us to consider all aspects of our review from the following viewpoints. We were asked to look at the policies and legislation concerning the conservation and management of salmon and freshwater fish. We decided that fish conservation must take priority over exploitation; if stocks are not properly conserved there will be nothing to manage. Fish are an integral part of the aquatic ecosystem and cannot be looked at in isolation: the Group therefore considered the freshwater environment as a whole. This required us to consider not only the impact that changes to the environment could have on fisheries but also the impact that fish conservation and management might have on the environment. Throughout the report we have been conscious of the importance of considering the ecological needs of fish and their environment and the need for integrated management.

The structure of our report reflects these viewpoints. Part I sets the boundaries for the extent of our Review and considers the purpose of fisheries management and, in particular, salmon and freshwater fisheries legislation. Part II examines the ecological requirements of freshwater fish and makes recommendations for improvements in environmental quality. In Part III we consider the importance of fisheries to people and make recommendations for increasing the social, economic and recreational benefits of fisheries. Part IV is concerned with the details of regulating fisheries in order to achieve environmental and social objectives. In making recommendations for changes to the legislation our aim has been to create a more flexible package of legal controls that will be able to meet changing need over the years to come. Last, but definitely not least, in Part V we make recommendations for changes in institutional and administrative arrangements, and funding for fisheries management. Our approach in this Part has been guided by your predecessor's direction that we should consider the rationale, objective and adequacy of public expenditure on fisheries.

The Review Group makes a total of 195 recommendations. As requested, we have grouped these into those requiring changes to primary legislation; those that could be implemented without such changes; and those best addressed outside salmon and freshwater legislation. It would be wrong of me to attempt to single out some recommendations as more important than others but I would like to draw your attention to our most fundamental conclusions and recommendations.

We received overwhelming support for Government involvement in the conservation of freshwater fish and the management of freshwater fisheries. We concluded that this involvement should have the following objectives:

- to ensure the conservation and maintain the diversity of freshwater fish, salmon, sea trout and eels and to conserve their aquatic environment;
- to enhance the contribution salmon and freshwater fisheries make to the economy, particularly in remote rural areas and in areas with low levels of income;
- to enhance the social value of fishing as a widely available and healthy form of recreation.

Furthermore we believe that these three objectives should provide a statutory interpretation for the Environment Agency's duty to maintain, improve and develop salmon and freshwater fisheries.

The key conclusion from our review of institutional and administrative arrangements is that the regulation and management of salmon and freshwater fisheries should be integrated at the different levels at which action is undertaken, and integrated with other categories of environmental management. In particular, we note that under present departmental structures, no single government department in England can have policy responsibility for all issues of relevance to freshwater fisheries. We believe that it is essential, therefore, that there is better coordination within and between departments in order to ensure that an integrated, holistic approach is brought to bear on fisheries. The same principles of coordination should apply to the work of subject committees of the National Assembly for Wales.

We are in no doubt that there is a convincing rationale for public expenditure to achieve the objectives referred to above. We are also in no doubt that existing levels of expenditure are inadequate. Although we make suggestions for increasing the contributions from private sources and for raising public expenditure by novel means, we conclude that there is a need for a substantial increase in Grant-in-Aid for the Environment Agency's fisheries function in England and Wales and recommend accordingly.

I would like to take this opportunity to thank the Government for appointing me to chair the Review Group. I consider it a great privilege and I can honestly say that I have enjoyed every minute of it. Much of the responsibility for this rests with the members. I could not have asked for a better group of individuals. Although, by design, each came to the Review with their own particular interests – which were not always mutually compatible – the Group worked together right from the start. I believe that it is a great tribute to their dedication and wise thinking that all the recommendations were agreed unanimously. I thank them all for their hard work, patience and kindness to me. Unfortunately, as you are aware, one member of the Group, John Golding, died in January last year. I greatly valued his support for me as a chair and sorely missed his advice on the conduct of the Review. In recognition of my, and the Group's, appreciation we have dedicated this report to him.

Yours sincerely

Lynda M. Warren

Professor Lynda M. Warren

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Executive summary

Scope of the review

1. We were asked by Ministers to review policy and legislation applying or relevant to salmon and freshwater fisheries and to make recommendations. We have interpreted our terms of reference (which are set out in Chapter 2) as requiring us to consider the conservation both of all fish that spend all or part of their lives in freshwater (we refer throughout to these as salmon and freshwater fish) and of the ecosystems in which they live: our report therefore considers not just the management of fisheries but the various factors that may affect fish and their environment. We also consider the economic and social aspects of fisheries. We conclude that it is important that fisheries are not treated in isolation from their environmental context and that fisheries management should be integrated with general catchment management.
2. We consider that Government involvement in the conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries should have the following objectives:
 - to ensure the conservation and maintain the diversity of freshwater fish, salmon, sea trout and eels and to conserve their aquatic environment;
 - to enhance the contribution salmon and freshwater fisheries make to the economy, particularly in remote rural areas and in areas with low levels of income;
 - to enhance the social value of fishing as a widely available and healthy form of recreation.
3. New legislation on salmon and freshwater fisheries should focus on achieving these objectives. Problems that affect the freshwater environment as a whole should be dealt with through environmental legislation, which should recognise the importance of fish in the aquatic ecosystem. New legislation on fisheries should treat all fish occurring in freshwater on an equal basis.
4. The Environment Agency should retain responsibility for regulating salmon and freshwater fisheries in England and Wales. Its statutory duty to maintain, improve and develop, salmon and freshwater fisheries should be interpreted as a duty on the Agency to meet the objectives set out in paragraph 2 above.

Fish and their environment

5. In spite of recent general improvements in river and inshore water quality the evidence we have received indicates a serious decline in the quality of the freshwater environment caused by water pollution, water abstraction and the impact of agriculture, land drainage and development. We conclude that modern farming practices, in particular, cause substantial damage to freshwater habitats. We would like to see: fundamental changes to the Common Agricultural Policy to encourage less intensive farming methods; tighter rules on agricultural pollution and, in particular, on the use of sheep dips, with the use of synthetic pyrethroid dips eventually phased out; the introduction of specific agri-environment schemes to reduce the impact of farming on the freshwater environment and on fisheries. We are also concerned at the loss of wetland and river habitat by land drainage

and flood defence works and recommend that the Environment Agency should draw up a co-ordinated programme of river and river corridor habitat restoration. Other changes that we would like to see include tighter controls on water abstraction, on artificial transfers of water and on development in flood plains which adversely affect watercourses.

6. Commissioned Government research on piscivorous birds, published in September 1999, demonstrated the complexity of the inter-relationship between such birds and their prey species. Unfortunately, the research did not lead to firm practical management recommendations. In the circumstances we think that the present legal regime should be retained but believe that clear guidance should be given on the evidence required to demonstrate serious damage to fisheries and conclude that further research should be undertaken into alternatives to shooting.
7. The need for more information is not restricted to piscivorous birds. It is essential that policies on the conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries should continue to be based on the best available scientific evidence. The government, the Environment Agency, NERC and other funding bodies should give high priority and long term commitment to R&D on the freshwater environment and fisheries and should ensure better co-ordination of their research and monitoring programmes in this area. We would also like to see improvements in the monitoring of fish stocks and the state of the environment and additional research in a number of areas, with more emphasis on research on coarse fish.

Social, economic and recreational importance

8. A substantial number of jobs are angling-related and depend on the good management of fisheries throughout England and Wales. In both rural and urban areas angling can make a substantial contribution to the local economy. This is particularly valuable in remote rural areas with few other sources of employment. It is thus important that the economic value of salmon and freshwater fisheries in rural areas is recognised in the development of Government policies on the countryside and the rural economy.
9. Angling as a recreation has social as well as economic benefits. To achieve this the promotion of angling should be an integral part of the Environment Agency's function in relation to salmon and freshwater fisheries and should be funded accordingly. In particular, we would like to see the Agency expand its efforts to promote angling in urban areas, to improve access to angling for disabled people and to promote angling among young people.

Fisheries regulations

10. We received a wide range of evidence on close seasons, in particular in relation to coarse fish. We conclude that the power to impose a close season should be retained in future legislation, but that this should be exercised only where a close season is needed for fish conservation purposes. If there is a need to restrict access to freshwater habitats on wider environmental grounds, these restrictions should be made under general environment legislation and should not be applied to anglers alone. We believe that this approach will lead to the retention of the close season for salmon, sea trout and wild brown trout, but not generally for stocked trout or coarse fish. We would like to see the coarse fish close season removed on all waters, including rivers, except where it is necessary to avert serious risk of damage to fish stocks. For canals this should be done as soon as possible.

11. Coarse fish are almost invariably returned to the water alive, so rules on angling for coarse fish are not intended to limit exploitation, unlike those for such species as salmon and eels. Nevertheless, we believe that there is a continuing need for rules on angling for coarse fish. The same applies also to trout, although special consideration should be given to wild brown trout.
12. Eels appear to be in serious decline. As all eels in Europe form part of a single stock, we urge the development of a Europe-wide stock recovery plan involving measures to reduce exploitation of eels at all stages of their life cycle as soon as possible. We would also like to see the introduction of a ban on fishing for elvers other than in rivers in estuaries where it is currently practised and a number of other changes made to current legislation to improve information on catches of eels and controls on exploitation.
13. For salmon we conclude that conservation limits (spawning targets) represent the best practicable way of using scientific principles to ensure that exploitation of salmon stocks in individual rivers does not exceed acceptable levels. However, the credibility of conservation limits is entirely dependent upon the reliability of the data used to establish them and the rigour of the supporting analysis. For this reason conservation limits need to be subject to continued review and development and be updated as necessary. There needs to be close consultation of local interests in the development and in the implementation of conservation limits.
14. We endorse the Government's policy of phasing out mixed stock fisheries in home waters. We believe, however, that if possible this should be accelerated and that the Government should contribute substantial funding towards the cost of compensation arrangements intended to encourage netsmen to leave these fisheries on a voluntary basis. The Government should also do all it can to reduce the impact of Irish and distant water mixed stock fisheries on English and Welsh salmon stocks.
15. We believe that effort controls should remain the principal method of controlling the exploitation of salmon and would like to see powers to limit effort in both rod and net fisheries retained in future legislation; we make a number of recommendations for improvements to the current rules. We advocate the introduction of a carcass tagging scheme for rod and net caught salmon, together with a general bag limit for rod caught fish and parallel restrictions on numbers that can be taken in nets. Pending the introduction of such a scheme, we believe that there should be a ban on the sale of rod caught salmon.
16. We consider how the salmon resource should be allocated between rods and nets. We conclude that there is no justification for a blanket ban on all commercial netting for salmon where conservation limits are being met, but that there is a need for additional powers to regulate exploitation in order to allocate the catch between interest groups. However, under such a reallocation netsmen giving up licences should be entitled to compensation and no netsman solely or mainly dependent on fishing for his livelihood should be deprived of a licence without his consent.
17. We consider that the approach we recommend for the management of salmon should be applied, with minor modifications, to sea trout. Conservation limits should be developed and set for sea trout and Salmon Action Plans extended to include them. However, given the generally healthy state of most sea trout stocks, we do not think that at present there is a need for measures such as carcass tagging, a general bag limit or a ban on the sale of rod caught fish to be introduced for them.

18. There was unanimity among those giving evidence that it was necessary to retain controls over movements of fish, and we agree that such controls are fully justified. They should cover both movements for the purpose of stocking and movements for fish farming purposes.
19. We conclude that stocking should be permitted only where it can be justified, taking into account the benefits and the disadvantages. We propose a number of guiding principles which should be used to decide whether stocking should or should not be allowed in particular circumstances. Where stocking is permitted its effectiveness and environmental impact should be monitored. We believe that there is case for taking a particularly cautious approach to salmon stocking programmes and any proposals to stock salmon need to be evaluated against alternative management options.
20. Currently there are no adequate mechanisms for regulating fish farming activities. To remedy this, we propose that legislation be introduced requiring all fish farms, including fish dealers premises, to be licensed. A licensing authority should have the power to impose conditions of approval and to refuse licences for inappropriate sites. Details of licences and of the conditions attached to them together with other relevant information, should be included on a public register. We do not consider that the automatic exemption of fish farms from the requirement to seek approval from the Environment Agency for introductions should be retained and we consider that marine cage salmon and trout farms should not be permitted in estuaries of rivers containing migratory salmonids or in nearby coastal waters.
21. Existing rules regulating fish movements have proved difficult to enforce. We conclude that enforcement would be more effective if there were a legal requirement for all fish movements to be recorded and for all such movements to be accompanied by the correct documents.
22. We believe that the Environment Agency's proposed byelaw, making it an offence to take fish for use as livebait unless the fish are retained at and used only in the water from which they are taken, should prevent the transfer of livebait from one water to another. If, however, this should prove to be ineffective, we believe that livebaiting should be banned on all unenclosed waters. We also suggest that livebaiting should be banned altogether on waters where the release or escape of livebait could have an adverse impact on a valuable freshwater ecosystem or a rare fish population.
23. The passage of fish can be hindered by obstructions such as dams and weirs, and we suggest a number of improvements to the current legislation. We also think that there should be a presumption against the construction of estuary barrages affecting any river containing anadromous fish. Special rules on the use of fixed engines to catch fish should be repealed and all remaining fixed engines and fishing weirs regulated in the same way as fishing nets.
24. We make a number of recommendations for improving the enforcement of salmon and freshwater fisheries legislation. These include strengthening the powers of water bailiffs, requiring anglers to display rod licences on their person and introducing a fixed penalty scheme for minor fisheries offences.
25. Penalties imposed for fishing offences do not always reflect the seriousness of the offence. We conclude that efforts should be made to persuade the judiciary of the potential seriousness of fisheries offences and suggest that a special environmental court might provide a more suitable regime for trying fisheries offences.

Institutional and financial arrangements

26. We conclude that there should be no change in the current institutional arrangements for regulating salmon and freshwater fisheries, with the Ministry of Agriculture, Fisheries and Food and the National Assembly for Wales retaining overall policy responsibility and the Environment Agency remaining responsible for regulation on a day to day basis. The evidence we received, however, revealed considerable dissatisfaction with the way the Environment Agency exercises its responsibilities, and we recommend a number of changes which we hope will address this.
27. We conclude, in particular, that the Environment Agency's current advisory committee system is not working well. We consider that the Environment Agency needs to consult its Regional Fisheries Ecology and Recreation Advisory Committees (RFERACs) more fully in the process of policy formulation, so that all those involved feel their views are being taken into account and that they are working in partnership with the Environment Agency towards shared goals. We think that more far reaching changes are needed at the local level, and recommend that the Agency restores a two tier advisory structure, with a formal local committee system. This should involve at least one local committee in each Environment Agency Area, with a legal requirement for the Agency to consult local committees, and take their advice into account, on a range of issues. We also consider that the Environment Agency should work more in partnership with local interests, such as river trusts.
28. The Environment Agency's responsibilities in coastal waters overlap with those of Sea Fisheries Committees (SFCs). We conclude that closer co-operation is needed between the Environment Agency and SFCs in coastal waters, and suggest that there should be a full review of the role and powers of SFCs and of their relationship with the Environment Agency. We also consider that the Environment Agency should be required by law to develop Fisheries Action Plans for all catchments. Where appropriate, Salmon Action Plans should be incorporated into these Plans, which should be reviewed regularly.
29. We were specifically asked by Ministers to consider what the rationale is for public expenditure for salmon and freshwater fisheries and whether existing levels of public expenditure are adequate. We conclude that there is a convincing rationale for Government intervention to achieve the objectives detailed in paragraph 2 above for policies on the conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries and for that intervention to be publicly funded.
30. As far as the level of public spending is concerned, we note that in real terms there has been a considerable reduction in spending on salmon and freshwater fisheries since the early 1990s; in particular, there has been a very substantial reduction in Government Grant-in-Aid to the Environment Agency to fund its spending on fisheries. There appears to be no justification in fisheries terms for these cuts, or for the current situation whereby all Grant-in-Aid is spent on salmon and sea trout fisheries; a significant proportion of the Environment Agency's spending on coarse and trout fisheries benefits the general public, not only anglers, and should be publicly funded. We conclude that current levels of public expenditure on salmon and freshwater fisheries are not adequate and should be increased, and that the additional work on coarse fisheries that we recommend in this report should be publicly funded. We therefore conclude that in the forthcoming public expenditure round the Government should provide a substantial increase in Grant-in-Aid. We also suggest that, in the longer term, the Government should develop ways of raising money to fund some of the Environment Agency's spending on fisheries through a levy on charges for abstraction licences and discharge consents.

31. We were also asked by Ministers whether it was possible to secure a greater contribution towards the costs of the public sector involvement from those directly involved with salmon and freshwater fisheries. We conclude that there is a good case for retaining rod licences, and that rod licence duties should continue to contribute to the funding of the Environment Agency's fisheries activities. We consider, however, that there is only limited scope to increase rod and salmon net licence duties, although we would like to see increases in licence duties on instruments used in eel and elver fisheries. We do not support other suggested ways of raising funds from fisheries interests, including charges on fisheries' owners. In our view it must be for the Government to meet the cost of additional spending that we believe to be essential to the conservation of salmon and freshwater fish. In particular, if salmon and sea trout are to continue to survive in reasonable numbers the Government will have to meet most of the cost.

32. It is important that the amount of money that the Government is being asked to find is put in perspective. In 1998/99 the Government provided Grant-in-Aid of £32 million to four opera and ballet companies and £7.4m to the Environment Agency for fisheries work in England and Wales; in 2001 it plans to provide only £3.2m for England. Even if fisheries Grant-in-Aid is substantially increased, the Government will be paying comparatively little to conserve salmon and freshwater fish and their habitats and to encourage a recreation enjoyed by over two million anglers.

Recommendations

I Changes in salmon and freshwater fisheries policy that could be implemented without changes to primary legislation.

Objectives, institutional arrangements and funding

1. Government involvement in the conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries should have three principle objectives:
 - to ensure the conservation and maintain the diversity of freshwater fish, salmon, sea trout and eels and to conserve their aquatic environment;
 - to enhance the contribution salmon and freshwater fisheries make to the economy, particularly in remote rural areas and in areas with low levels of income;
 - to enhance the social value of fishing as a widely available and healthy form of recreation. (3 2.1)
2. The Environment Agency should continue to be the body responsible for the regulation and management of salmon and freshwater fisheries in England and Wales. (14 3.3)
3. The Environment Agency's statutory duty to maintain, improve and develop salmon and freshwater fisheries should be retained. This duty should be interpreted as a duty on the Agency:
 - to ensure the conservation and maintain the diversity of freshwater fish, salmon, sea trout and eels and to conserve their aquatic environment;
 - to enhance the contribution salmon and freshwater fisheries make to the economy, particularly in remote rural areas and in areas with low levels of income;
 - to enhance the social value of fishing as a widely available and healthy form of recreation.

This interpretation should be put on a statutory basis at the first available opportunity¹ (3 4.2)
4. In the forthcoming public expenditure round the Government should provide a substantial increase in Grant-in-Aid for the Environment Agency's fisheries function in England and Wales. (15 3.9)
5. Rod licences should be retained and rod licence duties should continue to contribute to the funding of the Environment Agency's fisheries activities. (15 4.3)
6. The Environment Agency should provide a wider range of payment options for fishing licences including direct debit. (15 4.5)
7. The Environment Agency should ensure that all work carried out by its fisheries function to benefit its other functions is properly identified and costs recovered accordingly. (15 3.11)

¹ The final part of recommendation 3 will require primary legislation

8. The Environment Agency should intensify its efforts to improve integration of its policies and activities, particularly those which affect fish, fisheries and the aquatic environment. (14 5.3)
9. The promotion of angling, and in particular opportunities for angling, should be an integral part of the Environment Agency's function in relation to salmon and freshwater fisheries, and funded accordingly. (9 3.2)
10. The Environment Agency should expand its efforts to develop fisheries and promote angling in urban areas, to improve access to angling for the disabled and to promote angling among young people. Government should provide additional funding for these purposes. (9 3.7)
11. Instructor rod licences should be introduced to enable beginners to fish without having to hold an individual rod licence, and the minimum age at which a rod licence is required should be raised to 16. (9 3.10)
12. The Environment Agency should propose appropriate increases in licence duties on instruments used in eel and elver fisheries. (15 4.11)
13. The Environment Agency should establish clearer accountability at Area level for implementing national policies and standards and for achieving planned environmental and socio-economic outcomes. (14 5.4)
14. Environment Agency regions which are large and diverse should, if necessary, have more than one Regional Fisheries, Ecology and Recreation Advisory Committee (RFERAC). (14 6.9)
15. The Environment Agency should consult RFERACs at an early stage in the process of developing policy: in particular it should:
 - keep committees informed of the development of policies on which they are consulted;
 - involve committees as fully as possible in its decisions, particularly at the regional level;
 - take account of committees' views on any issue on which they wish to provide advice. (14 6.11)
16. RFERAC chairman should continue to be appointed by Ministers and RFERAC members by the Environment Agency. Candidates for RFERAC membership should be interviewed by a panel with a majority of independent members and the appointment procedure should be open and transparent. (14 6.13)
17. The Environment Agency should restore a two tier advisory structure, with a formal local committee system. Under this system the Agency should be required by law² to:
 - establish and maintain at least one local committee in each Area;
 - consult local committees, and take account of their advice, on the development of Fisheries Action Plans, on annual fishery related targets and on priorities for the use of its resources on fisheries;

² It is assumed that this could be implemented via a Ministerial direction under Section 40 of the Environment Act 1995.

- consult local committees, and take account of their advice, on other issues of relevance to salmon and freshwater fisheries, such as local flood defence programmes, water quality investments in particular where the Agency is a statutory consultee;
 - arrange regular meetings of all local committees;
 - report at one of the meetings each year to local committees on progress against targets and on the state of local fish stocks and additionally to make regular progress reports. (14 6.17)
18. The Environment Agency should be required by law to develop Fisheries Action Plans for all catchments. Where appropriate, Salmon Action Plans should be incorporated into Fisheries Action Plans, which should be reviewed annually with targets updated to reflect revised priorities and available resources. The development of Fisheries Action Plans should be an integral part of the LEAP process. (14 11.2)
19. Statutory agencies with functions of relevance to the management of fisheries should work more closely together to ensure that fisheries issues are properly addressed. Where the responsibility for implementing legislation falls to different agencies, it is essential that these agencies co-ordinate their activities. (14 8.5)
20. The Environment Agency should be properly funded, through Grant-in-Aid, to fulfil its sea fisheries responsibilities in areas where it acts as a Sea Fisheries Committee (SFC). In such waters it should perform the full range of SFC regulatory duties necessary to regulate and conserve sea fish as well as salmon, sea trout and eels. (14 7.7)
21. There should be a full review of the role and powers of SFCs in coastal waters and of the relationship between SFCs and the Environment Agency. This should cover, among other things:
- the respective roles and jurisdictions of the Environment Agency and SFCs;
 - how co-operation between the Environment Agency and SFCs can be improved so as to make best use of resources devoted to the enforcement of sea fisheries and salmon and freshwater fisheries legislation in coastal waters;
 - extending the Environment Agency's powers to act as an SFC in estuaries of rivers containing migratory salmonids;
 - how the Environment Agency and SFCs can best co-operate to regulate eels fisheries in coastal waters;
 - how best to protect diadromous fish, other than salmon, sea trout and eels, in coastal waters. (14 7.10)
22. We would encourage anglers and angling organisations in England and Wales to establish an anglers' consultative forum to give advice to the Environment Agency and Government on the development of policies concerning angling. (9 4.1)
23. The Sports Councils in England and Wales should provide greater financial support for the encouragement of angling and the promotion of angling excellence. (9 4.2)

The regulation of fishing

24. The power to impose a close season for angling should be exercised where evidence shows that there are serious risks of damage to fish stocks which can be addressed by this means. (10 3.13)
25. Byelaws should be introduced to abolish the close season for coarse fish on canals and rivers except where its retention is necessary to avert serious risk of damage to fish stocks. (10 3.22)
26. There should be a framework of common rules on angling for coarse fish in England and Wales, implemented by means of byelaws. These need to be straightforward and enforceable, and if necessary they should be complemented by Codes of Practice, agreed with the relevant angling organisations. Local byelaws should be used to deal with local problems. (10 4.3)
27. The Environment Agency should explore areas where the management of enclosed waters can be deregulated from fisheries legislation where this encourages owners and managers to maintain, improve and develop their fisheries without detriment to fish stocks elsewhere. (14 14.3)
28. Measures to reduce exploitation of eels at all stages in their life cycle and to develop a stock recovery plan as part of a wider European Management Programme should be pursued urgently as a matter of priority. (10 6.4)
29. The Environment Agency should consider as a matter of urgency ways of improving information on catches of eels and elvers. (10 6.9)
30. A ban on fishing for elvers, other than in rivers and estuaries where it is currently practised, should be introduced as rapidly as possible. (10 6.14)
31. Consideration should be given to imposing minimum and maximum size limits for eels taken and retained in net and trap fisheries. (10 6.17)
32. The Environment Agency should review all the factors likely to lead to by-catches in eel net and trap fisheries of other fish, with a view to providing consistent guidance on how by-catches can be reduced to the minimum. This should then be used to develop rules on the design of fyke nets, and the locations in which they are used, that can be enforced through byelaws and conditions on net licences. (10 6.19)
33. Express consent from the Environment Agency should be required for the removal of predatory fish in excess of specified maximum numbers from all unenclosed waters. (11 7.2)
34. Conservation limits for salmon should continue to be used to define thresholds below which the number of spawning salmon in each river should not be permitted to fall. To be acceptable, conservation limits must be realistic and credible and should be subject to continued review and development and be updated as necessary. The Environment Agency should provide estimates of the higher target stock sizes it will aim to achieve in order to ensure that conservation limits are met four years out of five, and should consider developing further lower limits below which no exploitation would be permitted. (10 8.9)
35. When and where appropriate, the Environment Agency should develop and apply separate conservation limits for one-sea-winter (grilse) and multi-sea-winter salmon. (10 8.12)

36. When the Environment Agency publishes the conservation limits for each river it should explain the sources of data and the calculation of those limits to encourage local ownership of resulting management strategies. (10 8.14)
37. Salmon Action Plans should set out the procedures to be followed if stocks in a particular river do not exceed their conservation limits. Local interests should be fully consulted and their views taken into account, before the procedures are finally established. (10 8.15)
38. Steps should be taken to improve the quality and reliability of data collected for salmon management. (10 8.18)
39. The phase out of mixed stock salmon net fisheries in England and Wales should be accelerated, and to achieve this compensation should be offered to netsmen to encourage them to leave these fisheries on a voluntary basis as soon as possible. (10 9.3)
40. The Government should provide substantial pump-priming funds to launch compensation arrangements designed to accelerate the phase out of mixed stock salmon net fisheries on a voluntary basis, and should take the lead in setting up these arrangements. (10 9.4)
41. The Government should continue to press the Irish government, by all available means, to take all practicable measures to reduce the impact of the Irish drift net fishery on English and Welsh salmon stocks. (10 9.7)
42. The Government should continue to do its best to ensure that NASCO sets quotas for the West Greenland and Faroe Islands salmon fisheries at the lowest achievable level. (10 9.9)
43. A ban on the sale of rod caught salmon should be introduced as soon as possible³ ; the position should be reviewed if and when a carcass tagging scheme comes into force. (10 10.15)
44. The Environment Agency should set conservation limits for sea trout. (10 12.4)
45. Salmon Action Plans should be extended as soon as possible to include sea trout, and where appropriate brown trout, pending development of comprehensive Fisheries Action Plans. (10 12.7)

Fish transfers and stocking

46. Introductions of fish for stocking purposes should continue to be regulated and stocking should be permitted only where it can be justified taking account of the benefits and disadvantages. (11 3.2)
47. Guidelines on stocking, embodying the following principles should be established:
 - stocking should be allowed only where there is no significant risk of ecological detriment to donor waters or receiving waters and where there is a demonstrable environmental, economic or recreational advantage;
 - stocking should not normally be permitted in waters with established fish populations where it is not currently practised and has not been practised in recent years. However, stocking may be justified in such fisheries if it is needed in order to restore depleted populations or mitigate the effects of, for example, loss of spawning habitat;

³ This might require primary legislation

- where recreational pressures justify stocking to sustain exploitation rates by anglers or losses due to predation higher than could be sustained naturally, decisions on consent applications should take account of the carrying capacity of the water involved and the management regime proposed for that water body;
 - fish should not normally be introduced into waters outside the existing natural range of the species concerned or into new catchments within their existing ranges;
 - reintroduction of fish species which are no longer present in a catchment should be permitted only after an assessment of the likely environmental effect of the reintroduction. (11 3.3)
48. Where stocking is consented:
- the size, age, number and provenance of the stocked fish should be appropriate to the ecological characteristics of the receiving water;
 - the effectiveness and environmental impact of the stocking should be monitored;
 - The Environment Agency should itself undertake periodic reviews of its policy on stocking consents, based on its assessment of the effectiveness of stocking and its environmental impact. (11 3.8)
49. Stocking with salmon should be employed only to address a decline in stocks where:
- alternative methods to solve the problem have been fully evaluated and the need for stocking has been clearly identified and justified;
 - the programme is appropriate and conforms to agreed guidelines/criteria (including the use of appropriate stock and the adoption of best hatchery practices). (11 3.14)
50. Marine cage salmon and trout farms should not be permitted in estuaries of rivers containing migratory salmonids or in adjacent coastal waters. (11 4.5)
51. Any transgenic fish kept in England and Wales should be confined to self-contained land-based and escape-proof facilities, with all necessary measures taken to ensure they cannot deliberately (by, for example, vandals) or accidentally be released into the natural environment. (11 4.6)
52. Environmental impact assessments should be made for all proposals for new fish farms or extensions to existing fish farms. In addition, detailed planning guidance should be issued to assist local planning authorities in assessing the suitability of a proposed location. (11 4.8)
53. When applications for the introduction of non-wild varieties of native species are considered, the Section 30 consent determination should follow the criteria laid down for non-native species covered by licensing provisions. (11 5.3)
54. The Government should seek a revision of the basic fish health directive (91/67/EEC) to permit specifically the imposition of restrictions on stocking fish into the wild. (11 6.7)
55. Health checks on fish that are to be stocked should be conducted under the following circumstances:
- the Environment Agency should continue to impose fish health conditions on stocking waters where stocking would involve a significant risk of spreading disease; these

conditions should not be confined to satisfying a laboratory check of a sample of the fish to be stocked;

- the Environment Agency should carry out a risk assessment of all proposed stockings and that the fish health conditions it imposes should be commensurate with the level of disease risk. For those stockings that do not involve a significant risk the onus should be on the owners to ensure that the fish stocked are disease free;
 - the Environment Agency should consider testing selected waters on a regular basis to establish a list of disease free sources of fish for stocking. (11 6.11)
56. Where the release or escape of fish used as livebait could have an adverse impact on a valuable freshwater ecosystem or a rare fish population, the Environment Agency should ban the use of livebait in the water in question. (11 8.2)
57. If there is evidence that the byelaw stipulating that livebait may be used only in the water from which they are taken is being widely disregarded, the Environment Agency should ban the use of fish as livebait in all unenclosed waters. (11 8.3)

Enforcement

58. The Environment Agency should make greater use of properly trained and equipped honorary water bailiffs and there should be greater consistency over the use of honorary bailiffs between regions. (13 3.3).
59. Anglers should be required by law to display their rod licences prominently on their person (13 4.1)
60. We strongly encourage all fisheries' owners and managers to ensure that anyone permitted to fish their waters possesses a valid rod licence. (13 4.2)
61. The Environment Agency should introduce a fixed penalty scheme for minor fisheries offences. For such a scheme to be viable, it is essential that the income from fixed penalties is retained by the Agency to defray its costs. (13 5.2)
62. Government and the Environment Agency should continue their efforts to make judges and magistrates aware of the potential seriousness of fisheries offences and to ensure that punishments imposed by Courts reflect the seriousness of the offence. (13 5.4)

Research and development

63. Policies on the conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries should continue to be based upon the best available scientific information. (8 2.5)
64. The Government, the Environment Agency, NERC and other funding agencies should continue to give high priority and long term commitment to the funding of R&D on the freshwater environment and fisheries and should ensure that adequate funding is available to conduct research and implement the findings. (8 2.6)
65. Those responsible for research and monitoring by government departments, the Environment Agency, the nature conservation agencies and NERC should ensure good co-ordination of all research programmes which have a bearing on the management of fisheries and the freshwater environment. Where possible databases should be linked and access provided for key partners. (8 2.12)

66. Research proposals should be evaluated on the basis of benefit in relation to cost, rather than cost alone. (8 2.14)
67. The Environment Agency should establish a panel to audit its R&D and monitoring; the panel should include some independent members. (8 2.13)
68. The Environment Agency should ensure good co-ordination of fisheries monitoring programmes with other Environment Agency monitoring and harmonisation of the programmes with those of English Nature and the Countryside Council for Wales. (8 3.1)
69. The Environment Agency should adopt a structured approach to the design of its monitoring programme so that it is both modernised and better targeted, and information should be produced in such a manner as to be effective in meeting the future fisheries management needs of the Agency and others. (8 3.5)
70. The revised fisheries monitoring programme that is being developed by the Environment Agency should be linked with monitoring for other components of the aquatic environment (for example invertebrates and habitat). Research is required to provide more cost-effective methods for monitoring fish populations. (8 3.6)
71. There is a need to develop and improve methods to assess the socio-economic values of all recreational activities that are dependent upon the freshwater environment, and to investigate the impacts of all recreational activities on fish and the environment. (8 4.2)
72. Research to identify the conservation value of individual rivers should be extended to cover all major catchments and should not be confined to those that are known to contain species and habitats of relevance to the EC Habitats Directive. Future research should be based upon an holistic view of environmental and fisheries management. (8 4.3)
73. Research should be conducted into the possible effects of climate change on salmonids and freshwater fish, but this should not be conducted in isolation from similar studies on other aspects of the freshwater environment. (8 4.4)
74. There is a continuing need for studies of the wide range of factors that affect fish stocks in freshwater and of methods to reverse adverse effects, in particular historic damage. (8 4.6)
75. MAFF and the Environment Agency should continue to conduct research on fish diseases, their identification, distribution and effects on wild stocks. (8 4.7)
76. The Environment Agency and MAFF should continue to fund research to develop and refine the methods used to set conservation limits and management targets for salmon stocks, in co-operation with ICES and NASCO, and for sea trout. (8 4.8)
77. Further work should be undertaken to update and develop methods for monitoring and assessing salmonid stocks, and the regulatory and management authorities should ensure the best co-operative use of resources in this area. There should be further long-term studies of the population dynamics of individual river stocks of salmon and sea trout as a basis for improved stock management on different river types. (8 4.9)
78. Research is required on the impacts of human activities on salmonid stocks and the effectiveness of a wide range of habitat restoration methods. The results of the studies must be readily available to all interested parties. (8 4.11)
79. Research is required on the behaviour and distribution of salmonids in the sea and the factors impinging on them. There is a need to establish whether by-catches may be

occurring in pelagic fisheries particularly in the Norwegian Sea, and the necessary research should be undertaken in co-operation with other countries and bodies as soon as possible. (8 4.12)

80. Research should be conducted on sea trout to provide a sound understanding of their ecology and, in particular, of their relationship with salmon. (8 4.14)
81. Wild brown trout and grayling fisheries should be supported by habitat management and research which underpins our understanding of their long-term sustainability. (8 4.16)
82. There is a need to increase the research programmes on coarse fish communities in different habitats. Future research should be based upon an holistic view of environmental and fisheries management. (8 4.17)
83. Fundamental research is required on all the coarse fish species in England and Wales, their habitat requirements, behaviour and population dynamics. Research is also required on the relationships between fish species within communities and on the factors causing species composition to change over time. (8 4.19)
84. Research is required on the effects of angling practices, such as ground baiting, on fish and freshwater ecosystems. (8 4.20)
85. Research on eels should be continued in particular to elucidate the population dynamics of the species and to improve the monitoring of eel stocks. This work should be integrated with studies on eels in other European countries. (8 4.21)
86. Research is needed to establish the distribution of rare and non-target fish species, describe their ecology and investigate factors that may be limiting the size of stocks, such as the effect of obstructions. (8 4.22)
87. The Government should carry out research on the potential effects of various non-indigenous species on native fish and ecosystems. (8 4.23)

II Changes in salmon and freshwater fisheries policy which require changes to primary legislation

Scope of legislation

88. New legislation on salmon and freshwater fisheries should focus on providing Government and its agencies with the means to achieve their objectives for the conservation and management of salmon and freshwater fish. Problems that affect the freshwater environment as a whole should be dealt with through environmental legislation. (3 3.4)
89. New salmon and freshwater fisheries legislation should include powers to introduce by secondary legislation measures necessary to attain Government's objectives for salmon and freshwater fisheries. (3 5.2)
90. Salmon and freshwater fisheries legislation should apply to all fish that normally complete their life-cycle in freshwater (and freshwater crayfish) wherever they occur; to salmon and sea trout to six miles from territorial sea baselines; to all other diadromous species and to sea fish when they are in waters inland of the inland limit of the jurisdiction of Sea Fisheries Committees (3 3.10)

91. In normal circumstances bylaws should not come into force until confirmed by a Minister or the National Assembly for Wales. There should be a power for the Environment Agency to use an accelerated byelaw making procedure in emergencies. Byelaws made under such a procedure should be of very limited duration and made only in response to unforeseeable, specific problems. (14 4.6)
92. The Environment Agency should be able to exercise its byelaw making powers to conserve salmon and other diadromous fish originating outside England and Wales while they are within its jurisdiction. (14 9.5)
93. The Environment Agency should have the power to pay grants towards the cost of fisheries and habitat improvement work. (14 13.4)
94. The Government should explore and develop ways of raising money to fund some of the costs of the Environment Agency's fisheries function through a levy on charges for abstraction licences and discharge consents. (15 3.10)
95. Section 4 of the Salmon and Freshwater Fisheries Act 1975 (poisonous matter and polluting effluent) should not be repealed until adequate replacement provisions are incorporated into general water pollution legislation. (3.3.7)

Regulation of fishing

96. New fisheries legislation should prohibit the use of any instrument or device other than rod and line for the taking of any fish in freshwater unless its use is authorised by the Environment Agency. Licensing would be a form of authorisation. It should also be an offence to possess any unauthorised instrument or device with the intention of using it to take fish. (10 2.1)
97. It should no longer be illegal to use roe, other than that of any salmonid fish, as a bait, but the use, sale, purchase or possession of the roe of any salmonid fish for the purpose of taking salmon, trout or freshwater fish should be prohibited. (10 2.2)
98. The current protection for salmon parr, salmon and sea trout smolts, gravid salmon and sea trout, and salmon and sea trout kelts should be retained. Any measures needed to protect undersized and gravid fish of other species should be implemented through byelaws. (10 2.3)
99. The present statutory provisions on close seasons should be replaced by a power to impose close seasons either by Order or by byelaw. (10 3.12)
100. If any powers are considered necessary to control access to freshwater habitats for conservation purposes they should be contained in general environmental legislation. (10 3.21)
101. In future legislation, eels should be treated in the same way as other fish except where special provisions are needed. (10 6.5)
102. In future freshwater fisheries legislation the word "eel" should be restricted to the genus *Anguilla* and the Environment Agency should regulate fishing for eels in all waters within its jurisdiction. (10 6.7)
103. New legislation should contain the necessary powers to limit numbers of eel nets, traps and other devices used for catching eels in specified areas. (10 6.8)

104. Government should explore the practicalities of introducing a legal requirement for all sales of eels and elvers to be made to licensed dealers and, if such a requirement is feasible, introduce the necessary legislation. (10 6.10)
105. Powers to introduce Net Limitation Orders should be removed; in their place the Environment Agency should have the power to limit net licence numbers through byelaws. These powers should specifically provide for licence numbers in a net fishery to be reduced immediately where this is necessary for conservation purposes. Byelaws limiting numbers of net licences should remain in force for not more than ten years, with the exception of those relating to the phase-out of mixed stock fisheries. (10 10.4)
106. Powers should be retained to select applicants to whom salmon net licences will be issued when numbers of applicants exceed the number of net licences available. Local interests should be fully involved in establishing the selection criteria, which should be transparent. Where appropriate full-time fishermen should be given priority. (10.10.5)
107. The powers to introduce close seasons and close times for salmon net fisheries should be retained and these powers should continue to be used to control levels of exploitation. (10 10.6)
108. Powers should be available to the Environment Agency to impose restrictions on the design and use of nets, with the details left to the relevant byelaws. (10 10.7)
109. Powers to introduce restrictions on angling methods and areas where angling is permitted should be retained in future legislation. (10 10.8)
110. No compensation should be paid to owners or occupiers of fisheries, or other interested parties, for the effects of measures adopted for conservation purposes. Section 212 of the Water Resources Act 1991 should be repealed. (10 10.9)
111. Legal powers to introduce carcase tagging should be contained in new salmon fisheries legislation; in the meantime, the Environment Agency and Government should develop detailed proposals for such a scheme. (10 10.23)
112. Once a salmon carcase tagging scheme is in place, a general bag limit should be introduced. (10 10.26)
113. If and when a general bag limit is set for salmon caught by anglers the carcase tagging scheme should include a ceiling on the number of tags that can be issued to individual salmon netmen in any year. (10 10.27)
114. A power should be introduced to restrict salmon net licence numbers by byelaw for economic and social reasons. No netsman solely or mainly dependent on fishing for his livelihood should be deprived of his licence without his consent under this provision. Any netmen deprived of their licences under this provision should be entitled to compensation. If agreement cannot be reached on the level of compensation, this should be determined by an independent arbitrator. (10 11.14)
115. Once carcase tagging is in place consideration should be given to introducing recreational salmon netting licences, with lower licence duties and catch limits than ordinary netting licences. (10 11.17)
116. The traditional nature of a salmon net fishery, both in terms of the time it has existed and the methods it employs, should be taken into account by the Environment Agency and Government in reaching decisions on the allocation of catches between rod and net

fisheries. However, the wish to retain the economic viability of a traditional net fishery should not be used as a pretext for over-riding conservation considerations. (10 11.19)

Fish farms and fish transfers

117. The current exemption of fish farms from the requirement to seek approval for introductions of fish should be ended, but the Environment Agency should have the power to exempt particular categories of fish farms from this approval process and to issue consents covering introductions of a particular type within a given period. (11 4.2)
118. Legislation should be introduced requiring all fish farms, including dealers' premises, to be licensed and the licensing authority should have the power to refuse licences for inappropriate sites and to impose conditions of approval. (11 4.3)
119. Licences for fish farms should be listed on a public register containing licensing conditions and other relevant information, such as details of outbreaks of notifiable diseases and any prosecutions for breaching licensing conditions. (11 4.4)
120. Screens should be required on inlets and outlets of all fish farms and the Environment Agency should be given powers to impose conditions on the design and maintenance of the screens to be used on any fish farm. (11 4.9)
121. Legislation should be amended to extend the licensing provisions for non-native fish to all non-native cold water species. These might be defined as non-native species that are known to survive and breed outside England and Wales in conditions that are comparable to those appertaining to freshwater in England and Wales. (11 5.2)
122. The amended legislation for non-native species should contain powers for adding warm-water species to the category of fish species covered by the licensing provisions. This could be done by listing banned species but would require regular review to enable a precautionary approach to be applied. (11 5.4)
123. The Environment Agency should have explicit powers to remove and, where necessary, destroy unlicensed non-native fish and crayfish and to recover full costs from the owner or occupier of the fishery. (11 5.6)
124. The following procedures should be introduced to control the movements of fish:
 - a system should be set up to enable all movements of live fish to be recorded and traced;
 - under this system it should be a legal requirement that all movements of fish be accompanied by the correct documents;
 - anyone selling fish for stocking or any other purpose should be required to register, and the onus should be on the registered seller to fill in the correct documents;
 - moving fish without the correct accompanying documentation should be an absolute offence;
 - no stocking or movements for stocking should be permitted unless the stocking was authorised beforehand, and a register of all stocking consents should be publicly available;
 - an offence of possessing fish or equipment for the holding or transporting of fish in suspicious circumstances should be created, with the burden of proof reversed so that the onus would be on those found with fish or equipment in such circumstances or

without correct documentation to prove that the fish were being handled legally. Conviction for the offence should lead to forfeiture of the fish and equipment involved and the penalty for the offence should reflect potential gains from the offence;

- there should be a power of disqualification and/or refusal of registration;
 - the six month rule should be relaxed so that the time limit for making prosecutions becomes six months from the time that sufficient evidence comes to the attention of the prosecutor. (11 7.6)
125. Ministers should be given wide ranging powers to introduce further restrictions on fish transfers, including, if necessary, prior authorisation of all movements of fish. (11 7.7)

Obstructions

126. Anyone creating a new obstruction to the passage of any fish, or increasing or rebuilding an existing one, either in whole or in part, on any river should be required by law to install a fish pass to a design approved by the Environment Agency unless excused from doing so by the Environment Agency. In approving the design, the Environment Agency should determine the purpose of the fish pass, in terms of the species and sizes of fish which should be able to use it, and should require it to be suitable for this purpose. (12 2.6)
127. It should be a requirement to instal elver passes (if the fish pass is not suitable for this purpose) on all new or altered dams and other obstructions, and their installation should be encouraged on existing ones. (12 2.7)
128. If it is not feasible to establish who owns an obstruction, the Environment Agency should have the power to enter on the land and take action to reduce or remove barriers to the passage of fish. (12 2.9)
129. The legislation should be revised so as to require all outlets drawing water from rivers to be screened with a view to preventing the ingress of fish. (12 4.2)
130. Future salmon fisheries legislation should treat all nets (whether fixed or not), putchers and other devices currently defined as fixed engines or fishing weirs in the same way, and existing provisions on fixed engines, fishing weirs and fishing mill dams should be repealed. Where privileged fixed engines, fishing weirs and fish mill dams are still in use, or the devices concerned have been kept in good repair and are capable of use, the right to use them should be preserved; in other cases the rights to use privileged fixed engines, fishing weirs and fishing mill dams should be extinguished. (12 5.4)
131. Future fisheries legislation should continue to prohibit the setting of any unauthorised fixed net or net left unattended in inland or tidal waters. (12 5.5)

Enforcement

132. Statutory water bailiffs should be given powers of arrest and prosecution under the Theft Act. (13 2.1)
133. The Environment Agency should have powers to dispose of equipment that has been used for poaching. (13 2.4)
134. Statutory water bailiffs should be given powers to:
- examine all fishing instruments, baits containers and fish;

- search all premises used for handling, selling or otherwise dealing in fish;
- enter all land adjoining water;
- seize, under warrant, any net or instrument suspected of being used to take fish illegally;
- arrest suspected offenders at any time of the day or night;
- demand production of a rod licence if there are grounds for suspicion that someone has been fishing recently.

Warrants to enter premises suspected of being used to commit fisheries offences should be valid for one month. (13 3.2)

135. A summary offence of falsifying a rod licence or using a false rod licence should be created under fisheries legislation. (13 4.3)
136. Anyone convicted of a serious fisheries offence should be ineligible to hold a rod or net licence for a fixed period. (13 5.3)

III Recommendations addressing matters which do not or should not fall within the scope of salmon and freshwater fisheries legislation

Habitats

137. All relevant legislation should incorporate an element of flexibility so that measures can be modified in response to changing climate. (6 5.3)
138. It should be made clear, by legislative changes if necessary, that sediment can be a polluting substance and that action resulting in the introduction of excessive amounts of sediment into watercourses comes within the scope of the offence of causing pollution. (6 6.4)
139. All farmers should be required by law to prepare Farm Waste Management Plans. (6 6.3)
140. Government and the Environment Agency should continue to fund research into the effects of pesticides and veterinary medicines on fish and invertebrates, including the sub-lethal effects. The results of this research should be made known to the bodies responsible for licensing these substances and should be taken into account by those bodies in deciding on and reviewing approvals and conditions of use. (6 6.6)
141. Research should be carried out into the natural recovery of, in particular, upland streams after pollution events and on the best ways to enhance this recovery. (6 6.7)
142. Government should support research into and the development of effective alternatives to synthetic pyrethroid (SP) sheep dips, such as injections and pour ons and should positively promote these. As soon as alternatives are available to control sheep scab, the Medical Veterinary Products licence for SPs as a sheep-dipping chemical should be withdrawn. (6 6.11)
143. The Environment Agency's programme of sheep-dipping site inspections and guidance in best practice should be pursued with continued vigour, focusing particularly on upland sheep-farming areas where base-poor soils provide little or no natural buffering. (6 6.13)

144. There should be a general presumption in favour of the disclosure by one Government agency to another of information, including information on individuals, needed to protect the environment and any legal restrictions on such disclosure should be removed. (6 6.14)
145. The Environment Agency should make use of its powers to place closure orders on leaking or inappropriately sited sheep dipping installations. (6 6.15)
146. Warnings on package labelling and in advisory leaflets about environmental risks from sheep dips should be prominently displayed in large, easily-readable typeface. (6 6.16)
147. The competence testing and certification scheme for purchasers of sheep dips should be extended to include all who use and dispose of sheep dips. (6 6.17)
148. A licensing system for all mobile sheep dip and sheep spray operators should be introduced. (6 6.20)
149. When effective neutralising agents become available, sheep dip should be packaged with sufficient neutraliser and it should be made illegal to purchase dip without its neutraliser. Labelling should state clearly and prominently that neutralised sheep dip can cause serious environmental damage and must be disposed of only in accordance with the relevant Code of Practice. (6 6.21)
150. The procedure for approving and licensing of veterinary medicines should be revised to reflect the level of environmental risk in the conditions of storage, use and disposal that are likely to be observed in practice rather than those recommended by the manufacturer. If there is a significant risk that a product will be misused and so cause serious damage to the environment, it should not be licensed. (6 6.22)
151. Government should seek to ensure that any direct payments made to farmers under a reformed CAP reflect their role in maintaining wildlife habitats in the countryside. Such payments should take into account the contribution farmers may make to the maintenance and improvement of salmon and freshwater fisheries. (6 6.25)
152. Stricter rules on over-grazing by sheep, designed to prevent environmental damage to vulnerable hillsides, should be drawn up as soon as possible and enforced by cross-compliance. (6 6.27)
153. The Government should press for all livestock subsidies to be paid on an area basis. (6 6.28)
154. Clear enforceable guidelines on cultivation of such crops as maize should be drawn up to make it clear that they should not be grown on highly erodible flood plains. Cross compliance should be used to ensure that these guidelines are observed. (6 6.29)
155. Government should make greater use of the provision in the Rural Development Regulation permitting it to divert funds from direct support payments to farmers to pay for agri-environment measures. (6 6.31)
156. Government together with its agencies should promote co-ordinated measures to protect watercourses on as wide a scale as possible. In particular, Government should consider schemes to encourage fencing in livestock farming areas and uncultivated buffer strips in arable farming areas. Ideally, these schemes should be combined into single, national watercourse corridor schemes. (6 6.35)
157. To encourage maximum uptake of schemes to protect watercourses, Government should seek revision of the rules for EU livestock and arable subsidy schemes so that strips of land

- intended to provide protection to rivers and streams are not deducted from areas used to calculate entitlements to subsidy payments. (6 6.36)
158. A scheme should be developed under the Rural Development Regulation to provide greater opportunities for the restoration of wetlands. (6 6.37)
 159. Government should recognise that the conservation and development of salmon and freshwater fisheries contribute to rural development and to protection and enhancement of the environment, and so should be regarded as legitimate subjects for all appropriate agri-environment and rural development schemes. (6 6.40)
 160. All authorisations relating to forestry, including approval of applications for grants, should be required to take full account of the impact of the proposed afforestation on fish habitats, on the aquatic environment and on fisheries. Where existing conifer forests line watercourses, trees should be removed to create buffer strips along streams. (6 7.1)
 161. Woody debris blocking or fringing streams should not be removed as a routine fisheries or flood defence measure. Any necessary flood defence work should aim to minimise adverse impacts on wildlife habitats. (6 7.2)
 162. There should be a requirement that, before any work is undertaken to restore a canal to navigational use, a full assessment of the impacts be conducted. (6 8.5).
 163. Environmentally acceptable flow regimes for freshwater fish should be established for all rivers affected by abstraction. The needs of all fish, not only salmonids, should be taken into account when establishing abstraction regimes. (6 8.6)
 164. Research should be carried out to determine acceptable flow regimes and the needs of freshwater flora and fauna. (8 4.5)
 165. It should be made unlawful to remove water from, or to fill in, a watercourse or a stillwater without taking reasonable steps to rescue or protect the fish. (6 8.10)
 166. All major water users should be under a duty of care to manage their abstractions and/or discharges for the benefit, wherever possible, of fisheries and the environment. (6 8.9)
 167. The Environment Agency and other bodies should assess the effects on the environment of artificial movements of water, such as reservoir releases and water transfers between and across catchment boundaries. This assessment should take into account the potential effect of the movement on both the donor and the receiving water. Steps should be taken to mitigate adverse effects and halt water movements where the likelihood of serious environmental damage, such as the transfer of species or disease or disruption of migration, is unacceptably high. (6 8.11)
 168. Environment Agency and Internal Drainage Board rural flood defence programmes should be reviewed to assess the scope for the relaxation of dredging and other drainage works and the consequent reinstatement of extensive wetland habitat in headwater catchments and river valleys where there is no associated risk from flooding to people or property. (6 9.2)
 169. The Environment Agency, conservation agencies and other interested organisations should develop collaborative catchment based wetland habitat conservation strategies to ensure that maximum use is made of suitable opportunities to restore wetland habitats and to enhance wildlife habitats generally. (6 9.3)

170. The Environment Agency should take the lead in drawing up a co-ordinated programme of river and river corridor habitat restoration, involving other government agencies and interested parties. The programme should draw on a range of funding sources, both public and private. (6 9.6)
171. Government should adopt Statutory Water Quality Objectives for all major watercourses as soon as practicable. However, in order to be effective the monitoring programme must be reliable, rigorously and consistently applied and be capable of detecting episodic events. (6 10.2)
172. Further research should be conducted as a matter of urgency into the prevalence and impact of endocrine disrupting substances in the freshwater environment. (6 10.3)
173. There should be a presumption against development where there is a risk of an adverse impact on a watercourse. Statutory planning guidance should require planning authorities to undertake a full assessment of the impact on the aquatic environment and on fisheries of any application for planning consent to which the Environment Agency has objected and should only grant consent to such applications in exceptional circumstances. (6 11.1)

Predation

174. The power to licence the killing of cormorants by shooting should be retained. Licences should be issued to authorise shooting to kill as part of a pre-determined programme of scaring which should be site specific and time limited. Licence provisions should include an upper limit on the number of birds that can be killed during the period of the licence. (7 3.10)
175. The power to licence the killing of piscivorous birds other than cormorants should be retained. Licences should be site specific and time limited and should include an upper limit on the numbers of birds that can be killed during the period of the licence. (7 3.11)
176. Section 4 of the Wildlife & Countryside Act 1981 should be amended to provide that the defence of killing a bird to prevent serious damage to fisheries should be qualified so that the defence is not available if the likelihood of a need to kill was known in advance of the action and no licence had been applied for or the licence had been determined. (7 3.12)
177. Authorities licensing the killing of birds under section 16 of the Wildlife and Countryside Act should issue clear guidance on the sort of evidence that will be required to demonstrate serious damage to fisheries. This guidance should take account of the practical difficulties involved in obtaining the necessary data. (7 3.14)
178. Administrative procedures for deciding licence applications to kill birds by shooting should be changed so that an application can be lodged without the supporting evidence of serious damage. (7 3.15)
179. Licensing authorities should devise a more streamlined, precautionary approach to deal with applications for repeat licences, which takes account of the effectiveness of the previous scaring programme and the number of birds on the site at the time of the application. (7 3.16)
180. The nature conservation agencies and the present licensing authorities should collaborate to formulate criteria for issuing licences and ensure that these are reflected in the guidance referred to in Recommendation 178 (7.3.15). These criteria should be based on the best available scientific evidence and should be reviewed regularly. The Environment Agency

and fishery representatives should contribute to the development and review of these criteria. (7 3.17)

181. The criteria for issuing licences should require the licensing authority to consider the likely effectiveness of other means of dealing with the problem of piscivorous birds, taking account of the research findings but there should be no blanket requirement for an applicant to demonstrate that these have been used prior to making a licence application. (7 3.18)
182. The Wildlife & Countryside Act should be amended to permit the issue of licences to kill birds for the purposes of conserving non-avian wildlife. (7 3.20)
183. Where the population of a fish species is so low that there is a need to prohibit fishing, or where the conservation status of the fish species so demands, this should be considered a prima facie case for trying to prevent exploitation by predation as well. In such circumstances, it should not be necessary to demonstrate a direct impact of predation. The risk of a further decline in the fish population level should be sufficient to invoke the precautionary approach in favour of the fish. (7 3.19)
184. Further research should be undertaken on management measures other than shooting to deal with the problem of piscivorous birds, including, in particular, more extensive trials of the effectiveness of habitat modifications such as fish refuges, and their effects on angling. (7 3.21)
185. Where appropriate, future fisheries research and monitoring programmes should include consideration of the effects of predation by piscivorous birds. (7 3.22)
186. The present legal controls over the shooting of seals should be retained but the provisions regarding the rifles and shotguns that can be used should be revised to ensure that target animals are killed instantly. (7 4.4)
187. Research is required to investigate the potential effects of reintroduced populations of otters in areas where the native fish populations are under particular pressure. Any programme designed to encourage the re-establishment of otters should take account of the impact of the resulting predation on vulnerable fish stocks. (7 4.8)

Other issues

188. The contribution that salmon and freshwater fisheries can make to local economies, particularly in remote areas, should be recognised in the development and implementation of all Government policies. (9 2.8)
189. The Rural Development Plans for England and Wales should recognise the potential of fisheries to improve rural economies. In Cornwall and in West Wales and The Valleys an Objective 1 scheme should be introduced to encourage angling tourism through the improvement of fisheries and the development of angling opportunities in urban and rural areas. Similar schemes should be introduced, where appropriate, in Objective 2 areas. (9 2.8)
190. The Government, through its agencies, should extend its research into the socio-economic aspects of salmon and freshwater fisheries in order to determine the contribution that these fisheries make to employment in England and Wales and their potential for creating further sustainable jobs through suitably targeted fisheries improvement and development work. (9 2.9)

191. Tourist Boards and the Environment Agency should develop and promote best-practice guidance for the collection of data on visiting anglers. (9 2.11)
192. The Government should not legislate for unrestricted public access to land along watercourses or onto the water itself. If Government decides that there are circumstances in which it might wish to improve public access to such land and water this should be considered locally on a case by case basis and there should be full consultation with all those who have legal rights. (9 5.5)
193. There should be a presumption against the construction of barrages affecting any rivers containing anadromous fish. Barrages on such rivers should be constructed only if there are over-riding social and economic benefits, and adequate mitigation measures should be introduced. The latter should include fish passes which have been demonstrated to operate over a suitably wide range of flows, compensatory restocking where this is necessary; there should also be monitoring programmes to assess the effectiveness of these measures, and adequate budgetary provision for them. (12 3.2)
194. Government should consider setting up a specialist environment court to try environmental offences including those committed under fisheries legislation. (13 5.5)
195. Fines imposed by the courts for environmental offences should be paid to the agency responsible for bringing the prosecution to help meet the costs of mitigating environmental damage. (13 5.6)

Part I – Scope of the review

Chapter 1

The review process

1 Appointment

- 1.1 The Review Group was appointed on 8 April 1998 by the Minister of Agriculture, Fisheries and Food and the Secretary of State for Wales. Subsequently the Secretary of State's responsibility for salmon and freshwater fisheries in Wales was transferred to the National Assembly for Wales.
- 1.2 Members names and brief biographical details are listed in Annex I. Members were appointed in an independent capacity on the basis of their individual knowledge and expertise across the range of relevant fisheries and conservation issues. One member of the Group, John Golding, died in January 1999; while he was a member we benefited greatly from his knowledge of fishing and his understanding and experience of Government. We much missed his guidance during the final stages of the Review.
- 1.3 We were ably assisted in our task by the three independent assessors, also listed in Annex I. We wish to put on record our thanks to them for sharing their considerable knowledge with us and preparing information papers at our request, often at short notice.
- 1.4 Secretariat support was provided by Fisheries Division II of the Ministry of Agriculture, Fisheries and Food (MAFF) together with staff from the Welsh Office Agriculture Department and its successor department in the National Assembly for Wales. We wish to thank all those involved with the day to day administration of the review and especially with the organisation of the open sessions. More importantly, we are grateful to members of the Secretariat for their guidance on both procedural matters and points of substance. Any misgivings we may have had at the start of the review concerning the ability of the Secretariat to distance themselves from the decision making process were quickly dispelled. It would have been impossible to produce such a wide-ranging report in such a short time without the wealth of preparatory material produced by the Secretariat.

2 The Process

- 2.1 The Review Group met on 24 occasions from June 1998 to January 2000. We agreed at the first meeting to solicit evidence, in writing, from a wide range of interested parties and to invite parties to give oral evidence where we felt that further discussion of an issue would be useful.
- 2.2 We also decided to break the study up into sections so that we could consider the bulk of the evidence on a topic together. The topic sections were:
- salmon, sea trout and wild brown trout fisheries;
 - introductions and transfers of fish;
 - factors affecting habitats;
 - coarse, stillwater trout and eel fisheries;
 - fisheries and recreation; and
 - institutional arrangements for the management and regulation of fisheries; fisheries funding.
- 2.3 We were very much aware of the need to take account of the opinions of individuals and small fishing clubs, and felt that the submission of formal written evidence, followed if necessary by a call to appear before the Review Group, might be off putting for some people. We, therefore, decided to hold a number of regional meetings. These were widely advertised and well attended. We provided an opportunity for all those attendees who wished to give their views to present these to members of the Review Group without the need for a written submission and without giving notice of intention to speak. Regional meetings were held at Lymm (Cheshire), London, Aberystwyth, Exeter, Newcastle and Nottingham and proved to be of enormous value. Not only did we glean more information and views but also we were able to experience, at first hand, the different perspectives of fisheries across England and Wales.
- 2.4 All evidence sessions were open to the public. Minutes of these sessions were checked for factual accuracy with the witnesses concerned and the agreed minutes were made available on the Internet and, by post, from the Secretariat.
- 2.5 We received written evidence from over 350 groups and individuals and heard oral evidence from 30 of these, sometimes at more than one session. In addition, 105 people gave evidence at the regional meetings. The programme of open meetings is given at Annex II and a full list of all those who gave evidence can be found at Annex III. We are very grateful to each of them and appreciate the time and effort everyone made to give us the information we needed. The evidence is not being published as part of this report but is available for consultation in the MAFF library, Whitehall Place, London. We do, in addition, refer to individual evidence to support our conclusions in the report.
- 2.6 During the course of the Review members of the Group visited sites on the Rivers Eden, Lowther, Tweed and Wye and also travelled to Dublin to meet officials responsible for inland fisheries. We thank our hosts for arranging these meetings and for taking the time to explain their achievements and the problems they encountered and answering our questions so fully.

- 2.7 Our discussions of the evidence and our deliberations on our conclusions and recommendations were conducted in closed session. On occasions, such as when we were discussing possible institutional arrangements for fisheries management, members of the Secretariat and the technical assessors were excluded as well.
- 2.8 We set up a number of sub groups to prepare reports for the full group, bringing together the main issues on a particular topic, and to make suggestions for recommendations.
- 2.9 We agreed that all conclusions and recommendations would only be finalised if they were acceptable to the whole group. All discussions were conducted under Chatham House rules. Our aim, throughout, was to build up a report on the basis of consensus across the whole range of issues on an integrated basis. It would have been possible to protect the position of some individuals by excluding them from the debates on contentious issues in their main field of interest but this would have denied the Review Group the benefit of the very expertise for which the members were appointed. Furthermore, it would have been unlikely to produce a set of recommendations that would be widely endorsed. We consider it an important attribute of this report that all conclusions and recommendations have been agreed by all participants.
- 2.10 Our original intention was to submit the report to Ministers in the early autumn of 1999. The unexpected government announcement on 21 May 1999 of an impending cut in fisheries Grant-in-Aid disrupted our timetable, however. Given the potential impact of such a drastic cut, we considered it essential to revisit our previous deliberations in the light of this change of policy and, in particular, to invite witnesses to submit further evidence if they so wished. Nevertheless, we have stuck to our original schedule as closely as possible because we want our report to be of use in any debate on fisheries funding in the near future.
- 2.11 The cut in Grant-in-Aid was not the only fisheries decision made during the course of the review. We felt under pressure, on occasion, to release interim statements of our views on particular issues, such as the close season for coarse fishing on canals, prior to the completion of the report. We were also accused of being responsible for the drafting of the salmon conservation byelaws introduced in Spring 1999. Our response to these fisheries developments was to note their existence and take them into account in our deliberations. We did not succumb to the temptation to issue mini-reports on individual issues as we completed them because we believe it to be essential that the report should be read as a whole. We did, however, submit comments in response to a MAFF consultation exercise on reform of the Common Agricultural Policy (document titled 'A New Direction for Agriculture'). A copy of our letter is at Annex VIII.

3 Structure of the report

- 3.1 The 15 chapters of the Report are grouped into five Parts. Part I sets the boundaries for the extent of our Review and considers the purpose of fisheries management and, in particular, salmon and freshwater fisheries legislation. Part II examines the ecological requirements of freshwater fish and makes recommendations for improvements in environmental quality. In Part III we consider the importance of fisheries to people and make recommendations for increasing the social, economic and recreational benefits of fisheries. Part IV is concerned with the details of regulating fisheries in order to achieve environmental and social objectives. Part V contains recommendations for changes in institutional and administrative arrangements, and funding for fisheries management.

Chapter 2

The scope of the report

1 Terms of reference

1.1 Our terms of reference as announced in Parliament on 8 April 1998 were:

“To review existing policies and legislation in England and Wales concerning the management and conservation of salmon, trout, eels and freshwater fish and make recommendations. The review and recommendations should take particular account of:

- the need to maintain and where appropriate enhance biodiversity;
- the need to maximise the economic, social, and recreational benefits derived from salmon and freshwater fisheries, taking account both of the interests of local communities and local factors and traditions;
- the need for management of fisheries to be on a fully sustainable basis, taking account of the precautionary approach.

“The review should also consider other factors that may affect the development and sustainability of these fisheries.”

“The review should examine the institutional arrangements for the regulation and management of these fisheries (including the role of the private sector, the need to involve all interested parties, and arrangements in tidal and coastal waters) and how best such arrangements can be funded.”

1.2 The Minister of Agriculture, Fisheries and Food also wrote to the Chairman of the Review Group about the presentation of the Group’s recommendations and the coverage of the Review. He explained that the Government’s spending programmes were currently the subject of a Comprehensive Spending Review (CSR) and that, to avoid the possibility of pre-empting the outcome of our Review, he had agreed that the CSR examining MAFF’s spending programmes would not consider salmon and freshwater fisheries in any detail. Instead, he asked the Review Group to consider the questions which would have been asked as part of the CSR process. These were:

- what is the rationale for, and the objectives of, public expenditure on salmon and freshwater fisheries?
- are existing levels of public expenditure adequate and is it possible to secure a greater contribution towards the costs of public sector involvement from those directly involved with salmon and freshwater fisheries?
- what should the respective roles be of government Departments and the Environment Agency?

We deal with the first and second of these questions in Chapter 15 and the third question in Chapter 14.

1.3 In his letter the Minister also asked us to list our recommendations in three groups:

- changes in salmon and freshwater fisheries policy which could be implemented without changes to primary legislation;
- policy changes which would require changes in primary legislation;
- other recommendations, addressing matters which did not or should not fall within the scope of salmon and freshwater fisheries legislation.

We have done our best to follow this request, although with some recommendations it is a matter of judgement into which of these categories they fall.

- 1.4** It is regrettable that, despite the Minister's letter, the Government appeared to pre-empt the outcome of our Review by announcing in May 1999 plans for a substantial cut in fisheries Grant-in-Aid to the Environment Agency in respect of England from 2001/2002 onwards. We expressed our concern in a letter to the Minister; a copy, together with the Government's response, is at Annex IV. We were given an assurance by the Minister for Fisheries and the Countryside, both in his response to our letter and when he met the Group in July 1999, that our Review and our recommendations would be taken fully into account in the forthcoming spending round, which will determine the Government's spending plans from 2002/2003, we also welcomed the statement that the Government continues to attach great importance to our Review.

2 Interpretation of terms of reference – The underlying principles

- 2.1** Our terms of reference are much wider ranging and more comprehensive than those given to the previous general review body, the Committee on Salmon and Freshwater Fish, which reported in 1961¹. That Committee was charged with reviewing the then current salmon and freshwater fisheries legislation and was directed by the Minister that it was not its task to review the legislation on water pollution and water abstraction, although it should consider whether this legislation was adequate to protect fisheries.
- 2.2** The terms of reference for the present review go much further. We were charged with considering fisheries in an environmental and socio-economic context. Our difficulty has been in deciding just how broadly such considerations should range. Our starting point in deciding this was to look at the different elements of the terms of reference in some detail and, from our interpretation of them, to draw up some basic principles on which to build the review and, ideally, to guide fisheries management in future. These principles are explained below.
- 2.3** In addition, we have included a glossary (Annex V) to explain the meaning of technical terms used in this report. This is important because of the different use of terms in legal, technical and everyday parlance.
- 2.4** There are, however, two areas where we should explain the usage we have adopted:
- the first concerns the word 'government'. Since we started our review, responsibility for fisheries in Wales has been transferred to the National Assembly for Wales: accordingly, many of our recommendations are addressed both to the UK Government, in respect of England, and to the National Assembly. Rather than refer constantly to 'the Government and the National Assembly', we have used 'Government' (without the definite article)

¹ Report of the Committee on Salmon and Freshwater Fisheries. Cmnd 1350.

where we mean the government in both England and Wales. We have used ‘the Government’ (with the definite article) when we refer to the Government of the United Kingdom;

- the second concerns the term ‘salmon and freshwater fisheries’, as in salmon and freshwater fisheries legislation. We have used this as a shorthand for salmon, trout (including sea trout), eel and freshwater fisheries.

2.5 We received evidence on some issues which we considered fell outside the scope of the Review either because they did not come within our terms of reference or because they were outside our area of expertise. Thus, we did not directly address the issue of cruelty to fish. We consider that animal welfare is better dealt with as a general topic and that it is not appropriate to consider the issue in relation to fish alone. Some of those who presented evidence to us wanted us to address the perceived problem of non-fishing recreational use of the waterways. While we have touched briefly on access, we did not think that we were the appropriate body to look at the wider issue of recreational use of freshwater because none of the relevant interests was covered by the membership. We have looked, in some detail, at the Environment Agency’s role in fisheries management but we have not considered the overall internal management of the organisation.

2.6 With the principles outlined in paragraphs 2.7 to 2.21 to guide us, we adopted the following four-pronged approach to drawing up our conclusions and recommendations:

- assess the present situation and, in particular, issues of concern;
- consider how these issues might be influenced by cultural or environmental changes in the future, such as global warming;
- consider how these issues could be resolved in practice;
- consider whether this could be done under existing law or whether it needs minor or major legislative change.

Definition of fishery

2.7 There is no descriptive definition of ‘fishery’ in English law and its meaning has to be determined from the context of the legislation in question. The term is used to mean a number of different things. To ecologists, for example, it means the ecosystem including its fish, whether or not these are fished for; to fisheries managers it means the enterprise managed; to fishermen it means the place where they fish; to bureaucrats it means the sphere of activity covered by the relevant law – in this instance legislation relating to salmon and freshwater fisheries.

2.8 We do not think that it would be helpful to provide a single definition for fisheries because we fear this would cause confusion rather than clarity and simplification. It is better to accept that the term is used in different ways and to be aware of the context each time it is used. We are certain, however, that the regime for the regulation of fisheries cannot be considered in isolation from the ecosystems of which the fish are a part.

Importance of fish

2.9 Satisfaction from fishing – be it personal or financial – always depends on the presence of healthy fish in appropriate numbers. One of our basic principles, therefore, is that *the fish come first, that is, before the exploiters*. It also became apparent to us that fish are often

regarded as the poor relation in conservation terms when compared to other animals and birds, particularly where conflicts between species arise. The reason for this may well be that fish are often out of sight and for many people, therefore, out of mind. Hence the importance of an adequate regulatory framework to equally protect our fisheries heritage. Fish are an integral part of the aquatic ecosystem and share equal importance with other organisms including birds and mammals; this needs to be recognised more widely.

Coarse fish and salmonids

- 2.10** One complaint frequently made to us about existing fisheries legislation is that it concentrates unduly on salmon and sea trout, with coarse fish treated as an afterthought. In our Review we have tried to avoid valuing one species of fish over another. Instead, we have focused on the problems that affect fish and fisheries, and if there are parts of our Report which tend to concentrate on a particular species, this is because the problem we are addressing especially affects that species. We thus deal at length with regulating exploitation of salmon, sea trout and eels because exploitation can have a direct impact on stock levels; this is not the case with coarse fish, which on this issue can be covered more briefly.

Fish and their environment

- 2.11** There can be no fish for recreational or commercial fishermen to catch if the environmental quality is too poor to support fish life. We interpret fisheries management as including management of the ecosystem. In the case of rivers, for example, this means considering all elements of the system, both living (animals, plants and micro-organisms) and non-living (water, dissolved gases, substrate, etc.), and not just the fish. Concentrating on one component makes loss of balance a likely outcome.

Integrated management

- 2.12** Fisheries do not exist in isolation from the rest of the environment. The need for integrated management is widely acknowledged but it is not easy to achieve in practice. Our terms of reference demonstrate the Government's recognition of the importance of an holistic approach. We have endeavoured to consider the impact of policy proposals in one sector of fisheries on other sectors of fisheries and on other interests.

Sustainable development

- 2.13** The terms of reference required us to take account of the need for fisheries management to be on a fully sustainable basis and to consider factors that might affect that sustainability. 'Sustainable development' was defined by the Brundtland Commission² as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs". Although 'sustainability' is sometimes used in a narrow, technical sense, the two terms are often used interchangeably and we have followed this approach. Article 2 of the EC Treaty requires the promotion of a harmonious, balanced and sustainable development of environmental activities and Article 6 states that environmental protection measures must be integrated into policies and activities with a view to promoting sustainable development. In this country as well there is a clear legal

² World Commission on the Environment and Development (1987) 'Our Common Future' Oxford University Press at p.8.

commitment to sustainable development. For example, it is the principal aim of the Environment Agency, in discharging its functions so as to protect or enhance the environment, taken as a whole, to contribute towards attaining the objective of achieving sustainable development (Environment Act 1995 section 4). Furthermore, the Government of Wales Act 1998 gives the National Assembly for Wales express duties in relation to sustainable development.

2.14 Despite these legal commitments to sustainable development, it not clear how these are to be translated into practice. The Government's strategy for sustainable development³ describes sustainable development as a means of ensuring "a better quality of life for everyone, now and for generations to come". It goes on to identify four objectives which we have found useful in our review:

- social progress which recognises the needs of everyone;
- effective protection of the environment;
- prudent use of natural resources; and
- maintenance of high and stable levels of economic growth and employment.

2.15 Our principle on the priority of fish over fishing is one expression of our understanding of sustainable development. On its own it is insufficient, however, because it does not take account of the socio-economic aspects of the concept. Fisheries management is about people and their needs and aspirations. We have been conscious of the need to consider the impacts of both current fisheries management and of any proposals we make for changes on the lives and livelihoods of individuals and local communities. The Group was particularly mindful of the fact that although its members covered a very wide range of relevant experience and expertise it was inevitable that some fisheries interests might feel they did not have a voice on the Group. We have aimed for consistency and fairness in all our conclusions and recommendations, especially those relating to allocation of the fish resource and funding of fisheries management.

Biodiversity

2.16 The term 'biodiversity' encompasses all life's variety including genetic diversity, diversity between species and diversity of ecosystems. It includes fish but is by no means restricted to them. We have interpreted our terms of reference as requiring us to consider not only the impacts of various activities on fish biodiversity and to make recommendations for maintaining and enhancing it, but also the impact of fisheries management and fishing on other sorts of biodiversity and to make recommendations accordingly.

Precautionary approach

2.17 The precautionary principle is a development of the German environmental concept of Vorsorgeprinzip, which embodied the idea that it was wrong to delay action to avoid environmental damage until there was conclusive scientific evidence of a causal relationship between a particular human activity and that damage. There are numerous different interpretations of the principle, ranging from those implying that anyone wishing

³ 'Sustainable Development: A Better Quality of Life. A Strategy for Sustainable Development for the UK' Cm 4345, issued by the DETR in May 1999.

to carry out potentially damaging activities must first prove that these will not cause environmental harm, to those that apply the principle where there is risk of serious environmental damage.

- 2.18** Principle 15 of the Rio Declaration 1992 is based on the latter interpretation. It states “where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation”. Article 174 of the EC Treaty states that Community environmental action must be based on a precautionary approach but does not define this approach.
- 2.19** Principle 15 has been the starting point for our thinking. We consider that the precautionary approach is best considered in the context of sustainable management as a tool for managing risk. It is not an excuse for not carrying out proper scientific investigations and it is not just a reversal of the burden of proof. In considering whether a precautionary approach is necessary we have asked ourselves the following questions: what would be the consequences of allowing a potentially damaging activity to go ahead or continue for a while? If damage did result, would it be possible to rectify it and, if so, at what cost? If the precautionary approach were invoked to prevent an action taking place, would this lead to other potentially damaging activities being carried out instead? Is the risk of environmental damage sufficiently great to justify the social and economic costs that might result if activities are not allowed to proceed? By ‘risk’ we mean the combination of the likelihood of damage arising and the magnitude of such damage should it arise.

Polluter pays principle

- 2.20** Those who use water resources and whose actions damage the environment and make mitigation work necessary should pay for that work. We consider that government also has responsibilities, under this principle, to mitigate the damage caused not only by present national policies but also the historic damage done under the policy guidance and support of previous governments.

Beneficiary pays principle

- 2.21** We adhere to the ‘beneficiary pays principle’ which places the cost of fisheries management on those who get the benefit of that expenditure. This principle can be used as a justification for government spending when the result is a benefit to the public as a whole such as the protection of biodiversity. It can also be used to justify the imposition of specific charges on those who directly use the resource, that is those who fish and those who profit from fishing.

Chapter 3

The objectives and scope of fisheries legislation

1 Integrated fisheries management

- 1.1 Legislation on fisheries has developed independently from legislation on environmental protection. As our Terms of Reference illustrate, however, fisheries should not be treated in isolation from their environmental context. As part of our consideration of the possible scope of any future fisheries legislation, we explored the idea of subsuming fisheries legislation within the broader framework of environmental law; we rejected this, however. Although the Government's commitment to sustainable development and the requirements under EC law to incorporate environmental considerations into all spheres of Community activity both point towards a greater integration, we remain convinced that fisheries legislation is sufficiently specialised to justify it remaining a discrete body of law in its own right.
- 1.2 Despite reaching this conclusion we advocate the integration of fisheries management into general catchment management. We received evidence, from a number of sources, of damage to fish habitats and populations from activities outwith the control of fisheries law. We were also told that fisheries management can have adverse environmental effects. We are convinced that it is essential that all those responsible for making or implementing policy on freshwater should work together. Environmental planning has been one of the growth activities of the last few years. Although we recommend in Chapter 14 a statutory requirement to produce Fisheries Action Plans, we do not think that it is appropriate for the structure or broad content of these plans to be contained in the legislation. That would be too prescriptive.

2 The objectives of fisheries legislation

- 2.1 The evidence we received overwhelmingly supported Government involvement in the conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries. We conclude that such involvement should have three principle objectives.

Government involvement in the conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries should have three principle objectives:

- *to ensure the conservation and maintain the diversity of freshwater fish, salmon, sea trout and eels and to conserve their aquatic environment;*
 - *to enhance the contribution salmon and freshwater fisheries make to the economy, particularly in remote rural areas and in areas with low levels of income;*
 - *to enhance the social value of fishing as a widely available and healthy form of recreation.*
- (Recommendation 1)*

- 2.2 Maintaining the diversity of wild fish is consistent with the UK's international commitments on biodiversity and to sustainable development, and the UK is also committed internationally to conserve salmon. There is also an international dimension to

the conservation of eels. Moreover, fish are an essential part of the freshwater aquatic environment and healthy fish stocks are an indicator of environmental quality.

- 2.3** Fisheries already make a significant contribution to rural development and to the rural economy, and there is scope to increase this substantially. Fisheries can also provide opportunities for farmers to diversify their activities. The second objective in paragraph 2.1 above is thus consistent with the policies pursued by the Government and the National Assembly for Wales on rural development and farm diversification.
- 2.4** Fishing is one of the most popular, and widely available forms of recreation. There is a wide range of angling available in towns, including inner cities, and angling can provide low cost, easily accessible opportunities for recreation for people who may find it difficult to afford, or participate in, other recreational activities. The third objective above is thus consistent with the Government’s key objective of developing a fair and inclusive society in which communities are healthy and secure.

3 The scope of fisheries legislation

- 3.1** During our Review we examined the scope of existing fisheries legislation. This focuses on the regulation and management of salmon and freshwater fisheries but also contains other, related provisions; these include making it an offence to pollute waters in a way that will harm fish and a range of measures restricting trade in salmon and salmon products.
- 3.2** We note that there has been a number of developments since the last major revision of salmon and freshwater fisheries legislation in England and Wales in 1975, including, most notably, an increase in the level of protection afforded to the freshwater environment under environmental legislation. As we comment above in section 1, there is wide agreement that fish and fisheries should not be treated in isolation and that measures to protect fish need to be consistent with, and complement, measures designed to protect aquatic ecosystems.
- 3.3** The various legal restrictions on trade in salmon and salmon products have been made redundant by the development of the single market – under which they are unenforceable in relation to trade with other parts of the European Union – and the year-round availability of farmed salmon.
- 3.4** We conclude that new salmon and freshwater fisheries legislation should focus on providing Government and its agencies with the means to achieve the objectives we recommend above in paragraph 2.1. It should address issues such as the impact of fishing and fisheries related activities, together with the encouragement and promotion of fishing. Problems that affect the freshwater environment as a whole, such as habitat degradation, water abstraction and pollution, should be dealt with through environmental legislation.

New legislation on salmon and freshwater fisheries should focus on providing Government and its agencies with the means to achieve their objectives for the conservation and management of salmon and freshwater fish. Problems that affect the freshwater environment as a whole should be dealt with through environmental legislation. (Recommendation 88)

- 3.5** Section 103(3) of the Environment Act 1996 provides for the making of byelaws to regulate fisheries for environmental purposes. We do not think that fishing should be singled out for controls to provide environmental protection in those cases where the threat is not specific to fishing. For example, using a fisheries close season to protect breeding birds from disturbance by those accessing the waterside may be expedient but does not achieve the primary purpose and serves to alienate anglers (see Chapter 10, section 3). Section 103(3)

powers should be used only when there is a specific need to regulate fisheries because fishing is causing direct environmental harm.

- 3.6 Opportunities for new fisheries legislation do not arise very often. We conclude that it is essential, therefore, that the recommendations we make will stand the test of time. We do not want future generations to regard their fisheries legislation as a hindrance to fisheries management. We conclude, therefore, that any new fisheries legislation arising from this Review must be couched in terms that provide sufficient flexibility to enable it to be adapted to unforeseen changing circumstances. One way of achieving this would be to provide sufficient powers for changes to be made through secondary legislation. We return to this suggestion in section 5 below.
- 3.7 While we are recommending that, in future, pollution should not be dealt with through fisheries legislation, it will be important to ensure that legislation on water pollution will adequately replace the current provisions of the Salmon and Freshwater Fisheries Act 1975. We understand from the Environment Agency that the provisions in the 1975 Act have some advantages and are still made use of on occasion. They should not be repealed until adequate alternatives are included in general water pollution legislation.

Section 4 of the Salmon and Freshwater Fisheries Act 1975 (poisonous matter and polluting effluent) should not be repealed until adequate replacement provisions are incorporated into general water pollution legislation. (Recommendation 95)

- 3.8 The Salmon and Freshwater Fisheries Act 1975 applies to salmon, trout (including sea trout), freshwater fish and eels. The Act defines ‘freshwater fish’ as meaning “any fish living in freshwater exclusive of salmon and trout and of any kinds of fish which migrate to and from tidal waters and of eels”. It was pointed out to us that this definition excluded anadromous fish other than salmon and sea trout and that, as a result, species such as shads, smelt and lampreys are not covered by existing freshwater fisheries legislation. The Act also does not cover marine species while they are in freshwater. There is also some uncertainty over the position of crayfish. Although MAFF told us that they believed that crayfish were covered by the definition of freshwater fish in the 1975 Act, we conclude that it would be helpful to make this explicit in future legislation.
- 3.9 We considered recommending that the Act should be amended to make it apply to all fish in freshwater, thereby avoiding the present problem of some species being excluded under the definition of freshwater fish. This change would have to be accompanied by a definition of ‘freshwater’ which could most usefully be done by defining freshwater limits. There is already legal provision for defining freshwater limits. For example, section 192 of the Water Resources Act 1991 provides for maps of freshwater limits to be deposited as conclusive evidence of the boundary between freshwater and tidal waters. The same limits could be used in new fisheries legislation. We rejected this option, however, because it is not possible, in practice, to draw a line defining the limit of freshwater accurately in an ecological sense. We prefer a definition that focuses on the fish themselves wherever they occur. This approach has the added advantage of not being a radical departure from the present legislation and should be more straightforward to implement. Furthermore, it avoids the creation of another legislative boundary in the coastal zone and is, therefore, more in tune with current thinking on the need for holistic, integrated coastal zone management.
- 3.10 We conclude that salmon and freshwater fisheries legislation needs to cover three categories of fish: those that normally complete their life cycle in freshwater, that is, non-diadromous species; salmon and sea trout; and species that occur in both freshwater and

tidal waters including all other diadromous species. We decided that the legislation should apply to the first category wherever they occur. For diadromous species other than salmon and sea trout (including lampreys) we decided that the legislation should apply to them when they are in waters inland of the inland limit of the jurisdiction of sea fisheries committees; the same should apply to sea fish, such as bass, insofar as they extend inland beyond the scope of sea fisheries legislation. We conclude that the present overlap between salmon and freshwater fisheries legislation and sea fisheries legislation in respect of salmon and sea trout should be retained. For salmon and sea trout, therefore, the seaward limit of the application of the salmon and freshwater fisheries legislation should remain the six mile limit.

Salmon and freshwater fisheries legislation should apply to all fish that normally complete their life-cycle in freshwater (and freshwater crayfish) wherever they occur; to salmon and sea trout to six miles from territorial sea baselines; to all other diadromous species and to sea fish when they are in waters inland of the inland limit of the jurisdiction of Sea Fisheries Committees. (Recommendation 90)

4 Fisheries duty

4.1 The Environment Agency has a statutory duty to “maintain, improve and develop salmon fisheries, trout fisheries, freshwater fisheries and eel fisheries” (Environment Act 1995 s.6(6)). It inherited this duty from its predecessor, the National Rivers Authority, which, in turn, inherited it from the Regional Water Authorities. In the evidence put to us there was strong and widespread support for retaining this duty. It was also pointed out to us, however, that the duty is imprecise as to the extent to which it covers the wider aquatic environment and fish species that are not fished for.

4.2 We have already made it clear that in our view the management and regulation of fisheries must cover the conservation of fish and of the freshwater environment as well as the development of fisheries. In section 2 above we recommend objectives for the Government’s involvement in the conservation and management of fisheries. We would like to see the Environment Agency’s fisheries duty interpreted accordingly (as we recommend in Chapter 14 we consider the Environment Agency should retain regulatory responsibility for fisheries). In the longer term, we would like to see these objectives given a statutory basis.

The Environment Agency’s statutory duty to maintain, improve and develop salmon and freshwater fisheries should be retained. This duty should be interpreted as a duty on the Agency:

- *to ensure the conservation and maintain the diversity of freshwater fish, salmon, sea trout and eels and to conserve their aquatic environment;*
- *to enhance the contribution salmon and freshwater fisheries make to the economy, particularly in remote rural areas and in areas with low levels of income;*
- *to enhance the social value of fishing as a widely available and healthy form of recreation.*

This interpretation should be put on a statutory basis at the first available opportunity. (Recommendation 3)

4.3 To avoid any doubt, we confirm that the objectives we are recommending of ensuring the conservation and maintaining the diversity of freshwater fish should apply to all fish, regardless of whether they are fished for; in our view the Environment Agency should pay particular attention to the need to conserve rare fish. As we mention elsewhere in the

Report (14.8.1) there must be close co-operation between the Environment Agency and statutory nature conservation bodies.

5 Secondary legislation

- 5.1 Existing fisheries legislation is mainly implemented through byelaws, and there is only limited scope to make changes through secondary legislation. Under Section 115 of the Water Resources Act 1991, an Order can be made by statutory instrument to modify any provision of the Salmon and Freshwater Fisheries Act 1975 relating to the regulation of fisheries. However, we were told that this power can only be used to modify existing provisions, not to alter them substantially or to introduce new provisions. Government does not currently have the power to make more far reaching changes by secondary legislation except to give effect to international obligations (Section 116 of 1991 Act).
- 5.2 We believe that it would be helpful if government were given greater powers to make fisheries law by Order. In Chapter 10, for example, we recommend that Government should have powers to introduce a carcass tagging scheme for salmon through secondary legislation. Similar powers could be used to implement major changes to existing rules that apply throughout England or Wales. An Order that could be debated in Parliament or the National Assembly for Wales might well be more appropriate than a byelaw as a means of introducing national measures, such as the 1999 ones on salmon conservation. A power to make substantial changes to freshwater fisheries legislation by Order would also make it easier for Government to respond to changing circumstances brought about by such factors as climate change. Opportunities to amend primary legislation are rare, and in our view it is essential for Government to have the ability to respond to new developments.

New salmon and freshwater fisheries legislation should include powers to introduce by secondary legislation measures necessary to attain Government's objectives for salmon and freshwater fisheries. (Recommendation 89)

Chapter 4

History of fisheries management

1 Historical background

- 1.1** Salmon are mentioned in Magna Carta and from the reign of Edward I a succession of Acts was passed by Parliament seeking to prohibit fishing for salmon at certain times of the year and to regulate the construction and design of fishing weirs and the use of nets. The law did not concern itself with other species of freshwater fish. By the mid nineteenth century, however, the law on salmon fisheries in England and Wales had become archaic and confused, and in 1860 a Royal Commission was appointed to examine the whole issue. The Royal Commission's report led to three Salmon Fishery Acts⁴, which swept away the old legislation and created, what was in its day, a modern system of salmon fisheries law and a modern administrative structure for applying it. Fishing methods were regulated, with a number of practices banned outright; local authorities (justices of the peace, subsequently County Councils) were given powers to set up fishery districts covering particular salmon rivers and to establish boards of conservators to administer salmon fisheries legislation within them; boards of conservators were given powers to make byelaws within their districts; within a district all those fishing for salmon were required to hold a licence, the income from which was to be used "in defraying the expenses of carrying into effect in such districts the Salmon Fishery Acts"; licence holders were given the right to elect additional members to the board of conservators.
- 1.2** In 1878 and 1884⁵ this system was extended first to waters containing trout and char and then to waters containing other freshwater fish, and a close season was introduced for freshwater fish. The whole structure was completed by the Salmon and Freshwater Fisheries Act 1886 which provided for this series of Acts to be known as the Salmon and Freshwater Fisheries Acts and for responsibility for them to be transferred from the Home Office to the Board of Trade. In 1903 this responsibility was transferred again, to the Board of Agriculture, which in consequence became the Board of Agriculture and Fisheries. The outstanding omission in the system, that boards of conservators were not empowered to levy licence duties for fishing for freshwater fish, was remedied by a further Salmon and Freshwater Fisheries Act in 1907; this also contained permissive powers enabling fisheries districts to be consolidated and boards of conservators restructured.
- 1.3** This Victorian and Edwardian legislation provides the basic structure, and many of the key elements, of the law that currently applies to salmon and freshwater fisheries in England and Wales and thus the framework within which the Government's present policies have been formulated. There is a strong emphasis on regulating methods and times of fishing, but no attempt to impose any overall control on effort. This defect was partially remedied by the Salmon and Freshwater Fisheries Act 1923, which consolidated all this legislation: this introduced the power to limit, by means of a net limitation order, the number of net licences that could be issued for a particular fishery. However, the power to limit numbers was subordinated to the perceived need to protect the rights of existing netmen which

⁴ The Salmon Fishery Acts 1861, 1865 and 1873

⁵ The Salmon Fishery Acts 1861, 1865 and 1873

limited (and continues to limit) the effectiveness of this mechanism as a means of reducing levels of exploitation.

- 1.4 The 1923 Act remained in force for some 50 years, with only minor amendment. In 1957 a committee was set up to review it and in 1961 its report⁶ made a large number of recommendations which, however, would have left the basic structure of existing fisheries law unchanged. Many of these were eventually incorporated in a new Act, the Salmon and Freshwater Fisheries Act 1975, which still applies.
- 1.5 While the fisheries legislation inherited from earlier Acts of Parliament has remained substantially unaltered, there have been marked changes in the structures for administering it and in the ways that these are financed. The 1923 Act retained, in modified form, the previous structure of fisheries districts and fisheries boards funded primarily from licence income. In 1948, however, two major innovations were introduced. Thirty-two River Boards were established covering all river systems in England and Wales, with responsibility for salmon and freshwater fisheries, land drainage and the prevention of river pollution.
- 1.6 At the same time the new River Boards were given the power to meet costs, which were not met out of other revenues, by precepts on the local authorities in their areas. Although licences continued to provide an important source of income, where this proved inadequate expenditure on fisheries could henceforth be funded by the rate-payer. One other significant development was that the prevention of pollution, which had previously been one of the principal activities carried out by many fisheries boards, particularly in parts of the country where coarse fish predominate, ceased to be regarded as a fisheries activity.
- 1.7 The replacement in 1965 of River Boards by River Authorities, with powers over water resources, had little effect on fisheries administration. But the replacement of River Authorities by ten multi-functional Regional Water Authorities in 1974 produced three important innovations: the water authorities were given a duty “to maintain, improve and develop” salmon and freshwater fisheries; they were required to establish advisory committees “of persons who appear to them to be interested” in any such fisheries and to consult them about the way in which they discharged their fisheries responsibilities; they were made responsible for the integrated catchment management of the aquatic environment including water abstraction, water supply and waste water treatment and disposal. The water authorities’ expenditure on fisheries was funded by a combination of income from licence duties and a contribution from the environmental service charge levied on all water rate payers.
- 1.8 In 1989 the water industry was fundamentally reorganised and the Regional Water Authorities’ regulatory responsibilities, including those on salmon and freshwater fisheries, were transferred to a new national body, the National Rivers Authority (NRA). At the same time, the environmental service charge was replaced by Grant-in-Aid direct from central government. Advisory committees were retained, and the NRA was required to establish in each of its regions a Regional Fisheries Advisory Committee. The replacement of the NRA by the Environment Agency in 1995, with still wider responsibilities, did not substantially alter this structure so far as fisheries was concerned.

⁶ Report of Committee on Salmon and Freshwater Fisheries : Cmnd 1350

2 The current legislation

- 2.1 The Salmon and Freshwater Fisheries Act 1975 (as amended) lays down the present basic legislative framework within which salmon and freshwater fisheries in England and Wales are regulated. Other important provisions are contained in the Import of Live Fish (England and Wales) Act 1980, the Wildlife and Countryside Act 1981, the Salmon Act 1986, the Water Resources Act 1991 and the Environment Act 1995.
- 2.2 Geographically, the current salmon and freshwater fisheries legislation covers England and Wales together with adjacent coastal waters up to six miles from the coast. Although it does not cover that part of the Tweed catchment which is in England (this is effectively subject to Scottish fisheries legislation) it covers the whole of the Border Esk catchment, including that part which is in Scotland.

The Salmon and Freshwater Fisheries Act 1975

- 2.3 The Salmon and Freshwater Fisheries Act 1975 is split into six parts and each is considered below.
- 2.4 **Part I** is headed ‘Prohibition of Certain Modes of Taking or Destroying Fish etc.’ and its main effects are to:
- prohibit certain methods for the purpose of taking or killing salmon, trout or freshwater fish;
 - make it an offence, except in certain circumstances, knowingly to take or sell immature fish or fish which are about to spawn;
 - restrict the way in which nets may be used for fishing for salmon or migratory trout in any waters;
 - make it an offence to discharge polluting effluent which is injurious to fish, their spawning grounds, spawn or food of fish; and
 - prohibit certain methods of taking or destroying fish, including explosives, poisons and firearms.
- 2.5 The main effects of **Part II**, ‘Obstructions to Passage of Fish’, are to:
- prohibit unauthorised fixed engines in any inland or tidal waters and prohibit the use of unauthorised fishing weirs and fishing mill dams used for taking or facilitating the taking of salmon or migratory trout;
 - ameliorate the effects of certain obstructions to the passage of fish through requirements, in certain circumstances, for the installation and maintenance of fish passes, free gaps or gratings; and
 - place restrictions on taking salmon or trout above or below certain obstructions.
- 2.6 **Part III** is titled ‘Times of Fishing and Selling and Exporting Fish’ and, together with Schedule 1, its main effects are to:
- establish close seasons and close times during which fishing is generally prohibited; and
 - make it an offence to sell or export salmon or trout other than rainbow trout caught in the United Kingdom during certain periods.

- 2.7 Part IV is headed 'Fishing Licences' and its main effects are to:
- require the Environment Agency to regulate fishing for salmon and trout by a system of licences and, unless excused by the Minister, to regulate fishing for freshwater fish and eels by a system of licences;
 - permit the Environment Agency, by order confirmed by the Minister, to limit the number of licences issued for fishing by instruments other than rod or line for salmon or trout, other than rainbow trout; and
 - make it an offence to fish without an appropriate licence.
- 2.8 Part V is titled 'Administration and enforcement' and its main effects are to:
- prohibit the introduction of any fish or spawn of fish into inland waters unless written consent is obtained from the Environment Agency;
 - provide powers to water bailiffs; and
 - provide for the prosecution of offences and lays down penalties.
- 2.9 Part VI is headed 'Miscellaneous and Supplementary' and includes a number of regulations including definitions and provisions relating to Border rivers and the Solway Firth.

Import of Live Fish (England and Wales) Act 1980

- 2.10 This Act provides the power to:
- make orders prohibiting the import, either absolutely or except under licence, of any live fish or the eggs of fish of a species that is not native to England and Wales and which might compete with, displace, prey on or harm the habitat of any freshwater fish, shellfish or salmon;
- (NB Since the introduction of the single EU market, the Act can no longer be used to restrict imports from other Member States but it can be used to prohibit the keeping or release of non-native species).
- 2.11 To date, two Orders have been made under this Act:
- the Prohibition of Keeping of Live Fish (Crayfish) Order 1996; and
 - the Prohibition of Keeping or Release of Live Fish (Specified Species) Order 1998.

The Wildlife and Countryside Act 1981

- 2.12 Section 14 of the Act makes it an offence to:
- release or allow to escape into the wild any animal of a kind which is not ordinarily resident in and is not a regular visitor to Great Britain in a wild state;
 - release or allow to escape into the wild any animal included in Part I to Schedule 9 of the Act which lists various non-native species which have become established in the wild, including zander, catfish and certain species of crayfish.
- 2.13 Section 16 of the Act provides that Section 14 does not apply to anything done under, and in accordance with, the terms of a licence granted by the appropriate authority (which in the case of fish and shellfish is MAFF or the National Assembly for Wales).

The Salmon Act 1986

2.14 The Salmon Act 1986 is mainly concerned with the administration of salmon fisheries in Scotland. However, it includes some important provisions that relate to England and Wales namely:

- provision for the introduction of a salmon dealer licensing scheme;
- creation of an offence of handling salmon in suspicious circumstances;
- clarification and amendment of the law on the use of fixed engines; and
- a requirement that the Minister and the Secretary of State for Scotland report on the salmon net fisheries of north east England and eastern Scotland. This resulted in the publication of the Salmon Net Fisheries Report in 1991.

The Water Resources Act 1991

2.15 The main provisions of the Water Resources Act 1991 that relate to fisheries are:

- **Section 115** which provides for the making of Orders to amend the provisions of the Salmon and Freshwater Fisheries Act 1975 and sets out the procedure for making such Orders;
- **Section 116** which gives Ministers the power to make regulations to modify enactments relating to the carrying out by the Environment Agency of its fisheries functions in order to give effect to international obligations;
- **Section 142** which makes provision for the Environment Agency to apply for Orders to enable it to levy contributions on owners and occupiers of fisheries; and
- **Sections 210-212 and Schedules 25 and 26** which confer powers on the Agency to make and enforce byelaws, set out the purposes for which fishery byelaws may be made, the procedures that must be followed in making them and provide for the payment of compensation to those disadvantaged by certain byelaws.

The Environment Act 1995

2.16 The Environment Act 1995, which established the Environment Agency, includes the following provisions on salmon and freshwater fisheries:

- **Section 2(1)(a)(v)** which transferred the National Rivers Authority's fisheries functions to the Agency;
- **Section 6(6)** which sets out the Agency's duties in relation to salmon and freshwater fisheries;
- **Section 6(7)** which defines the area in which the Agency carries out its fisheries duties;
- **Section 13** which provides for the establishment of regional and local fisheries advisory committees;
- **Section 47** which gives the Minister the power to pay grant-in-aid in respect of the Agency's fisheries function; and

- **Section 103(3)** amends the Water Resources Act 1991 to provide for the making of byelaws regulating fisheries for marine or aquatic environmental purposes. Aquatic environmental purposes are defined as including the conservation or enhancement of natural beauty or amenity of aquatic or waterside areas and the conservation of fauna and flora dependent on, or associated with, aquatic or waterside environments;
- **Section 104** provides for the introduction of fixed penalties for fisheries offences;
- **Section 105 and Schedule 15** gives effect to a number of other provisions relevant to fisheries including the compulsory fitting of gratings to fish farm intakes and outfalls (with effect from 1 January 1999); and the transfer, from the Minister to the Environment Agency, of responsibility for granting consents and approvals in connection with the making of fish passes, fitting of gratings by the Agency and the use of noxious substances.

2.17 The Environment Act also imposes a number of other duties on the Environment Agency that are of relevance to salmon and freshwater fisheries:

- **Section 4** makes it the principal aim of the Agency, in discharging its functions to protect or enhance the environment, to contribute to sustainable development, taking into account any likely costs and guidance from Ministers;
- **Section 6(1)** states that it shall be the duty of the Agency, to the extent that it considers desirable, generally to promote:
 - (a) the conservation and enhancement of the natural beauty and amenity of inland and coastal waters and of land associated with such waters;
 - (b) the conservation of flora and fauna which are dependent on an aquatic environment; and
 - (c) the use of such waters and land for recreational purposes.
- **Section 7(1)(a) and (b)** impose a duty on Ministers and the Agency, in formulating or considering proposals relating to any functions of the Agency, other than its pollution control functions, to exercise their powers to further the conservation and enhancement of natural beauty and the conservation of flora, fauna and geological or physiographical features of special interest. With respect to the Agency's pollution control functions, the duty is limited to a need to have regard to the desirability of these objectives.
- **Section 7 (1)(c)** imposes a duty on Ministers and the Agency, in formulating or considering any proposal relating to any functions of the Agency to:
 - (a) have regard to the desirability of protecting and conserving buildings, sites and objects of archaeological, architectural, engineering or historic interest;
 - (b) take into account any effect which the proposals would have on the beauty or amenity of any rural or urban area or any such flora, fauna, features, buildings, sites or objects; and
 - (c) have regard to any effect which the proposals would have on the economic and social well-being of local communities in rural areas.

Part II – Fish and their environment

Chapter 5

Fish communities and their habitats

1 Introduction

- 1.1 This chapter provides an introduction to the range of freshwater communities occurring in England and Wales as a background to other sections of our report. While the main emphasis is upon the fish species that are present in different types of freshwater habitat, fish are only part of the complex freshwater ecosystems, which also comprise a wide range of other aquatic and terrestrial animal and plant species (indeed some important freshwater habitats such as ponds may contain no fish). Nevertheless, fish species frequently act as important indicators of the state of the ecosystem.
- 1.2 The freshwater fish communities present in the British Isles are relatively ‘young’ in geological and evolutionary terms. It is probable that most non-migratory species died out during the last ice-age, which ended about 12,000 years ago. The present fish community structure is thus the result of recolonisation by species from north-western Europe, via rivers draining the short-lived land bridge which now forms the bed of the North Sea, and by species which could tolerate salt water and were therefore able to recolonise rivers from the sea.
- 1.3 Great Britain therefore has a relatively impoverished fish fauna compared with the rest of Europe. Thirty-seven freshwater species are generally regarded to be indigenous, including the migratory (diadromous) species like salmon and eel, and six marine species spend a significant part of their lives in freshwater (See Box 1 and Annex VI). At least a further 18 species (or groups of species) have been deliberately introduced. In comparison, there are about 80 species in north-west Europe and over 200 in Europe as a whole. A number of other species have been imported for ornamental purposes but are not thought to have been introduced into the wild except in isolated cases.

2 Fish and their freshwater habitats

- 2.1 Box 1 lists all fish species known to occur in the wild in England and Wales. Of these, 46 (including all the introduced species) spend all their lives in freshwater. Five of the indigenous species are considered to be ‘rare’⁷ although this includes species that are probably already extinct in Britain (for example burbot) or at the edge of their natural range. Most of the introduced species do not breed in the wild in Britain or do so in only localised

⁷ classified as rare in NRA R&D Report 18 – Winfield, I.J., Fletcher, J.M. and Cragg-Hine, D. (1995) Status of Rare Fish – a literature Review of Freshwater Fish in the UK

areas. However, there are notable exceptions, such as zander, which have become established in a large number of waters since they were first released at the end of the 19th Century.

Box 1 The Freshwater fish fauna of England and Wales (excluding hybrids)

(Latin names of species are listed in Annex VI)

Distribution in England and Wales			
Principle habit	Common ¹	Rare ¹	Introduced
Diadromous:	Eel	Allis shad	
	Salmon	Houting ²	
	Sea trout	Smelt	
	River lamprey	Sturgeon	
	Sea lamprey	Twaite shad	
Freshwater residents:	Barbel	Arctic char	American brook trout/Brook char
	Bleak ³	Burbot ²	Bitterling
	Bullhead	Powan/Schelly/	Catfish (Wels or Danubian)
	Brook lamprey	Gwyniad	Catfish (Ictalurid) ⁶
	Brown trout	Spined loach	Goldfish
	Chub	Vendace	Grass carp ⁴
	Common bream		Ide/Orfe
	Common carp ⁵		Koi carp/Ghost carp
	Crucian carp ^{3 5}		Largemouth bass ⁶
	Dace		Pikeperch/zander
	Grayling		Pumpkinseed ⁶
	Gudgeon		Rainbow trout
	Minnow		Rock bass ⁶
	Perch		Salmon (landlocked) ^{4 6}
	Pike		Silver carp ⁵
	Roach		Sturgeon/Sterlet species ⁶
	Rudd		Sunbleak/Motherless minnow ⁶
	Ruffe ³		Topmouth gudgeon ⁶
	Silver bream ³		
	3-spined stickleback		
10-spined stickleback			
Stone loach			
Tench			
Marine: enter lower reaches of rivers:	Bass		
	Common goby		
	Flounder		
	Golden mullet		
	Thick-lipped mullet		
	Thin-lipped mullet		

Footnotes:

¹ Information on status of native British species is taken from Winfield, I., Fletcher, J. and Cragg-Hine, D. (1994) Status of Rare Fish – A literature Review of Freshwater Fish in UK. R&D Report 18, NRA, Bristol. 58pp.

² Probably extinct in Britain

³ Classified as 'fairly common' (see footnote 1.)

⁴ Not thought to breed at any sites where they have been released into the wild

⁵ Probably introduced historically but now generally regarded to be widespread

⁶ Introduced species which currently have a limited distribution

- 2.2 Of the indigenous species in England and Wales ten are classed as diadromous, spending part of their life-cycle in freshwater and part in the sea. Most of these are anadromous – meaning that they spawn in fresh water – and one, the eel, is catadromous and spawns in the sea. These species do not include those that occasionally penetrate into fresh waters. One anadromous species (the houting) is now generally considered to be extinct in British waters. The brown trout has both anadromous and freshwater forms, which may exist as separate or mixed populations.
- 2.3 Fish habitats in England and Wales vary widely, from torrential upland streams to the nutrient-rich conditions of some lowland lakes. The natural distribution of freshwater fish populations is influenced by various factors, including topography, hydrology, water chemistry and temperature. Thus, for example, the number of species decreases with increasing altitude, so that an upland river or lake may typically hold a fish community comprising only four or five species, dominated by salmonids, whereas a lowland river system may have ten or more species, with cyprinids and their relatives often predominating.
- 2.4 These characteristics provided the basis for a classification system, which has been used historically to divide rivers into zones based upon the dominant species present. This system illustrates the diversity of different fish communities that can occur and the relationships between river types and the species present. However, it is important to note that fisheries are actually much more complex than this and a great variety of intermediate community types may also be found.
- **The trout zone** – fast-flowing, cold throughout the year, and well oxygenated. Mainly in the upland headwaters of rain-fed river systems, but also found in strongly flowing and weedier chalk streams. The rocky, scoured bed of upland rivers supports little in the way of aquatic plants other than algae, mosses and liverworts. The fish community is dominated by salmonids but minnows, bullheads and stone loach also commonly occur.
 - **The grayling zone** – again, fast-flowing, cold and well oxygenated, and most often found in river sections immediately below the trout zone. But it is also found in some chalk streams where the aquatic plant community can be prolific. The fish community is dominated by salmonids (especially trout) and grayling, but with those cyprinids that tend to favour faster flow rates, for example chub, dace, bleak, barbel and gudgeon.
 - **The barbel zone** – moderately strong current with exposed gravel on the river bed, but also some silt deposition. The water temperature and dissolved oxygen content can fluctuate widely both diurnally and seasonally. Supports well-developed in-stream and marginal plants. The fish community comprises mainly cyprinids (chub, roach, dace, bleak and barbel) with perch, pike and eels also present.
 - **The bream zone** – slow flowing, meandering, lowland sections of rivers. Water temperature and dissolved oxygen content can fluctuate widely on a daily basis. Supports a prolific plant community of all types: submerged, emergent and marginal. The fish community is dominated by cyprinids such as bream and carp species, roach, rudd and tench, many of which are also found in still waters and are tolerant of low levels of dissolved oxygen.
- 2.5 This system of classification seems to correspond well with the observed distribution of freshwater fish species in British rivers, although clearly there can be considerable overlap between the zones. It also explains how a wide range of human activities can alter the

suitability of waters for different species by modifying the physical or chemical characteristics.

- 2.6 The Environment Agency recently developed a more sophisticated Fisheries Classification Scheme to assess river quality. In doing so it found that the greater part of the variability in riverine fish population characteristics can be explained by channel width and gradient, confirming that the above descriptive analysis, albeit simple, holds good. Results from the sampling of a narrow, steep upland stream will differ from results from a wide, sluggish lowland river. For example, trout and juvenile salmon might be found in the former and tench, roach and bream in the latter. As the Fisheries Classification Scheme is designed to compare like with like, steep upland river sites will not be classified as poor just because of the absence of the lowland species.
- 2.7 Stillwater fisheries in England and Wales are also very variable. Natural waters range from the large deep Cumbrian lakes formed in glacial valleys, through to clay-bedded lowland valley meres and the naturalised ancient peat diggings which have formed the Norfolk Broads. Still waters can also be classified according to the main species that tend to be present although, as with the river zones, these are artificial categories within a continuous range of habitat types.
- **Salmonid waters** – deep-sided lakes in mountainous regions, usually with cool clear peaty water with high oxygen content and moderately low nutrient levels. Such waters normally have relatively little vegetation and contain trout or char, and, where suitable spawning habitat is available, whitefish, pike and perch.
 - **Mixed waters** – lakes of medium depth with well-developed bays and shallows, and generally containing many submerged plants and marginal reed beds. These waters tend to have medium nutrient content and seasonally variable oxygen levels. The dominant fish species tend to be trout, perch, pike, roach, minnow and eel.
 - **Cyprinid waters** – shallow lakes in lowland valleys, usually having dense weed growth with lilies and reed beds. The water tends to be warm in summer with high nutrient levels, often resulting in heavy plankton growth and, particularly in smaller ponds, periods with low oxygen levels. The main species in such waters are usually bream, carp, tench, roach, rudd, pike and eel.
 - **Fishless waters** – usually small ponds or shallow pools, for example in blanket peat bogs, where temperatures and/or oxygen levels frequently become unsuitable for fish to survive.
- 2.8 Man-made waters include a wide variety of reservoirs, extensive gravel pit complexes, formal lakes and ponds. These waters also vary in their suitability for different species as a result of differences in their topography and water chemistry, although the species present will frequently be determined by the stocking policy of the fishery managers. Similarly, the building of canals created completely new habitats particularly suitable for species that favour slow flowing water.
- 2.9 Although many fish species are particularly suited to certain habitats, the fish populations in many rivers and lakes have been extensively modified by both deliberate and unintentional transfers of species, which have occurred since at least the Middle Ages. In recent years, there have been increasing pressures to permit the introduction of non-indigenous species from Europe and large numbers of fish, including large ‘specimen’ fish, have been imported both legally and illegally.

- 2.10** We also note the ecological importance of waters that have little or no value as fisheries; these include waters with no fish and those where any fish populations are limited by natural factors and/or pollution. Although such small neglected fish communities are rarely, if ever, monitored, their contribution to the wider ecosystem should not be ignored.

3 Freshwater fish

- 3.1** Fish that spend all their lives in freshwater exhibit a wide range of life strategies. Life spans, growth rates and age at maturation vary both within and between species. At one extreme, fish may be small, fecund, fast growing, short-lived and very numerous; whereas at the other extreme, the fish may be large, slow growing, long-lived, less fecund and fewer in number. Many species shoal; shoals of some species (for example roach and bream) may feed within discrete home ranges, while others (for example dace) return to the same location when they are not feeding. However, apart from the salmonids, most freshwater species do not generally defend territories (although some male cyprinids may defend small territories during spawning). As a result there may be greater scope for their population sizes in a particular water to fluctuate widely from year to year.
- 3.2** In England and Wales, spawning of freshwater species occurs primarily in the spring and summer months. Spawning activity is synchronised by environmental stimuli, especially changes in day length and temperature, and the relative importance of these and other cues tends to vary between populations and species. A number of species, including minnow, roach, bream, barbel, chub and dace, undergo seasonal migrations in order to form aggregations at common spawning sites. For some species these movements occur over relatively short distance (<5 km), but barbel, for example, may travel many kilometres to find suitable shallow gravel spawning areas. Spawning habitats of freshwater fish species can be categorised according to the type of substrate preferred. Some species (for example dace, barbel and chub) deposit their eggs on the rock or gravel bottoms of rivers and this tends to limit their distribution, others (for example gudgeon) prefer sand/gravel or aquatic plants/flooded vegetation on which to lay their eggs (for example carp and tench). However, some of the most widely distributed species, such as the roach and bream, have very much more flexible spawning requirements (plants or river bed substrate) and this adaptability is undoubtedly a factor in their relative success. Most species are open substrate spawners and do not guard their eggs.
- 3.3** The size of a particular year class of cyprinids may be significantly affected by the growth and survival of the newly hatched fry in the first few weeks of life. Thus, years of rapid fry growth often produce very strong year classes that can dominate populations for many years. Fish exhibit variable patterns of growth, and this is substantially influenced by environmental factors, principally temperature but also food availability and quality, dissolved oxygen, day length, salinity, ammonia, and pH.
- 3.4** Most of the native freshwater species in England and Wales are relatively widespread although their abundance clearly varies between areas and may be significantly affected by local factors. Many aspects of habitat quality for both salmonid and coarse fish species have been adversely affected by human activities. For instance, the naturally diverse physical features of rivers, including shallow gravel riffles, deeper glides and pools, each of which supports key life history stages of fishes, may have been removed by river straightening and deep dredging during historic land drainage and flood defence programmes. This has very probably led to widespread reductions in coarse and game fish diversity and abundance. Habitat restoration projects, currently gaining in popularity, are attempting to produce sustainable solutions to the very large legacy of physical habitat damage.

- 3.5 The chemical quality of freshwater is also a key determinant of fish stocks. Improvements in water quality in many rivers in recent years have generally resulted in increased fish populations. However, the effects on the fish populations may often be more complex; for example, it has been suggested that the reduction of nutrient-rich and warm water effluents on the River Trent in recent years has resulted in the river becoming clearer and that this has affected both the structure and distribution of the fish communities. We consider the effects of habitat degradation in more detail in Chapter 6.
- 3.6 One of the five rare freshwater species, the burbot, has not been recorded in British waters for over 20 years. Three of the other 'rare' species – the two coregonids (vendace and schelly/gwyniad) and the Arctic char – are generally anadromous where they occur elsewhere in Northern Europe but exist only as isolated landlocked populations in England and Wales. The vendace occurs in only two lakes in Cumbria and the schelly in four Cumbrian lakes and one lake in Wales; the status of one vendace and two schelly populations is poor and causing concern. There are few populations of Arctic char in England and Wales, which is the southern edge of its geographic range. The final rare species, the spined loach, has a very restricted distribution, primarily in central England and often in gravel pit habitats.
- 3.7 Three of the species of freshwater fish that are classified as 'common' or 'fairly common' in England and Wales, the silver bream, crucian carp and rudd, are considered to be 'rare' or at some risk elsewhere in Europe. Within the UK the loss of many weedy, clear-water lakes may be leading to reductions in the range of species such as rudd and perch, and crucian carp may be under threat from brown goldfish.

4 Salmonids

Atlantic salmon

- 4.1 Atlantic salmon spawn in freshwater in the autumn or winter by burying their eggs in gravel 'redds'. After the eggs hatch, the embryonic alevins remain in the gravel, drawing nourishment from their yolk sacs. When their yolk reserve is almost exhausted the young fish (fry) emerge from the gravel, disperse and begin to feed, growing into parr. The juveniles set up territories in suitable fast-flowing water, which they defend against competitors; this tends to impose a limit on the population size, often referred to as the carrying capacity of the stream. Once they attain a size of about 10-20 cm – usually after one to three years – the parr undergo morphological, physiological and behavioural changes to become smolts in preparation for migrating to sea in the spring.
- 4.2 The precise migration routes of salmon smolts after they enter the sea are not known, but they appear to move rapidly away from the coast towards areas of the North Atlantic and Northern Norwegian Sea, where prey species may be more plentiful or conditions more suitable for rapid growth. Salmon return to freshwater after one to three (or very rarely more) years at sea; those that return after one year are referred to as 'one-sea-winter' fish while the older fish are called 'multi-sea-winter' salmon. The terms 'grilse' and 'salmon' are also applied to these two age groups, although these terms are sometimes simply used to describe fish less than or greater than 7-8 lbs (~3 kg).
- 4.3 Multi-sea-winter salmon that return to rivers in the spring have long been prized by commercial and recreational fishermen alike. This is partly because the availability of fish early in the year extends the fishing seasons, but it also reflects the fact that these fish are usually large, in excellent condition and readily catchable by anglers. There is no universal

definition of the term 'spring salmon', which is variously used to describe particular age groups of salmon (for example 3-sea-winter and older) or salmon which return at particular times (typically before the beginning of May or June). Traditionally the term has been used to describe the large, 3 and 4-sea-winter salmon which mainly return very early in the year; however, these stock components are so depleted in England and Wales that most of the salmon caught in the spring are now 2-sea-winter fish. Although 2-sea-winter fish return throughout the year, many rivers have early runs between April and June.

- 4.4** The age at which salmon mature and the time of year when they return to fresh water are affected by environmental conditions, and the recent decline in the numbers of early returning multi-sea-winter salmon is thought to have been caused partly by changes in conditions at sea and in rivers. However, both 'age at maturity' and 'run-timing' are also affected by genetic factors, and so over-exploitation of these stock components may have contributed to the decline. Early-running one-sea-winter fish, which begin to return to rivers in June, are also believed to be of importance because they tend to breed in the same parts of the rivers as the older spring fish and are likely to share the 'early-running' genetic traits⁸.
- 4.5** The current status of salmon stocks is very variable. Most are thought to be under pressure from the gradual degradation of freshwater habitats, although there are some well-documented cases (for example Tyne, Wear and some South Wales rivers) of stocks being restored following the removal of major sources of pollution. Salmon stocks throughout much of the North Atlantic also appear to have been affected by changes in conditions in the sea (such as temperature), with the proportion of salmon surviving the marine phase of the life-cycle generally declining in recent years; multi-sea-winter salmon stocks have been particularly badly affected. The mechanisms by which marine conditions may affect growth, maturation or survival are not known. The decline in salmon stocks has resulted in increased controls on exploitation in fisheries throughout the North Atlantic region. We discuss the control of salmon exploitation in more detail in Chapter 10.

Sea trout and brown trout

- 4.6** The trout, *Salmo trutta*, is one of the most widely distributed freshwater fish species in England and Wales. For management purposes, individuals are usually classed as non-migratory (brown trout) or migratory (sea trout). In practice, however, all trout migrate, and different populations exhibit a wide range of migratory behaviour. While some trout remain in fairly localised areas of a river and some are anadromous, like salmon, others show intermediate behaviours such as migrating only as far as the estuary as occurs on the River Glaslyn. In a few populations, all the fish migrate to sea and in many others all remain in freshwater; however, in most cases sea trout exist in association with resident brown trout and interbreed with them. In such mixed populations, the females are more likely to migrate while more of the males remain in fresh water. This has obvious reproductive advantages: females benefit from being able to grow to a large size and thus produce more eggs, while males do not need to be so large because even a relatively small male can fertilise all the eggs of a large female. The extent to which genetic or environmental factors control this behaviour is not known.
- 4.7** The life-cycle of sea trout is similar to that of salmon, although they have slightly different habitat preferences in freshwater and, once in the sea, they do not generally migrate long

⁸ The Salmon Advisory Committee prepared a comprehensive report on salmon run timing in 1994

distances, tending to remain close to the coast and within about 100-150 km of their home river. In addition, in most rivers a substantial proportion of the sea trout return to freshwater only two or three months after emigrating as smolts (and are commonly referred to as whiting or finnock) although not all these fish will spawn. Nearly all older fish returning to freshwater will mature and spawn, although some will remain at sea for two to three years before their first return. Most fish then continue to spawn in each successive year for as long as they live. Like salmon, migratory trout can return to the river of their birth with a high degree of precision, and the different age groups tend to return at different times of year.

- 4.8** There appear to be quite clear differences between the sea trout populations in different parts of England and Wales, although the extent to which this reflects different races of fish or is simply the effect of different environmental conditions is not clear. Thus for example the stocks in the south-west are typically much faster growing fish than those in the north-west. The populations of sea trout originating in north-east England, from the Yorkshire Esk to the Tweed, undertake much longer marine migrations (~ 700 km) than other stocks. The post-smolts migrate southwards down the east coast of England and into the southern North Sea, where they are exploited on the East Anglian coast; some also migrate to the continental coast and as far as Denmark. Perhaps because of this behaviour, very few of the fish from the north-east rivers return to freshwater as whiting.
- 4.9** In many places, sea trout co-exist with salmon, although rivers vary from having almost 100% salmon (for example the River Exe and Wye) to almost 100% sea trout (for example the Rivers Otter and Afan). On some rivers, salmon and trout occasionally interbreed to produce viable hybrids, underlining the close genetic relationship between these species. There is often some segregation of salmon and sea trout within rivers, although adult fish frequently utilise similar spawning areas, with the risk of over-cutting of redds; since salmon tend to spawn later than sea trout, it is the trout that are most likely to be adversely affected by this. We discuss the difficulties of managing fisheries for migratory and non-migratory trout in more detail in Chapter 10.
- 4.10** Good catches of sea trout were recorded in England and Wales in 1987 and 1988, but they declined subsequently (1989-1992). At around this time there were marked reductions in stocks in some parts of Scotland and Ireland, where many sea trout were observed to display abnormal behaviour, such as returning to freshwater after only a short period in the sea. While the problems seen in Scotland and Ireland have been blamed by many on infestations of sea lice from marine salmon farms, those in England and Wales were not as severe and appear to have been the result of low flow conditions or other local factors. More recently, catches of sea trout in England and Wales have improved; however, we do not know what factors are causing these changes and we consider that this is an important area for further research.
- 4.11** Brown trout occur both as components of mixed populations with sea trout and as separate non-migratory populations. The life-cycle of the brown trout is the same as that of sea trout, except that they remain within fresh water (or in the estuary) when they migrate between their spawning and feeding areas. Indeed, non-migratory trout are indistinguishable from the migratory fish until the latter become smolts.
- 4.12** Populations of non-migratory brown trout extend the range of this species into waters that are inaccessible to the migratory variety, ranging from sections of rivers above impassable falls to isolated upland lakes. The population structure of these wild trout stocks is very variable: large nutrient-poor lakes may contain slow-growing, late-maturing (4-5 years)

trout which may live for 10-20 years, while chalkstreams may contain shorter-lived and faster-growing trout which mature after only 2-3 years. Some of the most famous brown trout fisheries are found in southern chalkstreams, such as the Piddle, Frome and tributaries of the Hampshire Avon. The alkaline water chemistry and relatively constant water flows and temperatures mean that these rivers support particularly diverse and productive ecosystems.

- 4.13** The status of wild brown trout populations in England and Wales is very variable with many having been heavily exploited and their habitats degraded. Many trout fisheries are now sustained only by stocking; hatchery-reared fish are usually released at a 'takeable' size to supplement the fishery, but these fish may also contribute to the spawning stock.
- 4.14** Populations of brown trout that have been relatively unaffected by stocking do exist; these are often in small mountain lakes or remote parts of rivers above obstructions that are impassable to migratory salmonids. We discuss how naturally breeding wild brown trout populations can be conserved in Chapters 10 and 11.

5 Eels

- 5.1** The European eel is a catadromous species, meaning that the fish spawn in the sea but return to freshwater to grow. However, some eels may remain in the sea throughout their lives while others may move freely between salt water and freshwater environments. All European eels are thought to belong to a single breeding population which spawns in the Sargasso Sea. The leaf-like larval eels (leptocephali) migrate to coastal waters, probably by drifting on the oceanic currents, before metamorphosing into small transparent eels (glass eels). As they enter estuaries and freshwater in the early spring, they become pigmented (elvers) and begin to look like small adult eels.
- 5.2** Eels are slow growing fish and commonly spend 10-15 years in fresh water (yellows eels) before once again returning to the sea as silver eels on their spawning migration. As they grow in rivers, eels gradually move upstream, and so the larger fish tend to be found further from the sea. The gender of eels appears to be determined by a combination of genetic and environmental factors, the most important of which is population density. Males predominate where eels are particularly abundant, a situation often found in estuaries and the lower reaches of rivers.
- 5.3** With the onset of maturation, yellow eels begin to metamorphose into silver eels. For males this tends to occur when they are between about 35 and 45 cm long and aged 6-15 years, while females mature at a length of over 45 cm when they may be up to 20 years old. Silver eels usually leave freshwater between August and December, but little is known about their behaviour in the sea. We also have limited knowledge about the marine component of the eel stock or the relative contributions that these fish and the eels emigrating from freshwater may make to the spawning population.
- 5.4** There is evidence from several parts of Europe that the number of elvers entering freshwater has decreased very substantially over the past 10-20 years. This is based upon catches in several major elver fisheries in Europe, including that in the Severn Estuary. The reason for the decline is not known, but it may be related to over-exploitation of elvers or adults, changes in marine environmental conditions, degradation of freshwater habitats, or diseases and parasites. The reduction in recruitment may take some time to affect adult eel populations, and thus catches, because of the long life-span of the fish. In addition, the extent of the effect on adult populations is difficult to predict, because little is known about the relationship between population size and levels of natural mortality. If the rate of

natural mortality in the populations is lower at low densities (for example because of reduced competition) then the stocks may be able to sustain a substantial reduction in recruitment; if not, it is likely that eel stocks will be greatly depleted for at least the next 10-20 years. The decline in eel catches has led to calls for reductions in exploitation, and this is discussed further in Chapter 10.

- 5.5 In recent years a parasitic nematode, *Anguillicola crassus*, has been introduced into Europe from the Far East probably through imports of live farmed eels. The normal host of the parasite is the Asiatic eel but it can also infect the European eel. Eels can become infected as elvers as soon as they enter freshwater and probably even in brackish water, but it is not clear whether they can also become infected in the sea. The parasite develops in the swim bladder of eels; it does not appear to cause serious mortalities in freshwater but it is feared that it may reduce the ability of silver eels to swim to the spawning areas and breed successfully. Since being introduced into Europe, *A. crassus* has spread very rapidly; it has been identified in a number of rivers in England and Wales, covering a wide geographic range and is now generally assumed to be widespread.

6 Other diadromous species

- 6.1 Seven other diadromous species have been recorded in rivers in England and Wales; five are classified as 'rare', including the houting, which is now probably absent from British waters, and the sturgeon, which is no more than an infrequent visitor and does not breed in British waters.
- 6.2 The two species of shad occur in coastal waters but only the twaite shad is known to breed in British rivers and then only at a few locations. Estuarial pollution and man-made barriers are thought to have been responsible for the loss of these fish from many rivers. The fish breed around late June in waters just above the tidal limit. The fry hatch after four to six days and quickly drop down to the estuary, where they begin to feed and grow. The males start to mature after about three years and the females after about five years. There are small commercial catches of shad in the River Severn and they are also angled for on some rivers that still have a reasonable run of fish (for example the Rivers Wye and Severn).
- 6.3 The smelt, which has a similar life-cycle to the shad, has been lost from a number of estuaries due to pollution, although it has been recorded as returning to the Thames in recent years. The full distribution of this species in England and Wales is not well documented.
- 6.4 The two anadromous species of lamprey are fairly widespread in England and Wales. These species have a similar life-cycle to the migratory salmonids, but after hatching they have an extended larval stage, with the larvae (known as ammocoetes) living in burrows in sandy silt. After metamorphosis into the adult form, they migrate to sea where they become parasitic on other fish; however, little is known about their main hosts.

7 Estuarine species

- 7.1 A small number of marine species also venture into fresh waters in England and Wales. This group includes two species of mullet, flounder and several species of goby. These species are all reasonably common, although the thin-lipped and golden mullet occur mainly in the south. The upper reaches of estuaries also provide important nursery areas for many other species including bass, sole and brill.

Chapter 6

Fish habitats

The problems

1 Introduction

- 1.1 Chapter 5 provides an overview of fish communities and freshwater ecosystems. The maintenance and enhancement of fish populations is dependent on the existence of the appropriate environmental conditions. We are greatly concerned, therefore, by the large amount of evidence of serious decline in the environmental quality of freshwater ecosystems which we received from a wide range of sources. In this Chapter we assess the problems affecting fish habitats and recommend some solutions. Although the focus of our attention has been on fish and their requirements, we do not consider these in isolation. Fish are an important component of aquatic ecosystems, and are influenced by, and influence, other elements of those ecosystems.
- 1.2 The maintenance and improvement of fish habitats is an important aspect of fisheries management. Works range from routine 'gardening' along the bank carried out by owners and club members through to large scale, catchment-based projects carried out by statutory bodies, trusts and partnerships often with the help of external funding. Our attention was drawn to the achievements of several such projects.
- 1.3 However, this positive management can be outweighed by other human activities that have a serious detrimental impact upon the freshwater environment. In some cases management has been instigated for the very purpose of mitigating such damage. For the most part these damaging activities are not illegal and so improved enforcement of our current law alone will not solve the problem. As with most areas of human endeavour, there can be conflicts between different sectoral interests. These conflicts are generally resolved by employing some form of prioritisation. All too often, the freshwater environment loses out to an apparently more pressing human need such as urban and industrial development; then the impact on the freshwater system is likely to be intentional and direct. In other cases, notably in relation to agricultural practices, damage to freshwater systems is an incidental consequence. There is often no deliberate intention to cause damage. It is more often the case that the sensitivities of the aquatic systems are overlooked in the policy making stage and in its execution.
- 1.4 Before going on to make recommendations for ways in which fish habitats can be safeguarded and improved, we set out the main problems that were raised with us in evidence. The problems are grouped into three categories: those concerned with the quality of water; those concerned with the quantity of water and the patterns of flow; and those concerned with the impact on the bed of the watercourse and the adjacent land.

2 Water pollution

- 2.1 Water quality is affected by dissolved gases, minerals and organic materials in the water. The introduction of pollutants can affect this quality directly, for example by adding toxic

chemicals to the system, or indirectly, for example by adding so much organic material that the oxygen content of the water becomes severely depleted.

Agricultural pollution

2.2 Water pollution from agricultural sources is a major cause for concern. It should be emphasised that many perfectly legal activities can present a risk of pollution if carried out inappropriately. Examples of the main types of pollutants include:

- insecticides from arable crop sprays, from produce and seed-treatments and from sheep dip and fleeces;
- herbicides and fungicides from arable crop management;
- fertilisers (nitrates, phosphates, potassium) from arable and grassland management;
- sewage sludge applied to farm land;
- slurry;
- milk washings;
- silage liquor;
- soil and silt (sediment).

2.3 Some pollutants (for example milk washings, slurry, silage liquor) remove dissolved oxygen from the water and can kill fish through asphyxiation. Others are directly toxic to fish (for example liquids with high ammonia contents) and some (for example organochlorine pesticides) are also persistent and bioaccumulate along food chains to poison top predators such as otters. Fertilisers can cause over-enrichment (eutrophication) of aquatic systems with resultant loss of sensitive plant and animal species, algal blooms and reduced fish productivity. In the worst cases, only a few pollutant-tolerant species may survive. Low concentrations of agri-chemicals, such as synthetic pyrethroid sheep dips, may not be directly toxic to fish but are capable of wiping out invertebrates over long stretches of rivers and streams and thus depleting the food sources on which fish and many birds are dependent and reducing the biodiversity. Pollution from sheep dips remains a particular problem, and we address this in detail in Section 6.

2.4 Of particular significance to fish spawning on or within gravels is the very widespread occurrence of excessive soil/silt inputs that block up the vital river bed interstices that convey oxygenated water to incubating eggs and yolk-sac fry and carry away waste products. Silt inputs can arise from various sources including excessive bank erosion through over-grazing and arable land close to rivers, particularly when this is cultivated to reveal bare soil in autumn. Subsequent rain can wash large quantities of fine sediments directly into rivers or via track and drainage systems. Choked spawning gravels can be difficult for salmon and trout to excavate and ongoing siltation can cause very high egg mortality rates. Such effects may be widespread in English and Welsh rivers and avoiding this damage may require careful riparian land use and soil conservation over extensive areas. Clearly sediment can act as a form of pollution and should be recognised and treated as such. Details of research into the effects of sediments are set out in Chapter 8.

2.5 The way in which a pollutant gets into the aquatic system is an important consideration in any plan to prevent pollution. Agricultural pollution comes from both point sources and diffuse sources. In general, point source pollution is easier to control and, indeed, most

inputs of this type are already prohibited or, at least, regulated by law. The main issue in these cases is the correct implementation of the law and its enforcement. Diffuse pollution, such as leaching of agri-chemicals and run-off, is more difficult to control by direct regulation. Instead, prevention is needed and this is likely to require radical changes in practice.

- 2.6** Some pollutants may have an adverse effect on fish even at very low concentrations. Research has shown that very low levels of some commonly used agri-chemicals (below the levels considered safe by the licensing authorities) can affect a salmon's olfactory capability thereby disrupting reproductive behaviour and physiology. Low concentrations of such chemicals may also affect the ability of salmonids to return to their natal streams. The herbicide Atrazine, for example, has such effects at concentrations down to 0.04ug/l which is one fiftieth of the Annual Average Environmental Quality Standard of 2.0ug/l which is the value used by the Environment Agency to set long-term discharge consents.

Industrial and sewage pollution

- 2.7** Authorised discharges from industrial sources and via the sewerage infrastructure result in polluting material entering watercourses. In the past, the main pollutants have been heavy metals, organohaline compounds and organic nutrients, the effects of which on freshwater ecosystems have been well documented. The micro-organisms in sewage treatment works, like all living organisms, are vulnerable to poisons. Pollution incidents can therefore damage or incapacitate sewage treatment works increasing risk of damage to receiving waters. Recently, the dangers of endocrine disrupting chemicals, such as oestrogen-mimicking compounds, have been recognised. Warm water discharges can also have direct effects on the fauna and flora and can affect the toxicity of some pollutants and the oxygen content of the water.
- 2.8** Legislation to control industrial pollution has been tightened up considerably in recent years and many rivers (for example the Tyne, Thames and Mersey) have shown a dramatic improvement in water quality as a result. Problems remain in some areas (for example the Tees), however, where there are still substantial industrial discharges.
- 2.9** Under-investment in the sewerage infrastructure over many years resulted in unsatisfactory discharges to watercourses, primarily through storm overflows. Although there have been substantial improvements since privatisation of the water industry and substantial investment (up to £8 billion), some river systems, particularly those in densely populated catchments, are still vulnerable during dry weather when river levels are low. Sewage effluent can be a major component of the flow and in some rivers the flow may be entirely dependent upon treated sewage effluent at certain times limiting the scope for natural recovery. Problems arising from this situation include low oxygen levels and ammonia toxicity and disturbingly high concentrations of other contaminants, primarily because of a lack of dilution. Oestrogenic and androgenic substances in sewage effluent are a particular cause for concern because they are known to cause sex reversal in fish and have effects on other animals.
- 2.10** Atmospheric pollution can also have significant effects on water quality. For example, deposition of sulphur compounds and other pollutants on the surrounding catchment, from the burning of fossil fuels, can increase the acidity of surface waters in areas where there is inadequate buffering capacity in the soils. This is a particular problem in upland areas with shallow soils overlying granite. The acid conditions may themselves be toxic to fish but they may also result in increased concentrations of toxic metals such as aluminium.

3 Water as a resource

Water quantity

- 3.1 The quantity of water is as important as its quality. Human demands on water can lead to a reduction in the volume of water available for aquatic systems. The Environment Agency currently regulates around 48,000 water abstraction licences, many from underground aquifers, but also from lakes and rivers. In addition, there are numerous daily water abstractions that are too small to come within the regulatory system. Many of these are taken from headwaters that contain fish spawning and nursery areas. On some catchments, particularly those with many small scale farms on minor tributaries, there may be cumulative problems for stream flows, especially in late summer. Riverine fish species have life cycles adapted to particular annual flow regimes. Migratory patterns, spawning success, fry survival and subsequent fishery sustenance all depend on adequate flows.
- 3.2 Even where abstraction is not a problem, river flows can be depleted as a result of blanket afforestation of catchments. A substantial quantity of available water in an afforested catchment can be lost via evaporation and transpiration. The quantity of water is also dependent on the way in which flow is managed. We consider the impact and control of obstructions to flow in Chapter 12.
- 3.3 The environmental problems stemming from reduced water quantity include:
- loss of ponds and wetlands;
 - reduced flowing periods in winterbournes;
 - loss of large areas of nursery habitats for salmonid and coarse fish;
 - inadequate flows to stimulate fish migrations at their normal times;
 - increased water temperatures and reduced dissolved oxygen;
 - increased risk of pollution because of decreased effluent dilution;
 - new bore holes drying out neighbouring lakes and marshes;
 - ecological imbalance, leading to a reduction in the conservation and fisheries value of the waters (for example loss of fast-water plant and animal species).

Water movements

- 3.4 Artificial impoundment of water and its subsequent release can also have a serious impact. For example, large upland reservoirs intercept winter rainfall and impound it for several months. During storage, the water may undergo significant physical and chemical changes. Water subsequently released from lower reservoir levels into rivers can have a range of damaging effects including deoxygenation, cooling and acidification.
- 3.5 Transferring water both within and between catchments is another potential problem. Large scale movements of water, possibly through some sort of national grid system involving existing waterways, has been proposed as one method of alleviating regional drought. With projected changes in climate and the consequent prediction of even drier conditions in the south east, the pressure for large scale water movements of this type may increase. The danger with this practice is that waters of different origin and quality become mixed creating a variety of potential problems. These include an increased chance of

inadvertent transfer of undesirable species between catchments (for example zander fry, zebra mussels), possible disruption of migration both within and into catchments, and the spread of diseases or parasites of fish and other organisms, for example alder disease. There is also a possibility that the behaviour of migratory salmonids will be disrupted by mixing pheromones from different rivers.

4 Watercourses and adjacent land

- 4.1 The substrate of a watercourse, together with the banks and their associated vegetation, are just as important determinants of the ecological quality of an aquatic system as is the water itself. Salmonids are particularly vulnerable to impacts on the physical character of a watercourse. There are three main types of impact: damage to the channel morphology and topography; damage to the river banks and riparian vegetation; and degradation of the river bed, for example by gravel removal or deposition of silt.
- 4.2 Intensification of agriculture has resulted in a number of serious problems affecting rivers. Most insidiously, land drainage for agricultural purposes has greatly reduced wetland habitat in many areas. This has had adverse effects on many rivers because the loss of natural ‘sponges’ means that water is drained much more rapidly, leading to more intense floods followed by longer periods of low flows. The latter create difficult conditions both for salmon and sea trout migration and for fishing; in addition, more intense floods tend to lead to greater erosion.
- 4.3 Trampling of river banks and poaching of river beds by livestock also cause rapid erosion, which increases the sediment load in the water and also flattens the profile of the riverbed making it wider and shallower.
- 4.4 In lowland areas, changes in agricultural practice have led to the creation of large areas of bare soil exposed to the elements. The main causes are the increase in winter crops and the growing of maize in flood plains. The consequence is that large amounts of silt can enter watercourses, particularly during heavy rainfall or flooding, causing serious damage to fish habitats and their associated fish food organisms.
- 4.5 In uplands, excessively high stocking densities of sheep lead to overgrazing, which leaves land prone to erosion, particularly in bankside areas during floods. This causes silt deposition in the water and can also lead to channel widening, ultimately reducing the fish carrying capacity of the reach during summer low flows. There is also evidence that where there is overgrazing rivers tend to become more ‘flashy’, rising and falling more rapidly with concomitant increases in erosive power, thus exacerbating the problem.
- 4.6 Too much vegetation around water can be as damaging as too little. Dense shading by trees can reduce stream productivity and, hence, the numbers of fish that the system can support.
- 4.7 As well as degrading water quality, forestry can lead to physical damage from siltation and from debris blocking spawning streams. Dense shading from conifers can greatly reduce a stream’s productivity and their decaying needles support only a sparse invertebrate fauna. Coniferous trees can also exacerbate acidification problems because they can filter out and concentrate atmospheric pollutants, which are then washed into streams by rainfall. Since forests are often planted in upland areas where the soil has poor buffering capacity, this can result in the acidification of streams containing important populations of juvenile salmon and trout.

- 4.8 Some exotic plant species also pose a threat of habitat damage because of their tendency to smother native vegetation on river and lake banks and within water bodies. The knock-on effects for invertebrates, fish and other wetland wildlife can be considerable. Three species are of particular concern: Japanese knotweed (*Fallopia japonica*); giant hogweed (*Heracleum mantegazzianum*); and Himalayan balsam (*Impatiens glandulifera*). All are now widespread throughout the British Isles.
- 4.9 Land development, including agricultural works, is a major cause of alterations to watercourses. River diversions, bank straightening and stabilisation works, and flood protection measures inevitably result in a deviation from the natural state. In addition, a large number of ponds have been filled in to make way for development and agricultural intensification. Over 75 per cent of the ponds that existed at the beginning of the 20th century have now been lost and this loss continues at about 1 per cent per year. The resulting decrease in habitat diversity leads to a deterioration in the fisheries and conservation value of a site, together with a reduction in angling opportunities.
- 4.10 The immense scale of wetland habitat loss in England and Wales over the last 100 years has left us with only tiny fragments of such habitat. Silt and decaying plant materials accumulate in ponds and wetlands changing most from open water habitats to fen and eventually to woodland. These processes can take thousands of years or, in productive habitats, decades. In a natural landscape new wetlands are continually being formed by flushes, fallen trees, banks of sediment left by rivers, ox-bows (cut-off meanders), surface undulations and local subsidence. It is important to ensure a widespread, diverse and suitably distributed assemblage of wetland habitat through the development of catchment based conservation plans.
- 4.11 Fish habitat improvement works, whilst being an invaluable fisheries management tool, can, if inappropriately applied, have detrimental effects on both the wider environment and the riverine habitat itself and can have adverse impacts on other non-target fish species. Examples include the increased risk of flooding as a result of in-stream schemes that constrict flow without due consideration of channel capacity; deliberately altered physical stream characteristics resulting in reduced silted backwaters for juvenile lampreys; single species management favouring one species (for example gravel areas for salmon spawning) over another (for example juvenile trout rearing areas). In addition, with respect to a single species such as salmon, facilitating the creation of adult holding pools to increase angling success, and hence exploitation, may not be compatible with the need to maintain good juvenile rearing habitat.
- 4.12 Inappropriate fish stocking regimes can also affect habitats. A key problem is the overstocking of some natural stillwater coarse fisheries to produce high catch rates. High densities of carp or common bream can adversely affect water quality and habitat. Problems include the eradication of submerged plants, increased turbidity and a serious reduction in invertebrate populations. These problems can adversely effect populations of sensitive fish species, such as crucian carp, rudd and perch, as well as amphibians, water birds and mammals.

Recommended solutions

5 The general approach

- 5.1 We now consider ways of dealing with the problems we have outlined above and make recommendations. Before doing so, however, we wish to draw attention to a more general

problem: the failure to consider freshwater systems holistically. Although management of activities that affect water, such as pollution, abstractions and discharges, is carried out in an integrated way within the Environment Agency there is little co-ordination with management of the land and there is thus no coherent approach towards the management and conservation of the freshwater environment as a whole. Too little regard has been paid to the integrated nature of freshwater systems, to interactions between the terrestrial and aquatic environments, and to the need to take account of the dynamics of water flows. We conclude that there is an urgent need for improved planning and management at the catchment level, involving all those with responsibilities for regulating and managing activities that may impact on the freshwater environment. This is a problem we address in Chapter 14.

- 5.2** In conducting our Review we are conscious that there is currently considerable uncertainty over the nature and extent of climatic change. There is increasing evidence of global warming, but it is not clear how this will affect England and Wales. The Government's own advisers consider that the most likely hypothesis is for more extreme weather events with increased rainfall in winter, and less rain, with longer periods of low flows, in summer. Such a weather pattern would mean more flooding in winter and more frequent droughts in the summer; the latter would, in many areas, compound the problem of over-abstraction that we have identified. These changes, linked to higher average water temperatures, would impact on fish habitats, fish survival and the distribution in England and Wales of species (for example the potential loss of salmon from southern spate rivers). There is a possibility, however, that global warming, together with an associated reduction in the arctic iceshelf, could lead to major changes in the Gulf Stream. If this were to happen global warming could mean significantly colder average temperatures in England and Wales.
- 5.3** Given these uncertainties, it is essential to maximise and maintain natural diversity to enable species to respond to changes in the environment. It is also important for Government to be ready to make any necessary modifications to existing legislation, policies and practices that are needed to respond to unexpected climatic change.

All relevant legislation should incorporate an element of flexibility so that measures can be modified in response to changing climate. (Recommendation 137)

- 5.4** Conservation legislation provides for scientifically important areas of land to be given special status as protected areas. The Moran Committee felt that fisheries could benefit from this approach and proposed that the Environment Agency should be given powers to designate river systems and parts of river systems as Special Fisheries Protection Areas where, in the Agency's opinion, fisheries quality needs improvement or special protection and special measures are necessary to achieve this.
- 5.5** We agree with the Moran Committee that fisheries need protection from the damaging effects of over-abstraction, poor water quality and inappropriate land use but we do not think that an additional type of protected area designation would be useful. There is a danger that it would be used only in cases of high conservation value whereas we consider that the Environment Agency, and other regulators, should take account of the environmental impacts on fisheries in all their decisions. We conclude that Fisheries Management Plans, which we discuss in Chapter 14, provide a more suitable way of addressing the special needs of particular rivers and, indeed, stillwaters, on a catchment basis.

6 Agriculture

- 6.1 Farming over many centuries has largely determined the nature of the rural landscape in England and Wales and has shaped most wildlife habitats. Farmers continue to play a key role in the conservation of the countryside and of the wildlife it supports. However, from the evidence put before us we have concluded that many modern agricultural practices have caused substantial damage to freshwater habitats in many parts of England and Wales and that these present a serious threat to freshwater ecosystems and the fisheries they support.

Agricultural pollution

- 6.2 Pollution caused by agriculture remains a major source of concern. A concerted effort by the NRA saw a lowering in farm pollution incidents in the 1990s after a rise in the 1980s. The reduction in the number of incidents was primarily achieved by taking a pollution prevention approach, involving improved co-operation with farmers, farm visits and the development of farm waste management plans, coupled with more vigorous enforcement action. The Groundwater Regulations 1998 provide additional controls over the application to agricultural land of substances likely to pollute groundwater. Further significant reductions in agricultural pollution of watercourses, are, however, likely to depend on changes to farming practices, which in turn will require changes to the Common Agricultural Policy (CAP).
- 6.3 Despite the success of Farm Waste Management Plans, farmers are not required by law to prepare such plans. We believe that a statutory requirement for all farmers to prepare Farm Waste Management Plans would help further reduce the number of farm pollution incidents.

All farmers should be required by law to prepare Farm Waste Management Plans. (Recommendation 139)

- 6.4 We are concerned about the widespread pollution of rivers by sediment. One of the difficulties with dealing with the problem is that inputs of sediment into water bodies occurring as a result of agricultural practices have not been regarded as pollution. This means that it has not been seen either by farmers or the regulatory authorities as an offence. We believe that the problem would be easier to deal with if it were made clear to all concerned that sediment can kill juvenile fish and that action leading to the input of excessive amounts of sediment into the watercourse might lead to a prosecution for pollution.

It should be made clear, by legislative changes if necessary, that sediment can be a polluting substance and that action resulting in the introduction of excessive amounts of sediment into watercourses comes within the scope of the offence of causing pollution. (Recommendation 138)

- 6.5 Later in this section we highlight the benefits to freshwater habitats from buffer strips. Among other things buffer strips can reduce levels of sediment, nitrate and agricultural pollution.
- 6.6 The sub-lethal effects of pesticides and veterinary medicine on fish and on invertebrates are more difficult to deal with, since the levels that may trigger adverse effects are so low that in many cases only a complete ban on the substance in question would solve the problem. This may not be realistic. Nevertheless, it is important that research into these effects

continues and that the licensing authorities are made aware of the results of this research and take them into account in their decisions.

Government and the Environment Agency should continue to fund research into the effects of pesticides and veterinary medicines on fish and invertebrates, including the sub-lethal effects. The results of this research should be made known to the bodies responsible for licensing these substances and should be taken into account by those bodies in deciding on and reviewing approvals and conditions of use. (Recommendation 140)

- 6.7 There is also a need for research on the natural recovery of streams after pollution events and on the best ways to enhance this recovery.

Research should be carried out into the natural recovery of, in particular, upland streams after pollution events and on the best ways to enhance this recovery. (Recommendation 141)

Sheep dip pollution

- 6.8 The Anglers Conservation Association, and others, provided compelling evidence of sheep dip pollution causing serious and widespread damage to rivers and streams. Environment Agency surveys have confirmed that invertebrate populations on several thousand kilometres of upland waterways in England and Wales have been seriously impacted by organophosphate (OP) sheep dip and by synthetic pyrethroid (SP) sheep dip and wiped out in some areas. SP dip pollution can be ecologically devastating with virtually all invertebrates killed, sometimes over several kilometres of river or stream. Recovery of invertebrate communities can take many months or years. Where invertebrates have been wiped out stream beds are soon choked with lush algal growths owing to the lack of grazing pressure by insect larvae, snails, shrimps etc. Any fish present must migrate in search of new feeding habitats (which will already contain fish stocks) or starve to death. Local recovery of fish stocks and their predators (such as otters and kingfishers) may take many years.
- 6.9 In a survey undertaken by the Environment Agency in Wales more than one hundred sheep dipping sites were inspected in 1997, and at 49 per cent of water quality sampling points sheep dip pollution exceeded the maximum allowable concentration. More than 25 per cent of sheep dipping installations were found to be “seriously unsatisfactory”; five per cent discharged directly into watercourses. The results for the wetter summer and autumn of 1998 were only marginally better; 56 out of 348 (16 per cent) of installations were deemed to present high risks of damage to watercourses. Awareness among the farming community is increasing, but even in 1998 some 19 per cent of farmers were still disposing of used dip to soak-away or by direct discharge to a watercourse. By the autumn of 1998, in Wales 20 per cent of upland watercourses showed signs of impoverished fauna due to pollution, with 1200 km of streams seriously damaged by sheep dip pollution.

Box 2 Sheep scab

Unless treated in its early stages, sheep scab, a contagious skin disease caused by the parasitic mite *Psoroptes ovis*, can be very damaging in terms of animal welfare, and can result in economic loss and, perhaps, prosecution under the Sheep Scab Order 1997. A range of sheep medicines in the form of dips, pour-ons and injections has been approved by the Veterinary Medicines Directorate for use in the UK. Before any new products may be marketed they must be authorised in accordance with UK and EU legislation. Approval is based upon an assessment of scientific data provided by the applicant company against statutory criteria of safety, quality and efficacy. Safety in this context includes the health and welfare of the treated animals, of the consumers of any food products derived from treated animals, of the operators administering the treatment and of the environment.

- 6.10** Even when handled with care, sheep dips can damage the environment, and even the most conscientious of users may be unaware of the risks. We are also concerned about the effect on terrestrial insects when used SP dips are disposed of by spreading on land. In wet weather, and especially in areas where sheep have grazed heavily, there remains a significant risk of SPs entering watercourses in damaging concentrations. We conclude that this practice is environmentally damaging even when carried out at the recommended dilution level. We also received evidence that the fleece of a freshly dipped sheep can contain up to 2kg of dilute dip. This is more than sufficient for just one sheep to pollute seriously a stream if it crosses the stream before the fleece has drained thoroughly. Washings from wool-scouring operations and from sheep markets are also reported to be carrying sheep dip into sewage treatment works in toxic concentrations.
- 6.11** In theory the environment could be protected by adequately controlling these risks during the sheep dipping process, by containing the stock away from watercourses (but with an adequate supply of drinking water) for a long enough drying period, and by suitable disposal of used SP dip. However, we received convincing evidence that in watercourses SPs are at least 100 times more toxic to invertebrates than OP dips and that they have already resulted in serious environmental damage. We conclude that it is impracticable to reduce the risk of serious environmental damage from SP sheep dip to an acceptable level.

Government should support research into and the development of effective alternatives to synthetic pyrethroid (SP) sheep dips, such as injections and pour ons and should positively promote these. As soon as alternatives are available to control sheep scab, the Medical Veterinary Products licence for SPs as a sheep-dipping chemical should be withdrawn. (Recommendation 142)

- 6.12** We also conclude that while SP sheep dips remain in use, and to ensure the safe use of other sheep dips, improvements are needed in the regulation and management of sheep dipping. We therefore welcome the Environment Agency's initiative of visiting farms to inspect dipping stations and where necessary providing guidance on remedial works to protect the aquatic environment. We are also concerned that sheep dip chemicals may be entering private water supplies via discharges to soak-away – a practice that is unacceptable for disposing of such chemicals.
- 6.13** Under the Groundwater Regulations 1998 with effect from 1 April 1999 anyone disposing of sheep dip must be licensed for this purpose via the Environment Agency. We are concerned, however, that some sheep farmers may still be unaware of this requirement. Until 1 April 1999 it was possible for unsuitable disposal locations to receive 'deemed consent', as licences were issued without site visits. The present licensing scheme should not, therefore, be seen as an alternative to farm visits and guidance on best practice.

The Environment Agency's programme of sheep-dipping site inspections and guidance in best practice should be pursued with continued vigour, focusing particularly on upland sheep-farming areas where base-poor soils provide little or no natural buffering. (Recommendation 143)

- 6.14** The Environment Agency informed us that they found it difficult to establish the location of all sheep dips, and that information that other Government agencies held which might have helped with this task was not made available to it because of legal restrictions on the disclosure of certain categories of information. The situation may be improved by forthcoming freedom of information legislation, but we do not in any case believe that information needed by a regulatory agency to fulfil its duty to protect the environment should be withheld from it by other Government agencies.

There should be a general presumption in favour of the disclosure by one Government agency to another of information, including information on individuals, needed to protect the environment and any legal restrictions on such disclosure should be removed. (Recommendation 144)

- 6.15** Licences under the Groundwater Regulations provide additional assurance that sheep dip will be disposed of safely; however, they do not give any guarantee that sheep dipping installations are suitably located and soundly constructed, and they cannot prevent localised splashing or spilling of sheep dip during the dipping process. Continuing environmental damage will occur if leaking dipping installations are allowed to operate. Similarly, any sheep dipping installation that is sited closer to a watercourse than 10 metres – the minimum distance specified for separation of disposal sites – poses a serious pollution threat.

The Environment Agency should make use of its powers to place closure orders on leaking or inappropriately sited sheep dipping installations. (Recommendation 145)

- 6.16** It is, of course, essential that sheep dips are used, and disposed of, in accordance with the manufacturers' instructions. We were told that the farming unions have worked with the Veterinary Medicines Directorate, the Health and Safety Executive, the Environment Agency and others to produce advisory leaflets on sheep dip handling and disposal. We commend such moves to make guidance to sheep dip operators clear and concise, especially on packaging labels. It is important, however, that this guidance makes clear the risk posed to the environment by sheep dips. Advisory leaflets for farmers, and labelling on product packaging, should contain prominent warnings about the risks of damaging the ecology of rivers, streams and wetland sites.

Warnings on package labelling and in advisory leaflets about environmental risks from sheep dips should be prominently displayed in large, easily-readable typeface. (Recommendation 146)

- 6.17** Since 1 April 1995, purchasers of OP sheep dip have been required to pass a proficiency test and to hold a Certificate of Competence. This process assures the competence of the purchasers of sheep dip but not necessarily of its users: one person may purchase sheep dip and allow other non-certificated people to use it. The purchaser has a duty of care, however, to ensure that those subsequently permitted to use the dip are trained in its correct storage, handling, use and disposal. In January 1999 the certification scheme was extended to include SP dips. Taking into account the greatly increased environmental risks with SP sheep dips, we consider that the present certification scheme provides insufficient assurance that those using SP sheep dip will not put the environment at risk. We conclude that a more comprehensive certification process is required and that there should be greater emphasis on educating users as to the risks posed by SP sheep dips.

The competence testing and certification scheme for purchasers of sheep dips should be extended to include all who use and dispose of sheep dips. (Recommendation 147)

- 6.18 Mobile sheep dips and sprayers present special problems. We were informed that on completion of a dipping contract a mobile operator may need to dispose of up to a tonne of used dip. Several submissions suggested that mobile operators may have been spreading used dip along roadways or even discharging it directly into streams; however, the Environment Agency was unable to confirm such allegations.
- 6.19 We believe that in the long term a few hundred properly operated mobile sheep dips may be more cost-effectively regulated than many thousands of small fixed installations. A well regulated mobile dipping sector may be a means of reducing the risks to the environment and to public health.
- 6.20 At present there is no registration or licensing scheme for mobile sheep dips, and operators of mobile dips are required to pass no more stringent a competence test than any other purchaser of sheep dip. Given the potential of mobile sheep dips to create major environmental damage in many locations and over many months of the year, we believe that operators should be licensed and that significantly higher standards of competence should be demanded before a licence is granted.

A licensing system for all mobile sheep dip and sheep spray operators should be introduced. (Recommendation 148)

- 6.21 Although we were advised that ‘neutralising’ agents are available for certain types of sheep dips, we received evidence that the resulting waste materials are still not safe for soak-away disposal. We are concerned that the term ‘neutralising agent’ might be misinterpreted: the resulting chemical cocktail can still cause serious damage if allowed to enter watercourses. Nevertheless, we believe that as suitable neutralising agents become available their use will help reduce the impact of human error during disposal of used dip.

When effective neutralising agents become available, sheep dip should be packaged with sufficient neutraliser and it should be made illegal to purchase dip without its neutraliser. Labelling should state clearly and prominently that neutralised sheep dip can cause serious environmental damage and must be disposed of only in accordance with the relevant Code of Practice. (Recommendation 149)

- 6.22 We believe that there is a more general lesson to be learnt from what has occurred over the use of SP sheep dips. When they were introduced, SPs were seen as an answer to concerns about the possible effects of OP dips on sheep dip operators; however, a representative of the Veterinary Medicines Directorate (VMD) informed the group that the Veterinary Products Committee had recommended approval of SPs only after being satisfied that the chemicals were safe if stored, used and disposed of in accordance with the manufacturers’ instructions. We conclude that it is necessary to go further than this; it is essential also to test the likelihood of the manufacturers’ instructions being incorrectly interpreted and followed by a representative sample of those who will subsequently administer the medicine, and to assess the consequences of misuse. Only then, we believe, can the environmental risk exposure be realistically estimated.

The procedure for approving and licensing of veterinary medicines should be revised to reflect the level of environmental risk in the conditions of storage, use and disposal that are likely to be observed in practice rather than those recommended by the manufacturer. If there is a significant risk that a product will be misused and so cause serious damage to the environment, it should not be licensed. (Recommendation 150)

- 6.23** We note that the Government’s four point plan on OPs, announced in December 1999, accepts the advice of the Health and Safety Commission that extension of mandatory certification would not be appropriate and that best practice should, instead, be promoted through a range of measures including improvements to labelling, a programme of targeted inspection to reinforce messages on risk control and training and competence for sheep dippers and the supply of protective gloves with sheep dip. We are concerned that the advice fails to address the environmental issues arising from the use of OPs and would not like to see the plan applied to SPs. We can see no reason why government sectors should not work together to produce a policy for integrated health and safety including environmental considerations.

Agriculture support policy

- 6.24** Overall, we believe that a fundamental reform of the EU’s Common Agricultural Policy (CAP) is needed, with a shift away from support for production towards support for maintaining specific habitats and landscapes and other measures to sustain the rural economy. We are aware that this is the Government’s long term objective, and appreciate that, in the short term, the opportunity for making such a shift is constrained by the terms of the agreement on the Agenda 2000 for reforms of the CAP. We have framed our recommendations against this background.
- 6.25** We are in no doubt that action to reduce the impact of agriculture on salmon and freshwater fisheries is wholly consistent with the Government’s wider objectives on the CAP and on rural development. In Chapter 9 we describe the significant contribution that fisheries can make to rural development, particularly in remote areas. In addition, many of the measures needed to reduce the impact of agriculture on fisheries will also protect and improve the environment more generally. Moreover, farmers can play a vital role in maintaining the habitats needed to sustain fish populations, and hence fisheries. Some farmers may not themselves benefit from this work; for example, farmers with spawning and nursery streams on their land gain nothing from them financially. However, these streams play an essential role in the production of juvenile salmonids and, therefore, in the contribution that fisheries further downstream make to the rural economy. Payments to farmers under a reformed CAP should take this into account.

Government should seek to ensure that any direct payments made to farmers under a reformed CAP reflect their role in maintaining wildlife habitats in the countryside. Such payments should take into account the contribution farmers may make to the maintenance and improvement of salmon and freshwater fisheries. (Recommendation 151)

- 6.26** We received a considerable body of evidence indicating that increased sheep numbers in upland areas had led to over-grazing and to serious erosion. This has had a substantial adverse effect on rivers and spawning streams, and we believe it to be essential to reduce sheep numbers on vulnerable hillsides.
- 6.27** It is unlikely that this problem can be dealt with by reducing stocking densities generally, even if this were possible under the CAP. Conditions vary very substantially in upland areas, and stocking densities which may be perfectly satisfactory on some hills will cause major damage on others. It must be for the individual farmer to recognise when sheep are causing damage to the environment and to take appropriate action. The need for such action should be incorporated in stricter rules on over-grazing, enforced by cross-compliance – that is to say farmers should be eligible to receive sheep and other subsidies only if they adhere to rules intended to protect the environment.

Stricter rules on over-grazing by sheep, designed to prevent environmental damage to vulnerable hillsides, should be drawn up as soon as possible and enforced by cross-compliance. (Recommendation 152)

- 6.28 The impact on farmers' incomes of lower sheep numbers would be reduced if ewe premiums were paid on an area basis; this change is already being made in respect of Hill Livestock Compensatory Allowances. We would like to see all livestock subsidies paid on an area, rather than a per head, basis.

The Government should press for all livestock subsidies to be paid on an area basis. (Recommendation 153)

- 6.29 River valleys were traditionally used for extensive (low-density) livestock grazing with permanent grass leys, no cultivation and minimal chemical inputs. Such land use is friendly to river and wetland habitats. Many riparian meadows have, however, recently been taken out of such grazing regimes, ploughed and cultivated intensively for a range of arable root and cereal crops. Widespread damage to fish habitats can occur where land use change occurs in and closely adjacent to flood plains. When ploughed in autumn, for instance, for winter cereal production, bare soils are exposed to erosion. Later in the production cycle chemicals such as biocides and fertilisers can leach directly into watercourses. In lowland areas the growing of winter crops can create major risks of erosion and subsequent siltation. To help reduce erosion the targeting of set-aside strips along rivers and streams should be encouraged. Particular action needs to be taken with respect to maize growing within flood plains. (See Box 3 below)

Clear enforceable guidelines on cultivation of such crops as maize should be drawn up to make it clear that they should not be grown on highly erodible flood plains. Cross compliance should be used to ensure that these guidelines are observed. (Recommendation 154)

Box 3

Forage maize production in the UK has increased at least five-fold since 1985. Maize requires less nitrogen than intensive grass production and has less potentially polluting silage liquor when ensiled but, if grown without careful management, can lead to rapid soil erosion, and fertiliser and pesticide leaching into water bodies.

Good agricultural practice to avoid such problems includes choosing sites with suitable soil types, slopes and proximity to rivers and standing waters, rotating crops, avoiding soil compaction and rutting, sowing an autumn cover crop to protect soils, judging carefully fertiliser and herbicide requirements and application, and thus reducing soil and silt run-off with associated pesticide and fertiliser pollutants. Carefully sited contour ploughing, ditching, buffer-zoning and hedge-planting can all contribute to effective reductions in polluting inputs to watercourses.

- 6.30 In the longer term, we would like to see greater use made of cross-compliance to promote environment-friendly farming practices. We highlight below, for example, the benefits to freshwater habitats from buffer strips along rivers, streams and around stillwaters. In a reformed CAP payments to farmers could be linked to the establishment and maintenance of such buffer strips. Payments could also be made conditional on the development and implementation of satisfactory farm waste plans.

Agri-environment and rural development schemes

- 6.31** Changes to support regimes, while necessary, will only partially reduce the impacts of modern agricultural practices on fisheries. Pending the opportunity to introduce more far reaching changes to CAP, Government should make the maximum use of the opportunities available to it under the recent Agenda 2000 CAP reforms. In particular, it should make use of the provision permitting Member States to modulate (reduce) direct compensation payments to farmers so as to retain up to 20 per cent of the total payments to fund agri-environment measures under the Rural Development Regulation. While we welcome the recent announcement by Government in this area we would encourage greater use of this provision.

Government should make greater use of the provision in the Rural Development Regulation permitting it to divert funds from direct support payments to farmers to pay for agri-environment measures. (Recommendation 155)

- 6.32** During the course of our Review we heard a number of ideas for reducing the impact of agricultural practices on fisheries. We recommend below that some of these should be taken forward – something we believe can be done under the Rural Development Regulation.
- 6.33** We are persuaded by the evidence, notably from the Wye Foundation and the Tweed Foundation, that fencing to protect rivers, streams and some standing waters from cattle and sheep is often the most effective measure that can be taken to improve habitats. Along lowland river valleys beef and dairy cattle often use marginal river habitats at high densities stripping them bare of vegetation and breaking down river banks. In some upland areas sheep have a similar effect. The over-grazing of river banks damages fish habitats in several inter-related ways: marginal plant cover is lost, insect food inputs are reduced, the river channel is widened by erosion, siltation increases, current speeds and water depths are reduced. Using fencing to prevent grazing allows the re-establishment of riparian vegetation, bank stabilisation, channel narrowing, increasing water depths and current speeds and the sweeping away of silt deposits to expose gravel river beds. Fencing, therefore, can be a very cost-effective way of enhancing river habitats. To maintain and enhance biodiversity, it is important to manage for a varied mosaic of river habitats, leaving some areas of natural bank erosion and bare silt as these have their characteristic animal and plant communities including some rare species.
- 6.34** In arable farming areas uncultivated buffer strips along rivers and streams can play a similar role and reduce the risk of bank erosion. Set aside can make a contribution here but a more extensive scheme to encourage the creation and management of buffer strips along rivers and streams should be considered. Better protection of streams, in particular, would provide enhanced nursery areas for many species of coarse fish. Buffer strips can also serve to reduce the input of pollutants, including sediments although to be effective there may be a need to block field drains.

Box 4 Buffer strips

Strips of land alongside water courses or around still waters can provide a buffer between activities on neighbouring land and the freshwater ecosystem. They are referred to in a variety of ways, including riparian ‘buffer zones’ or ‘buffer strips’. Buffer strips may have a number of functions, including:

- stabilising and protecting river banks;
- reducing the movement of nutrients from neighbouring land to surface waters;
- filtering sediment (plus adhering contaminants such as pesticides) from water entering the watercourse or stillwaters;
- providing marginal cover for fish;
- providing input of invertebrates as fish food from riparian vegetation;
- providing habitat for bank-side species such as birds, amphibians and invertebrates;
- moving polluting activities (e.g. spray application) further from the watercourse;
- improving aesthetic value; and
- act as wildlife corridors for terrestrial animals and birds.

They may vary in width from a few metres to several hundred metres, depending upon their main purpose. The vegetation that is permitted to establish may vary from gross to well-developed woodland, and it will generally need to be managed to avoid deleterious effects such as excessive shading in smaller watercourses. Wetlands may also provide important buffer areas close to rivers, streams and other water bodies.

- 6.35 A more elaborate version of these options would be to bring together provisions for fencing and buffer strips in single watercourse corridor schemes, intended to protect rivers and streams from erosion and to encourage the growth and management of bankside vegetation. Ideally these schemes would be applied across the whole of England and of Wales. As well as providing benefits to fisheries, such schemes would yield other substantial conservation benefits: they would improve habitat for a wide range of both vertebrates and invertebrates, encourage a more diverse flora and provide wildlife corridors in intensively cultivated lowlands and heavily grazed uplands. With imaginative promotion a scheme encouraging the development of such ‘green veins’ across the countryside might well attract lottery funding as well as support from other agencies and conservation organisations.

Government together with its agencies, should promote co-ordinated measures to protect watercourses on as wide a scale as possible. In particular, Government should consider schemes to encourage fencing in livestock farming areas and uncultivated buffer strips in arable farming areas. Ideally, these schemes should be combined into single, national watercourse corridor schemes. (Recommendation 156)

- 6.36 One serious problem that has been encountered with existing fencing schemes is that they reduce the area of forage used to calculate entitlement to livestock subsidies. This can make them unattractive to farmers who fear that they will lose subsidy if they agree to enter a scheme. Similar difficulties arise with buffer strips on arable land: unless they are designated as set-aside they will reduce entitlement to arable area payments.

To encourage maximum uptake of schemes to protect watercourses, Government should seek revision of the rules for EU livestock and arable subsidy schemes so that strips of land intended to provide protection to rivers and streams are not deducted from areas used to calculate entitlements to subsidy payments. (Recommendation 157)

- 6.37** In Section 4 we highlight the effect land drainage has had on reducing wetland habitat. Water abstraction has also had a number of adverse environmental effects; we would like to see these reversed through schemes to recreate wetland habitats. We discuss this issue in more detail below, but we believe that there is no reason why a scheme under the Rural Development Regulation should not contribute to this objective. Schemes already exist to create new woodlands; the same approach could be applied to wetlands.

A scheme should be developed under the Rural Development Regulation to provide greater opportunities for the restoration of wetlands. (Recommendation 158)

- 6.38** The measures we recommend above could be implemented under the Rural Development Regulation either under the agri-environment provisions or as rural development schemes under Article 33. We note that in theory some of the measures we are recommending are already available to farmers under agri-environment schemes such as Countryside Stewardship (England) and Tir Gofal (Wales). However, competition for funds under these schemes is strong, and priority is given to proposals that will lead to a wide range of improvements on individual farms. This is a requirement of Tir Gofal, which seeks to address environmental problems on a whole farm basis. These schemes therefore favour complex proposals covering a limited number of farmers rather than simple measures covering a large number of farms. While there are obviously some advantages in environmental terms in seeking to address all the problems on an individual farm, this approach does not encourage simple measures such as fencing rivers and streams that can be a very cost effective way of obtaining improvements to riparian habitats and to watercourses. In our view it is important that a balance is struck between these two approaches.
- 6.39** While we would like to see the measures we are recommending made as widely available as possible, we agree that they would be most effective if they were targeted to encourage the widest possible take up in individual rivers or river catchments at most risk from river bank degradation and siltation. This would help avoid continuing damage to one part of a river reducing the effectiveness of improvements carried out on other parts.
- 6.40** If agri-environment and rural development schemes are to contribute to the conservation and development of salmon and freshwater fisheries, there will need to be a change in the perception in MAFF and elsewhere of the part that fisheries can play in achieving the objectives of these schemes. In this respect we are concerned that currently there appears to be no recognition of the fact that the conservation of fish and development of fisheries can contribute to rural development and the protection and enhancement of the environment. We note, for example, that there is no mention of inland fisheries in the Water Fringe Element of the English Habitat Scheme: improvement of fisheries is not one of the scheme's objectives, and MAFF's assessment of the effectiveness of the scheme does not consider whether it has had any effect on fisheries – despite the fact that the rivers covered by the pilot scheme are important salmon and trout habitats. As mentioned above, the Countryside Stewardship Scheme does have a number of provisions that can be used to improve freshwater fisheries but, again, this is not an objective of the scheme and potential improvements to inland fisheries are not taken into account in the scoring system used to prioritise applications. This needs to change.

Government should recognise that the conservation and development of salmon and freshwater fisheries contribute to rural development and to protection and enhancement of the environment, and so should be regarded as legitimate subjects for all appropriate agri-environment and rural development schemes. (Recommendation 159)

7 Forestry

- 7.1 Afforestation and deforestation can cause considerable damage to fish habitats. Afforestation can be reduced by sensitive management and, with new forests, by better siting and planning.

All authorisations relating to forestry, including approval of applications for grants, should be required to take full account of the impact of the proposed afforestation on fish habitats, on the aquatic environment and on fisheries. Where existing conifer forests line watercourses, trees should be removed to create buffer strips along streams. (Recommendation 160)

- 7.2 Woody debris occurs in streams in many wooded areas, not only in conifer plantations. In smaller streams large branches, and sometimes tree trunks, can block the watercourse, forming so-called 'trash dams'. Some fisheries managers routinely remove these to assist salmon and sea trout migration; trash dams are also often removed as a matter of routine for flood prevention reasons. While dams that completely block streams obviously impede fish migration, such dams form a natural part of the river habitat in wooded areas and can promote the creation of pools, furnish protection for fish from predators and provide a rich habitat for invertebrates. Although steps may need to be taken to assist fish migration, these need not involve removal of the whole dam. In other cases, trash dams should not be removed as a matter of routine and any necessary flood defence work should aim to minimise the adverse impact on wildlife habitats. Marginal dead wood habitat should routinely be left in river channels as it provides important physical cover for fish and increases habitat diversity for many species.

Woody debris blocking or fringing streams should not be removed as a routine fisheries or flood defence measure. Any necessary flood defence work should aim to minimise adverse impacts on wildlife habitats. (Recommendation 161)

8 Water abstraction

- 8.1 The Government has recently announced planned changes to the water abstraction licensing system in England and Wales. In future, the Environment Agency will issue all new abstraction authorisations on a time-limited basis, and the Environment Agency has been asked to convert most existing abstraction licences, including licences of right, to time-limited status. There will be a requirement for environmental reports to be submitted as part of abstraction authorisation applications. Further changes will be introduced as soon as parliamentary time allows. These will include: extra powers for the Environment Agency to establish exemption for small-scale abstractions on a catchment basis; a power for the Environment Agency to revoke an abstraction authorisation without compensation after four years without beneficial use; additional Environment Agency enforcement powers to deal with breaches of authorisation conditions; the removal, from 1 July 2012, of the right to compensation if a licence without time limit is curtailed on the direction of the Secretary of State on the grounds that the abstraction is causing significant environment damage. In addition, enforceable duties will be created to require water companies to conserve water in carrying out their functions and all other abstractors to use water in an efficient and effective manner.
- 8.2 We welcome these changes. It will, however, be important for the Environment Agency, in making use of these new powers, to recognise that water abstraction is only one of the factors that can adversely affect the freshwater environment. For example, the impact on fish habitats of low flows caused by abstraction can be aggravated by physical damage to

river channels such as over-widening; when seeking to remedy such problems the Environment Agency should wherever possible address all contributory factors.

- 8.3** We note that the Government is giving further consideration to the possible use of economic instruments in relation to water abstraction. We discuss the possibility of raising money to fund work on aquatic habitat improvements and restoration through a levy on abstraction charges in Chapter 15.
- 8.4** Historically, water has often been abstracted high in catchments, used and returned low down the river, often in the estuary. Today, especially in the light of the threat of climatic change, it is recognised that water should be returned to the river as near as possible to the point of abstraction, but taking account of potential environmental damage as a result of increased energy consumption.
- 8.5** We are aware that there are a number of initiatives to restore disused canals for navigation. While canals in themselves can provide valuable fish habitat, canal systems, including locks, are net users of water and the increased abstraction necessary to operate a restored canal can have an adverse impact on rivers and wetlands.

There should be a requirement that, before any work is undertaken to restore a canal to navigational use, a full assessment of the impacts be conducted. (Recommendation 162)

- 8.6** Water abstraction also affects fish movements. Migratory fish are frequently stimulated to move upstream or downstream by an increase in water flow, although their movements may also be restricted at high flows. Fish movements are often protected by setting prescribed minimum flows, but other methods, such as protecting a flow window or critical spates, may also be effective. Measures may also be adjusted at different times of year to take account of different runs of fish. However, we believe that little account is taken of fish other than migratory salmonids when abstraction regimes are being established. It is essential to establish the flow requirements for freshwater fish and other aquatic species and we recommend further research in this area in Chapter 8.

Environmentally acceptable flow regimes for freshwater fish should be established for all rivers affected by abstraction. The needs of all fish, not only salmonids, should be taken into account when establishing abstraction regimes. (Recommendation 163)

- 8.7** The Moran Committee drew our attention to the need to consider flow management on a catchment basis. The Committee suggested to us that the Environment Agency should have powers to introduce Operational Management Plans for every catchment. These plans, which would have a statutory basis, would prescribe the manner of operation of all flow controlling structures in the catchment.
- 8.8** We agree with the Moran Committee that rivers should be managed on a catchment basis. The management of flow is but one aspect of the whole catchment approach. Operational Management Plans, as proposed by the Committee, have implications extending beyond fisheries, however, and we decided that we would be going beyond our terms of remit if we considered them in any detail. We conclude that the concept is best considered in the context of the implementation of the EC Water Framework Directive.
- 8.9** Many regulated rivers, whether for water supply or flood protection, offer opportunities to manipulate flow for environment advantage. For example, ‘flushing flows’ can be released to clean gravels affected by siltation. Migration-inducing ‘freshet’ flows can assist upstream movement of migratory species when timed to coincide with natural events. We would therefore wish to encourage the water industry and other major abstractors/dischargers of

water, wherever possible, to utilise their activities in this area to benefit fisheries and the aquatic environment.

All major water users should be under a duty of care to manage their abstractions and/or discharges for the benefit, wherever possible, of fisheries and the environment. (Recommendation 166)

- 8.10 The most extreme form of water abstraction is the complete removal of water from a watercourse or a stillwater. Under current legislation there is no obligation on anyone doing this to protect the fish in the water concerned, and it is not an offence to cause fish deaths through the removal of water. This should be changed.

It should be made unlawful to remove water from, or to fill in, a watercourse or a stillwater without taking reasonable steps to rescue or protect the fish. (Recommendation 165)

- 8.11 As we point out in Section 3, artificial movements of water can have serious environmental implications. Releases from upland reservoirs and water transfers between and across catchment boundaries provide two examples. We would like to see much greater account taken of the possible environmental effects of such water movements.

The Environment Agency and other bodies should assess the effects on the environment of artificial movements of water, such as reservoir releases and water transfers between and across catchment boundaries. This assessment should take into account the potential effect of the movement on both the donor and the receiving water. Steps should be taken to mitigate adverse effects and halt water movements where the likelihood of serious environmental damage, such as the transfer of species or diseases or disruption of migration, is unacceptably high. (Recommendation 167)

9 Land drainage and flood defence

- 9.1 Land drainage for agricultural purposes has led to the loss of an enormous area of wetland habitat in England and Wales over the past 100 years; only tiny fragments of such habitats now remain. Marshes, bogs, fens, ponds and pools, all very high in wetland biodiversity, have been greatly reduced in abundance. But wetlands not only provide valuable habitat in their own right: they are also – or should be – an important element in the wider freshwater environment. In many river systems, wetlands used to provide both a biological reservoir for aquatic and semi-aquatic species and a physical reservoir which contributed substantially to river flows during periods of low rainfall. Drainage has altered the physical characteristics of such rivers, with higher peak flows, leading to more frequent flooding, and more prolonged periods of low flow. Both can be damaging to fish populations and the aquatic ecosystem.

- 9.2 We would like to see wetlands restored on a significant scale in appropriate river catchments. Given the changes that have taken place, and are likely to take place, in agricultural policy, there are strong arguments for reinstating some of the wetlands that have been drained in order to maximise agricultural production; in some areas the benefits of wetlands to conservation and the wider environment, as well as to fisheries, are likely to outweigh the benefit to the local economy of continued intensive farming. We have already recommended that use should be made of the Rural Development Regulation to encourage the restoration of wetlands. In some areas, simply stopping routine pumping of seasonally inundated areas would allow the re-establishment of marshland and associated habitats; in other areas it will be necessary to block field drains and ditches. Water level management plans can also be instigated by changing sluice management to retain winter floodwaters longer into the summer and to raise year-round water table levels. The potential for

standing water habitat restoration is very great but this potential will be realised only if the changes in agricultural support arrangements that we recommend take place.

Environment Agency and Internal Drainage Board rural flood defence programmes should be reviewed to assess the scope for the relaxation of dredging and other drainage works and the consequent reinstatement of extensive wetland habitat in headwater catchments and river valleys where there is no associated risk from flooding to people or property. (Recommendation 168)

9.3 We are aware that inappropriate work, including some actions intended to improve fisheries, can potentially harm fragile wetland habitats and increase pressures on fish stocks. For example, the digging of holding pools for salmon may result in increased levels of exploitation of the salmon stock and the loss of habitat for other species. On the other hand well targeted fisheries management can help to develop high quality wildlife habitats both in man-made and in natural waters. There is a need for strategic overview in each catchment to determine:

- what wetland habitats remain and how they can be protected;
- how best additional wetland habitats can be created, particularly through complementary work linked to other projects – for example land drainage work or physical habitat improvement for fisheries purposes.

Work to improve fish habitats, in particular, can contribute substantially to improvement of wetland and other habitats, and those undertaking such works need to be informed of how best they can contribute to enhancement of other habitats.

The Environment Agency, conservation agencies and other interested organisations should develop collaborative catchment based wetland habitat conservation strategies to ensure that maximum use is made of suitable opportunities to restore wetland habitats and to enhance wildlife habitats generally. (Recommendation 169)

9.4 We were quoted examples of physical damage to river channels by historic land drainage and flood defence works. Rivers have been managed for many years to reduce flood risks to people and property. The principal engineering methods have used ‘hard’ materials inappropriate to natural river habitats with the objective of conveying flood flows as quickly and safely as possible to the sea. Many river channels have been straightened and deep-dredged to lower water tables and increase flood capacities. Gravel shallows (riffles), corner pools, undercut banks, and marginal shrubs and trees have been removed leaving relatively barren and uniform river bed channels where once there were widespread, varied natural riffle-pool-glide habitat sequences. Given that freshwater and migratory fish lifecycles are adapted to use natural river habitats, it should come as no surprise that the removal of habitat features has profoundly damaging impacts on salmonid and coarse fish stocks. The historic legacy of government-funded damage to river physical habitats has recently been documented in the Environment Agency’s River Habitat Survey. Much needs to be done to remedy this widespread habitat damage. Fortunately, with more enlightened approaches to integrated river catchment management in recent years has come the realisation that ‘soft’ engineering techniques using natural and often living materials are the way forward. Willow, alder and hazel, for instance, can be used to protect river banks from erosion, maintain flood conveyance and provide adequate fish habitat under summer low-flows conditions. Two-stage and re-meandered channels can be produced to redress previous damage. Major schemes can be expensive but many valuable local initiatives, including some carried out by river trusts, have been undertaken at modest cost and with very positive results.

- 9.5 Even where damage is substantial and restoration costs are high, river restoration may still be cost-effective in the long-term. This is so because of the manifold benefits accruing from better fisheries, better water quality and quantity, better targeted flood defence schemes, diversified sources of income to farmers through eco-tourism and better conservation and biodiversity outcomes. The Environment Agency estimate that a realistic rolling programme for river habitat restoration would cost a minimum of £10m a year.
- 9.6 Funding such a programme will be a major challenge to Government, government agencies and private sector organisations such as river trusts. No single source of funding is likely to prove adequate. The increased Grant-in-Aid we recommend in Chapter 15 will be one element, together, we hope, with income from levies on abstraction licences and discharge consents. Use will need to be made of funds under the Rural Development Regulation, as we recommend in the preceding section. Where maintenance work for flood defence purposes is carried out, this should contribute towards restoration of historic damage caused by land drainage, with the costs met from flood defence funds. The Environment Agency and other interested bodies will need to explore other potential sources of funding, such as the National Lottery. To ensure that these different sources of funding are utilised in a co-ordinated manner, an agreed programme of habitat restoration should be drawn up involving all the principal organisations with an interest in fish and wildlife conservation. In our view the Environment Agency should take the lead in establishing such a programme, consulting fully with all interested parties. In catchments where river habitat restorations are being carried out, maximum use should be made of the opportunity to create wetland habitats such as marshes, wet woodland and stillwaters. While fisheries interests may often drive habitat initiatives, consideration should be given to the widest possible range of species, and especially rare species. River catchment habitat restoration programmes will need to take advantage of all economic opportunities to re-establish wildlife-rich areas, including fisheries and to ensure that overall programmes maximise biodiversity and sustainable fisheries for public benefit.

The Environment Agency should take the lead in drawing up a co-ordinated programme of river and river corridor habitat restoration, involving other government agencies and interested parties. The programme should draw on a range of funding sources, both public and private. (Recommendation 170)

10 Industrial and domestic pollution

- 10.1 Sewage and industrial discharges continue to pollute watercourses in many parts of the country. We are aware of the progress that has been made in recent years in dealing with these, both by improving the sewerage infrastructure and by imposing increasingly stringent consent limits on industrial discharges. During the course of our Review, the Water Regulator announced the pricing regime that water companies will be subject to over the next five years (2000-2005): this requires them to invest some £3 billion per year in infrastructure improvements over this period. We welcome the further improvements to water quality that this investment is likely to bring about.
- 10.2 Some of those giving evidence expressed disappointment that Statutory Water Quality Objectives (SWQOs) have not been introduced by the Government despite the considerable work that has been done by the Environment Agency to develop these standards. We understand that their application was suspended pending implementation of the Freshwater Fisheries, Shellfish and Bathing Waters Directives. The UK regulations implementing the Freshwater Fisheries Directive are being revised, which will provide more stringent statutory standards than those currently in force. We also understand that

the Environment Agency has received encouragement from Ministers to raise river quality further in line with the SWQO concept but on a non-statutory basis. We do not think this is satisfactory; while we conclude that SWQOs could be a powerful tool to ensure that water quality is improved to an acceptable standard they need, as the name implies, to be statutory. Moreover, if SWQOs are to be effective, monitoring must be applied rigorously, frequently and consistently and in such a way that one-off incidents can be identified and recorded so that a true picture of the health of major watercourses can be obtained.

Government should adopt Statutory Water Quality Objectives for all major watercourses as soon as practicable. However, in order to be effective the monitoring programme must be reliable, rigorously and consistently applied and capable of detecting episodic events. (Recommendation 171)

- 10.3** The potential impact of endocrine disrupting substances, including oestrogens and androgens, has only recently been appreciated. Research into the effects of these substances has shown that some degree of feminisation of fish in freshwater and marine environments can occur where there are substantial sewage discharges. There is, however, inadequate understanding of the impact of this phenomenon on fish populations or on other organisms, and further research is urgently required.

Further research should be conducted as a matter of urgency into the prevalence and impact of endocrine disrupting substances in the freshwater environment. (Recommendation 172)

- 10.4** Discharges from abandoned mines where pumping has ceased are a serious source of pollution, especially in Wales where the scale of the problem is huge. Experience, for example from an EU Life Project on the River Peledda, near Neath in South Wales, shows that it can cost several hundred thousand pounds per site to restore the quality of badly polluted mine-water discharges.

11 Development

- 11.1** Development for housing, transport services and industry, in particular on flood plains, can have dramatic effects on rivers and other watercourses, causing major changes to flow patterns. As well as causing physical alteration to river channels, development usually leads to substantial areas of impermeable materials which greatly increase run off from the land and hence river flows. Inappropriate developments in flood plains are not only a problem for those who have the misfortune to be flooded periodically; they can also cause severe damage to fish habitats. Although the Environment Agency is a statutory consultee for planning applications under the Town and Country Planning process for such development, local authorities are not required to follow its advice and we understand that around 40 per cent of the Agency's objections to planning consent for developments are ignored. While it may be unrealistic to expect the Agency to be given a veto over planning applications, its views should be given much greater weight. Much of the disagreement that arises over individual decisions could be avoided if the Environment Agency was given a greater role in the formulation of strategic planning policy.

There should be a presumption against development where there is a risk of adverse impact on a watercourse. Statutory planning guidance should require planning authorities to undertake a full assessment of the impact on the aquatic environment and on fisheries of any application for planning consent to which the Environment Agency has objected and should only grant consent to such applications in exceptional circumstances. (Recommendation 173)

Chapter 7

Predation

1 Introduction

- 1.1 Fish exist within communities of animals, and predator-prey relationships are a normal part of the natural interactions between species. These relationships are complex and the effects of predation on populations are not always easy to predict. Thus, in some cases, predation on juvenile fish may result in reduced mortality from other causes and there may be little or no effect on the number of adult fish surviving (a process known as 'compensatory survival'). Predator-prey relationships may also be affected by human activities, particularly where populations of fish or predator species are enhanced. The impacts of predators must always be evaluated with care and assessed in the context of the large range of other factors that affect fish stocks.
- 1.2 Several species of birds (mainly cormorants, goosanders, red-breasted mergansers and herons) and mammals (particularly mink, otters and seals) are predators of fish, as are a number of fish species themselves. Lack of information on the extent of the impact of this predation on fisheries has contributed to differences of opinion between fisheries managers on the one hand and conservation bodies – governmental and non-governmental – on the other. We are in no doubt, however, that the predation impact is one of the factors that needs to be taken into account in fisheries management strategies.
- 1.3 All species of birds are protected under conservation law but powers are provided to permit the control of piscivorous birds. For those species of mammals that are afforded protection at law, control measures are again contained in conservation legislation. For fish, conservation and fisheries legislation regulates methods used to take fish and contains some specific provisions for the removal of predatory fish.

2 Predatory fish

- 2.1 The indigenous freshwater fish populations of England and Wales include predatory species such as pike, perch, chub and trout. Some environmental perturbations and human activities can shift the balance between predators and their prey, requiring predator control measures to be taken. Examples include the recent introduction and spread of zander and the often excessive development of pike populations in reservoir trout fisheries.

3 Piscivorous birds

- 3.1 Obligations under the EC Birds Directive require the Government to take measures to maintain the population of all species of birds naturally occurring in the wild state in this country at a level that corresponds to ecological, scientific and cultural requirements, taking account of socio-economic and recreational requirements. Deliberate killing by any method is prohibited⁹ but Member States are entitled to derogate from this requirement to prevent

⁹ This prohibition applies to all species covered by the Directive and is not restricted to those listed in Annex 1. These are birds that are subject of special conservation measures concerning their habitats. As originally drafted, Annex I included *Phalacrocorax carbo sinensis* (the continental subspecies of the cormorant) but this was removed following a resolution by the European Parliament in 1996. The change was instigated by lobbying from fisheries' interests who believed, wrongly, that the removal would make it easier to obtain permission to kill cormorants.

serious damage to fisheries if there is no other satisfactory solution. The Government has to send a report to the European Commission each year identifying any derogations made for this and other purposes. The Directive is implemented in Great Britain by the Wildlife & Countryside Act 1981, Section 1 of which makes it an offence to kill or injure a wild bird. Section 4(3) provides a defence for an authorised person if he shows that his action was necessary for the purpose of preventing serious damage to fisheries. An authorised person is defined as the owner or occupier of the land where the action occurs or someone authorised by the owner or occupier. This defence would, therefore, apply to riparian owners. Section 16(1)(k) goes on to provide that there will be no offence for anything done for the purpose of preventing serious damage to fisheries if it is done under and in accordance with a licence.

- 3.2 The licensing authority for these licences is the Minister of Agriculture, Fisheries and Food or the National Assembly for Wales. Section 16 provides that licences may be general or specific; personal or to a class; subject to conditions; modified or revoked; and valid for the period stated. It specifically provides that licences to kill birds must specify the area and method to be used and will not be valid if made for a period in excess of two years.
- 3.3 In accordance with Section 16(10) “the minister” (MAFF or NAW) must consult with the relevant nature conservation agency “from time to time” as to the exercise of his functions under this section and shall not grant licences unless he is advised of the circumstances in which such licences might be granted. This requirement is implemented differently with respect to the different countryside agencies. We were informed that, in Wales, it had been the practice of the Secretary of State to consult the Countryside Council for Wales on every application; we assume that the National Assembly will continue this approach. In England, MAFF originally consulted English Nature on the exercise of its licensing power in general, rather than on individual applications. This policy changed following a challenge by the Royal Society for the Protection of Birds. According to the Joint Nature Conservation Committee (JNCC)¹⁰ English Nature is still not consulted over every application but has an agreed set of criteria which will trigger consultations in sensitive cases. In practice, this means that it is consulted over any application concerning goosanders or red-breasted mergansers, any application applying to land on or adjacent to SSSIs and on any application taking the number of cormorants to be shot annually over 500 nationally.
- 3.4 In 1998 136 applications for licences to kill piscivorous birds were made in England. Of these, 86 were granted. The majority of these (112 applications and 72 licences) were for killing cormorants. However, only 160 cormorants were reported to be killed that year out of a licensed maximum of 500. Table 1 below shows the numbers of licences granted in England and Wales during 1997, the most recent year for which complete figures are available. The numbers of birds shot under licence in Scotland is considerably higher and JNCC states that this reflects the relative abundance of goosanders and red-breasted mergansers in Scotland and the importance of salmon fishing to the Scottish economy. The number of birds shot for each licence granted is also higher. These differences reflect the policy in England and Wales to permit only small numbers of birds to be killed in order to enhance the scaring effect. The JNCC states that several thousand cormorants are killed each year in France and Germany to protect fisheries. This marked disparity between practice in this country and other Member States might suggest that the government is

¹⁰ ‘Update on Fish-eating Bird Issues’ JNCC 99 N10, September 1999

being over-cautious in meeting its obligations under the Directive. We understand that the European Commission intends to monitor very carefully the extent to which Member States use their rights of derogation in respect of the cormorant.

Table 1 Licensed shooting to prevent serious damage to fisheries in 1997¹¹

	Number killed and (in brackets) number of licences issued			
	Cormorant	Heron	Goosander	Red-breasted Merganser
England	209 (87)	11 (10)	6 (3)	0 (0)
Wales	4 (10)	0 (0)	3 (8)	0 (0)
Scotland	368 (43)	0 (0)	813 (32)	309 (22)

- 3.5** Balancing fisheries and conservation interests is not easy. It is difficult to assess the relative importance of species protection against a socio-economic demand because the two are not directly comparable. The problem is heightened because the evidence, on both sides, is often only circumstantial. We concluded that there is a need for clear advice on the criteria to be used in assessing the different claims and for this advice to be widely disseminated. At present the burden of proof of serious damage is difficult to discharge, not least because of technical difficulties in implementing the assessment methodology, yet the legal protection for birds is likely to lead to the precautionary approach being used in their favour rather than in favour of the fishery.
- 3.6** In 1995, MAFF, DETR and the Environment Agency commissioned a £1 million programme of research on piscivorous birds and their impact on inland fisheries, the results of which were released in September 1999. The aim of the research was to provide information to improve our understanding of the behaviour of fish-eating birds, the populations of these birds and the extent of the problem they pose for inland fisheries, and to develop effective management strategies.
- 3.7** We had hoped that the results of this research would provide a more objective basis for decision-making to allow the licensing authority to strike a justifiable balance between the conflicting interests. Although the results do add much useful information, they also demonstrate the complexity of the problem. Unfortunately, the research was unable to provide conclusive answers to all the questions addressed. Although further research may clarify some of these uncertainties, we concluded that this should not be allowed to delay a full review of current policies.
- 3.8** The research concluded that piscivorous birds present a problem for particular fisheries rather than a general problem. We are not convinced that there is sufficient evidence to eliminate the possibility of a more widespread problem but we do agree that management of the problem should be on a case by case basis. It was put to us that the problem of cormorant predation should be addressed by permitting more widespread shooting or even a general cull. We do not believe that it is appropriate to pursue this approach because an unacceptably large proportion of the cormorant population would have to be killed for it to be effective.
- 3.9** A summary of the results of the research project on the assessment of the effectiveness of management measures to control damage by fish-eating birds is shown in Table 2. It is

¹¹ Modified from JNCC 99 N10

important to note that some measures, especially shooting, were the subject of large-scale experiments whereas others, such as fish refuges and stock control, were not investigated so thoroughly. In some cases, it is difficult to draw any general conclusions from the results of the trials.

Table 2 Results of Commissioned Research on Management Measures to Control Damage by Fish-eating Birds

Management Measure	Results
Shooting Large-scale experiment	Significant reduction in cormorant numbers, which was maintained for up to six weeks after the treatment period. No significant difference between shooting to kill and shooting with blanks.
Stock Control Single trial site	Stocking with larger fish reduced losses to cormorants but increased the number of fish that were damaged. This was felt to be a cost-effective technique for some fisheries
Fish Refuges Two trials	Fish refuges may reduce availability of fish, especially large fish, to cormorants.
Laser Light Trial at several sites	Effective at scaring cormorants and gosanders but only at low ambient light levels. Equipment is expensive and use requires special training.
Habitat Management Single Trial at Small Stock Pond	The placing of wires may effectively exclude foraging cormorants as long as an alternative food supply is readily available. Doubts as to practicability for most sites. Roost modification of limited use at most sites.
Conditioned Taste Aversion Experiment with captive cormorants	CTA to trout was successfully introduced into cormorants. Further research needed to test applicability of technique for field conditions.
Human Disturbance Studied in relation to gosander on rivers	Effective at scaring gosanders but had only short-term effects on numbers. May be useful at 'hotspots'.

- 3.10** A review of information on deterrent and scaring methods that have been used in Europe suggested that human presence was the only consistently effective method of scaring cormorants away from a fishery. However, we were also told that cormorants often become habituated to the presence of people and may then take no notice of them. The research programme included an experiment to determine the effect of shooting but did not test the relative merits of shooting and the same level of human presence without shooting. Experiments to compare the relative effectiveness of scaring programmes involving shooting to kill and shooting with blanks showed no statistically significant difference. Taken together, however, the results of these two experiments showed a 50% mean reduction in cormorant numbers compared with controls. The failure to show a statistically significant difference between the effectiveness of lethal and non-lethal shooting does not necessarily mean that shooting with blanks is as effective as shooting to kill. Assuming that the basis for the scaring effect is that the birds learn to avoid an unpleasant stimulus – namely, being shot at – we surmise that it could well be that limited shooting to kill will enhance the response. As a corollary, birds repeatedly subjected to shooting with blanks only might learn that the stimulus is, in fact, harmless and cease to respond. In any event,

the evidence suggests that birds will return after a few weeks. If a scaring programme is to be effective in the long term, therefore, it will be necessary to repeat the scare frequently. We conclude that shooting to kill, if used as part of scaring programme, can play a useful role in reducing the impact of cormorants on fisheries.

The power to licence the killing of cormorants by shooting should be retained. Licences should be issued to authorise shooting to kill as part of a pre-determined programme of scaring which should be site specific and time limited. Licence provisions should include an upper limit on the number of birds that can be killed during the period of the licence. (Recommendation 174)

- 3.11** It was not clear from the research results that shooting to kill as part of a scaring programme will be effective for piscivorous ducks or for heron. Numbers involved are much smaller and any threat to a fishery may come from the same few birds over a period of time. Nevertheless, we conclude that there are likely to be situations when killing birds for fisheries purposes will be justified.

The power to licence the killing of piscivorous birds other than cormorants should be retained. Licences should be site specific and time limited and should include an upper limit on the numbers of birds that can be killed during the period of the licence. (Recommendation 175)

- 3.12** As stated in paragraph 3.1 above, Section 4 of the Wildlife and Countryside Act provides a defence against a charge of killing a bird for an authorised person to show that the action was necessary for the purposes of preventing serious damage to fisheries. This is additional to the defence of taking such action under the authority of a licence. The Act contains similar provisions in relation to other animals but with a proviso. In the case of other animals, Section 10 provides a defence of showing the action was necessary to prevent serious damage to fisheries but goes on to say that this defence cannot be relied upon if the likelihood of a need to kill was known in advance of the action and no licence had been applied for or the licence had been refused or the killing was not in compliance with its terms. Similar conditions are included in the Conservation (Natural Habitats, etc.) Regulations 1994 with reference to animals protected under the EC Habitats Directive.

Section 4 of the Wildlife & Countryside Act 1981 should be amended to provide that the defence of killing a bird to prevent serious damage to fisheries should be qualified so that the defence is not available if the likelihood of a need to kill was known in advance of the action and no licence had been applied for or the licence had been determined. (Recommendation 176)

- 3.13** We were told by fishery managers that they had experienced considerable difficulty in satisfying the licensing authority that there was serious damage to fisheries as a result of predation. It was suggested that there was inconsistency in the way applications were handled between different MAFF regions to the extent that fisheries managers felt that the chances of obtaining a licence were greater in some regions than in others. The same problem would presumably apply in the case of the defence under Section 4. We note that the research report claims that there are now sufficient data available on how practical impact assessments can be undertaken on a case by case basis and that guidelines for practical impact assessment by fishery managers have been developed. We question whether these can be readily implemented in practice and we accept that, given the paucity of information on fish population dynamics, it is difficult to come up with objective proof of serious damage. We do not, however, advocate a reversal of the burden of proof. This would merely transfer the problem of dealing with the scientific uncertainties onto those claiming that killing piscivorous birds is unacceptable on nature conservation grounds. Because there are two conflicting interests, both with important environmental

consequences, use of the precautionary approach will not provide much help either, except where there are special circumstances (see box 5 for an example).

Box 5 Predation of the schelly by cormorants at Haweswater

There have been concerns that the population of the schelly (*Coregonus lavaretus*) in Haweswater in the English Lake District, already in decline because of previous water abstraction regimes, is now being seriously threatened by predation by cormorants. A tree nesting colony of these birds first took up residence at Haweswater in 1992 since when its numbers have increased. Fifty pairs of cormorants bred there in 1998. Although there was no firm evidence of a threat, North West Water, which owns Haweswater, decided to adopt a precautionary approach and initiated a scaring programme during the breeding season of 1999 as a result of which no cormorants were fledged. The scaring programme did not involve killing any birds and did not, therefore, require a licence under the Wildlife & Countryside Act 1981. However, although a scaring programme each season may prevent the population from increasing, it does not follow that there will necessarily be a reduction in predation pressure. Cormorants are long lived birds and it is likely that there will be an influx of birds from elsewhere. In 1999, the numbers of birds attempting to breed did not change significantly from those that bred the previous year. It is possible, therefore, that schelly remain under threat. If this is the situation, there may be a case for trying to eliminate the colony by killing adult cormorants. The justification would be the balance of conservation needs between the schelly and the cormorant.

- 3.14 Instead, we suggest that the problem should be tackled by devising a pragmatic approach to determining what amounts to serious damage to fisheries. We do not think that it is appropriate to expect fisheries managers to undertake research to prove a significant impact on fish numbers, especially given the lack of definitive conclusions from the recent government sponsored research. Fisheries managers need to be given guidance on the sort of evidence they will need to put forward to provide the necessary proof of serious damage and guidance on the best method of obtaining that evidence. They also need to be informed, in advance, of the criteria that will be used in determining their applications. These criteria should be based on factors such as the species involved (birds and fish) and their conservation status; numbers of birds involved and numbers of fish estimated to be taken; time of year (for example whether it is the breeding season); population trends (birds and fish); and the value of the fisheries.

Authorities licensing the killing of birds under section 16 of the Wildlife and Countryside Act should issue clear guidance on the sort of evidence that will be required to demonstrate serious damage to fisheries. This guidance should take account of the practical difficulties involved in obtaining the necessary data. (Recommendation 177)

- 3.15 Whatever form the guidance takes, it is likely that it will include the need to provide evidence of impact over a period of time. Fishery managers told us of the frustration this can cause in practice. They want to be able to lodge an application to shoot cormorants as soon as they have circumstantial evidence of a problem rather than have to wait until they have the necessary data. We do not think it would be acceptable to issue interim licences on demand and then revoke or confirm them once the case for serious damage is presented. Such a system would be open to abuse. Nevertheless, on the principle that it is better to prevent damage rather than to limit it, we believe that it should be permissible to lodge an application before evidence of serious damage has been obtained. Consideration of the application, in particular consultation with the nature conservation agencies, could then

commence. A final decision would not be made, however, until a satisfactory case of serious damage was submitted.

Administrative procedures for deciding licence applications to kill birds by shooting should be changed so that an application can be lodged without the supporting evidence of serious damage. (Recommendation 178)

- 3.16** As stated in paragraph 3.10 above, scaring programmes need to be repeated. We would expect that any licence granted would normally take account of this fact and expressly permit shooting over an extended period. We can also see the merit in time-limiting licences and conclude that the present maximum period of two years is long enough. After this time, there should be a re-evaluation of the situation before a new licence is issued. We can see no point, however, in requiring applicants to go through the same rigorous licensing procedure in order to obtain a repeat licence. This would merely delay the onset of any scaring programme and thus increase the level of damage. We conclude that evidence based on the number of birds present and the results of previous scaring programmes should be sufficient, in the absence of any evidence to the contrary, to raise the presumption that there is a risk of serious damage to the fishery.

Licensing authorities should devise a more streamlined, precautionary approach to deal with applications for repeat licences, which takes account of the effectiveness of the previous scaring programme and the number of birds on the site at the time of the application. (Recommendation 179)

- 3.17** The Countryside Council for Wales told us that they thought that the nature conservation agencies were better placed than central government to assess the conflicting interests of wildlife conservation and fisheries management and that responsibility for issuing licences should be transferred to them. English Nature did not share these views. We conclude that CCW's evidence demonstrates the present wide differences in perceptions of the problems between the conservation and fisheries sectors. Changing the licensing authority would not, on its own, remedy the problem. Instead, we believe that the criteria for issuing licences should be agreed and published in guidance material.

The nature conservation agencies and the present licensing authorities should collaborate to formulate criteria for issuing licences and ensure that these are reflected in the guidance referred to in Recommendation 178 (3.15) above. These criteria should be based on the best available scientific evidence and should be reviewed regularly. The Environment Agency and fishery representatives should contribute to the development and review of these criteria. (Recommendation 180)

- 3.18** Existing licensing procedures require applicants to demonstrate that approved means of dealing with the problem of piscivorous birds have been tried but have failed. The results of the commissioned research demonstrate that other methods, beside shooting, can be effective under certain circumstances but will not be effective in others. We conclude from this that, while it is essential to consider the most effective method for each particular case, it is inappropriate to require a fixed set of methods to be used before an application is submitted.

The criteria for issuing licences should require the licensing authority to consider the likely effectiveness of other means of dealing with the problem of piscivorous birds, taking account of research findings but there should be no blanket requirement for an applicant to demonstrate that these have been used prior to making a licence application. (Recommendation 181)

- 3.19** Fish are as much part of biodiversity as are birds. Some fish species are given special legal protection under the Wildlife & Countryside Act and the EC Habitats Directive. It may, on occasions, be necessary to assess the relative conservation importance of two species – one

bird and one fish. It is the responsibility of the conservation agencies to assess the relative merits of these conservation interests in formulating their advice to the licensing authorities. Box 5 above gives a clear example of a situation where a cull of cormorants might be considered justified to conserve a rare species of fish.

Where the population of a fish species is so low that there is a need to prohibit fishing, or where the conservation status of the fish species so demands, this should be considered a prima facie reason for trying to prevent exploitation by predation as well. In such circumstances, it should not be necessary to demonstrate a direct impact of predation. The risk of a further decline in the fish population level should be sufficient to invoke the precautionary approach in favour of the fish. (Recommendation 183)

- 3.20 The present provisions of the Wildlife & Countryside Act do not allow for licences to be issued to kill birds for the purpose of conserving fish. Although it is possible under Section 16 to obtain a licence to kill birds for the purposes of conserving birds, such a licence is not available if the purpose is to conserve a non-bird species.

The Wildlife & Countryside Act should be amended to permit the issue of licences to kill birds for the purposes of conserving non-avian wildlife. (Recommendation 182)

- 3.21 In paragraph 3.8 we expressed our approval for a case by case approach to dealing with problems of piscivorous birds. We note, in particular, that trials showed that fish refuges may reduce the availability of fish – particularly large ones – to foraging cormorants in some situations but note that little consideration was given to the potential problems that these refuges might cause to anglers (for example, snagging hooks and lines).

Further research should be undertaken on management measures other than shooting to deal with the problem of piscivorous birds, including, in particular, more extensive trials of the effectiveness of habitat modifications such as fish refuges, and their effects on angling. (Recommendation 184)

- 3.22 We noted above that the limitations of the data should not be used as an excuse to delay the implementation of management strategies. Given the paucity of information on individual fisheries, however, we consider that opportunities should be taken to increase our understanding of predator-prey relationships where appropriate.

Where appropriate, future fisheries research and monitoring programmes should include consideration of the effects of predation by piscivorous birds. (Recommendation 185)

4 Piscivorous mammals

- 4.1 The main mammalian predators of freshwater fish and salmonids are seals, otters and mink. The killing of seals is regulated under the Conservation of Seals Act 1970 and otters under the Wildlife & Countryside Act 1981, the EC Habitats Directive 1992 and the Conservation (Natural Habitats, etc.) Regulations 1994. There are no particular restrictions on the killing of mink.

- 4.2 Based on the results of Government research undertaken in 1985, it is estimated that in 1997 some 232,000 tonnes of fish (sandeels, gadoids, especially cod, and flatfish) were consumed by grey seals and 55,000 tonnes by common seals. Although salmonids do not form a major part of the diet, there is no doubt that seals will take salmon. Most of the problems are caused by a few 'rogue' seals that regularly take fish in rivers and estuaries and at fish farms or near barrages etc. Any measures taken to protect salmon and freshwater fisheries, therefore, need to be targeted on these individuals. We do not believe that it is appropriate

to undertake a general cull because an unacceptably large proportion of the seal population would have to be killed for it to be effective.

- 4.3** The Conservation of Seals Act 1970 imposes a close season during which it is an offence to kill a seal unless the killing is authorised by licence. The statutory close season for common seals is 1 June to 31 August; for grey seals it is 1 September to 31 December. There is also power for the close season to be extended by secondary legislation. A year-long close season on the east coast of England was introduced in 1996¹². The Act permits shooting of seals during the open season provided an appropriately licensed firearm is used. Licences may also be granted to allow shooting in the close season in order to prevent damage to fisheries. Licences specify the area within which killing is permitted. In addition, fishermen may shoot seals in the close season without a licence in order to prevent damage to fishing nets or tackle or to any fish caught by that net or tackle provided that the seal is in the vicinity of the net or tackle.
- 4.4** The licence imposes restrictions on the type of firearm that can be used to shoot seals, which were intended to ensure that the most humane method of killing is used. Shooting is only allowed using a rifle with ammunition having a muzzle energy of not less than 600 ft-lbs (813.5 joules) and a bullet weighing not less than 45 grains (15.4 grams). We were advised, however, that the calibre of bullet is too small to ensure a clean kill and that there was a real prospect of injuring seals rather than killing them outright. It was suggested to us that shooting should be allowed with a rifle of not less than .240 calibre used in conjunction with a jacketed hollow-nosed or soft-nose bullet generating a muzzle energy of at least 1,700 ft-lbs (2,305 joules). These are the authorised conditions applicable for the shooting of deer under the Deer Act 1991. It was further suggested that killing with a shotgun of no less than 12 bore using AAA or SSG cartridges would also be acceptable.

The present legal controls over the shooting of seals should be retained but the provisions regarding the rifles and shotguns that can be used should be revised to ensure that target animals are killed instantly. (Recommendation 186)

- 4.5** The otter was one of the few mammalian species protected under Part I of the Wildlife & Countryside Act when it was first enacted. The protection has been strengthened under the Conservation (Natural Habitats, etc.) Regulations 1994, which implement the EC Habitats Directive in this country. It is an offence to kill or disturb an otter or to damage or destroy its holt. No offence is committed if the person killing the otter is an authorised person (that is, the land owner or occupier, or his authorised person); and shows the action was necessary to prevent serious damage to fisheries. The defence is not available if the likelihood of a need to kill was known in advance of the action and no licence had been applied for or the licence had been refused, or if the action was not in accordance with the terms of a licence.
- 4.6** The Regulations provide that there will be no offence for anything done for the purpose of preventing serious damage to fisheries if it was done under and in accordance with a licence granted by MAFF or the National Assembly for Wales. The conditions under which licences can be granted are more stringent than those under the Wildlife & Countryside Act, however. Licences may not be granted unless the authorising authority is satisfied that there is no satisfactory alternative and that the action will not be detrimental to the maintenance of the otter population at a favourable conservation status.

¹² The Conservation of Seals (England) Order 1996 came into force on 19 December 1996 and expires three years from that date. At the time of writing, a decision on whether to renew these measures has not been made.

- 4.7 Otters were seriously affected by organic pesticide residues in the 1960s and 1970s and were lost from many rivers. Numbers have increased considerably since that time but populations have still not reached previous sizes. The Environment Agency and the Wildlife Trusts have taken the lead in producing the Biodiversity Action Plan for otters and have both been involved in the Otters and Rivers Project designed to encourage the return of otters to river systems where otters used to live, mainly by improving habitats.
- 4.8 We welcome the return of otters. We do, however, question the practice of encouraging their return to areas where it could have an impact on vulnerable fish populations. There seems to be little sense in encouraging one species at the expense of another.

Research is required to investigate the potential effects of reintroduced populations of otters in areas where the native fish populations are under particular pressure. Any programme designed to encourage the re-establishment of otters should take account of the impact of the resulting predation on vulnerable fish stocks. (Recommendation 187)

Chapter 8

Monitoring and research & development

1 Introduction

- 1.1 Present monitoring and research is not providing the information necessary for the proper management of fisheries on a scientific basis. Although a better designed monitoring programme could go some way towards improving the quality of information, there is still a clear need for more resources for research.
- 1.2 We have been made aware of gaps in the knowledge base that are seriously impeding the effective management of fisheries. If, as we recommend below, policies on the conservation and management of salmon and freshwater fisheries are to be founded in good science, it will be essential for Government to make a greater commitment to monitoring and research.
- 1.3 In this chapter we focus on monitoring and research of direct relevance to the management of salmon and freshwater fisheries. Other recommendations on research are contained in Chapters 6 and 7.

2 Organisation of monitoring and research

- 2.1 Monitoring of salmonid and freshwater fish stocks and fisheries in England and Wales is undertaken mainly by the Environment Agency and, to a lesser extent, by the Centre for Environment, Fisheries and Aquaculture Science¹³ (CEFAS) for MAFF and the National Assembly for Wales. The Environment Agency and MAFF also commission much of the applied R&D conducted in England and Wales on salmonids and freshwater fish stocks and the factors affecting them, although additional research funding is provided by DETR and the water industry and by such organisations as English Nature and CCW. This applied research is carried out against a substantial background of work conducted on similar problems in other countries, particularly in Europe and North America, and other studies of freshwater fauna and flora undertaken by universities and other institutes in the UK with Research Council and other funding. Research funding is also provided by the EU, mainly to address problems that are relevant to a number of Member States.
- 2.2 While the findings of applied research programmes will benefit fishing interests, their main purpose is to assist in the formulation of management policy and to underpin the advice that enables the regulatory authorities to carry out their statutory duties. Some additional work is organized by riparian owners and fishing clubs; however, the industry is very fragmented and there are a large number of quite small fisheries. Most do not have the resources to undertake their own research, and many of the factors that require investigation are in any event beyond their control. This has been addressed in some areas by the formation of river trusts, although these groups generally fund habitat protection and restoration rather than research.

¹³ CEFAS is an executive agency of MAFF

- 2.3 Some of the evidence that we received during our Review was critical of the role that fisheries scientists play in the development of policies on fish conservation. It was claimed that many scientists adopted an over-theoretical approach, ignoring the experience of practical fisheries managers, and that it was in their interest to stress the need for more research, which they would then have to undertake.
- 2.4 While we sympathise with the frustration that is sometimes felt by those concerned with fisheries at the cautious approach often taken by scientists, we note that knowledge of many aspects of fish biology and behaviour is still limited. In these circumstances, it is almost inevitable that research will throw up further questions which will require further research to elucidate.
- 2.5 We also note that the Government's approach to the conservation of the natural environment and to the management of fisheries, both in freshwater and the sea, is based on science. We believe it unlikely that the Government would accept recommendations that were not based on the best available scientific information, nor do we think that such recommendations would be in the long term interests of fish conservation. We also note that the precautionary approach, which we were asked to take into account in our terms of reference, specifically requires decisions to be based on science.

Policies on the conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries should continue to be based upon the best available scientific information. (Recommendation 63)

- 2.6 There is also a need to ensure a long-term commitment to research activities. There is a perception in some quarters that it should be possible to define a list of research requirements which, once completed, would obviate the need for any further scientific studies. We realise, however, that the ability to recognise and investigate problems often depends upon the development of new scientific techniques. We therefore consider that research will continue to play an essential role in ensuring that fish stocks and their environment are properly managed. However, research will only play this role if it is adequately funded. Government must recognise that a commitment to base policies on the best available scientific information implies a commitment to provide the funding needed to ensure that adequate information is available.

The Government, the Environment Agency, NERC and other funding agencies should continue to give high priority and long term commitment to the funding of R&D on the freshwater environment and fisheries and should ensure that adequate funding is available to conduct research and implement the findings. (Recommendation 64)

- 2.7 Although much research is conducted to increase our general understanding of freshwater ecosystems and the species that inhabit them, the main R&D programmes supporting the management of freshwater fisheries are funded by the Environment Agency and MAFF. There are three strategic aims in the Environment Agency's Fisheries R&D Programme:
- to describe the status of fisheries resources in order to identify the nature and scope of management issues;
 - to understand the processes behind resource dynamics and responses to pressures, in order to identify management options;
 - to optimise decision-making and practical management procedures in order to deliver best practice.

- 2.8** The Environment Agency told us that it places considerable emphasis on implementing the outputs of R&D and on establishing robust data systems to support further research and routine assessment. A Fisheries Technical Manual series has been established and four volumes currently exist (on salmon and trout habitat management, resistivity counters and spawning targets). Training and communication of outputs through, for example, workshops and seminars is increasingly an integral part of the Environment Agency's R&D programme, and this is being co-ordinated through the National Salmon and Trout Fisheries Centre and National Coarse Fish Centre.
- 2.9** MAFF funds research in support of its strategic aims, which include: "to protect and enhance the rural and marine environment"; and "to improve the economic performance of the agriculture, fishing and food industries". The R&D programme on salmonids and freshwater fish principally relates to factors affecting the production of exploited species, particularly the migratory salmonids. Although MAFF funds research on eels, most work on coarse fish is funded by the Environment Agency. MAFF's programme is undertaken by CEFAS, and other scientific contractors, and addresses a range of topics, including factors affecting salmonid migration, reproduction, juvenile production and survival throughout the life cycle. MAFF encourages all the funded research groups to present their results for peer review in the scientific literature.
- 2.10** The objectives of other research funding agencies relate less specifically to fisheries management, although the eight strategic aims of the Natural Environment Research Council (NERC), for example, include providing 'objective, independent expert scientific advice and information to underpin national and international policy and sustainable development'.
- 2.11** The Joint Nature Conservation Committee (JNCC) is developing a freshwater strategy as part of its response to the EC Water Framework Directive, which it regards as an opportunity for developing a holistic and integrated approach to river, lake, wetland, estuary and coastal water management. Monitoring is an important aspect of the strategy and it is proposed by JNCC that the nature conservation agencies (English Nature and the CCW) and JNCC should collaborate with the Environment Agency to ensure that future freshwater management programmes have due regard to the surveillance and monitoring requirements of the Habitats and Birds Directives and of water-dependent SSSIs. JNCC is not, at present, recommending further research on freshwater species but has suggested that existing information could be used to better advantage if databases were linked so that all key partners could access them.
- 2.12** The current MAFF and Environment Agency R&D programmes are co-ordinated through regular meetings between Project Managers and, at the customer level, by the MAFF/EA Fisheries R&D Liaison Group. In addition, scientists advising the Environment Agency and MAFF maintain extensive contacts with colleagues in other countries, particularly Europe and North America, on many aspects of the R&D programmes. There is less co-ordination, however, between these programmes and those of NERC and other funding bodies, particularly in areas which encompass a wide range of disciplines, such as the impact of agricultural practices on freshwater ecosystems.

Those responsible for research and monitoring by government departments, the Environment Agency, the nature conservation agencies and NERC should ensure good co-ordination of all research programmes which have a bearing on the management of fisheries and the freshwater environment. Where possible databases should be linked and access provided for key partners. (Recommendation 65)

- 2.13 In addition we consider there is a need for the Environment Agency to audit its R&D and monitoring to ensure greater accountability.

The Environment Agency should establish a panel to audit its R&D and monitoring; the panel should include some independent members. (Recommendation 67)

- 2.14 We were informed that a range of differing tendering procedures and selection criteria is used by the funding agencies. We were concerned by suggestions that scientific quality might be compromised in some instances by a need to accept low cost tenders. We feel that scientific quality and the integrity and experience of the potential contractors should generally be the principle selection criteria.

Research proposals should be evaluated on the basis of benefit in relation to cost, rather than cost alone. (Recommendation 66)

3 Monitoring programmes

- 3.1 Monitoring of fish stocks and the state of their environment in England and Wales is primarily the responsibility of the Environment Agency, and we understand that all their programmes are currently under review. The Environment Agency's fisheries monitoring programme is derived from that developed by the Regional Water Authorities and is concerned almost wholly with fish communities rather than fishery performance. This historic programme has been criticised for failing to provide useful management information on the status of fish stocks, resulting in an inability to assess impacts such as drought, flow regime damages and climatic change. The Environment Agency has determined that, for the future, its monitoring needs to be able to: contribute to sustainable development; form an opinion on the state of pollution in the environment; provide for implementation of the proposed Water Framework Directive; consider the impact of its actions on rural communities; and meet the needs of the Habitats Directive and Biodiversity Action Plans. We consider that an essential element of the new monitoring programme must be good coordination of fish monitoring with other monitoring, to ensure that there are no gaps and overlaps and to ensure they are used to maximum effect. We are also concerned about the apparent lack of coordination of various freshwater sampling programmes between the Environment Agency and EN/CCW.

The Environment Agency should ensure good co-ordination of fisheries monitoring programmes with other Environment Agency monitoring and harmonisation of the programmes with those of English Nature and the Countryside Council for Wales. (Recommendation 68)

- 3.2 The Environment Agency has indicated that its intention is to move to a streamlined core programme, capable of producing consistent data that can be aggregated regionally or nationally, supported by a discretionary programme that can be tailored to react to local needs. The principal purpose of the core is to meet the specific needs of the fisheries function, and additions to the core programme to meet non-fisheries needs will only be provided if adequate funding is available from appropriate sources. The principal fisheries – coarse, salmon, sea trout, trout and eels – are being used to define the core programme. We support this initiative, provided that it is not simply seen as a way to cut costs.
- 3.3 The Environment Agency has told us that the core fisheries programme is likely to contain, firstly, a minimum programme aimed at showing whether the statutory duty to maintain, improve and develop fisheries was being met and, secondly, appropriate operational monitoring to assess the impact of management actions and to provide data that would allow interpretation of changes in fishery performance. This is likely to include a shift in

emphasis towards monitoring of catches as well as direct stock assessment techniques, coupled with monitoring of the water environment and the anglers' environment.

- 3.4** The Environment Agency has said that the discretionary programme will deal mainly with specific local issues – generally more reactive in nature – and the programme content will be subject to annual review and justification. The monitoring programme will be designed to ensure that the data collected are robust and useable and where practicable serve a number of purposes – local, regional, national and international – both within and outside the fisheries function. Methods to be employed in both core and discretionary programmes will need to be reviewed to ensure that best practice is adopted.
- 3.5** We are of the view that there will need to be a long-term commitment to the Environment Agency's programme for monitoring of coarse fish as well as migratory salmonids, and that this needs to be better targeted, more consistent between regions and generally more cost-effective. We suggest in Chapter 10, that fluctuations in salmonid populations could be better understood by use of heavily monitored index rivers which would provide reliable long-term data sets. This would establish the basis for evaluation of impacts on populations from natural events such as droughts, together with artificial influences such as abstraction and, over the long-term, climate change. We suggest that serious consideration is given to adopting a similar approach for coarse fish. There also needs to be improved dissemination of the results. We believe that the monitoring programmes should include on-going evaluation of changes in the socio-economic values of fisheries. Accordingly, we support the Environment Agency initiative of carrying out its in-house review and urge wide consultation on any revised programme.

The Environment Agency should adopt a structured approach to the design of its monitoring programme so that it is both modernised and better targeted, and information should be produced in such a manner as to be effective in meeting the future fisheries management needs of the Agency and others. (Recommendation 69)

- 3.6** Fisheries monitoring programmes can be expensive because of high manpower requirements and the costs of equipment such as traps and counters. We understand that research is underway on methods to improve monitoring, including investigations of surveying and sampling techniques, such as counters and electric fishing, and methods for designing fishery surveys and analysing data. There is also a need to ensure that monitoring is conducted efficiently and that collection of data on all components of the aquatic environment is effectively linked.

The revised fisheries monitoring programme that is being developed by the Environment Agency should be linked with monitoring for other components of the aquatic environment (for example invertebrates and habitat). Research is required to provide more cost-effective methods for monitoring fish populations. (Recommendation 70)

4 R&D programmes

- 4.1** Data collected as part of the Environment Agency's routine monitoring programmes, if properly co-ordinated and collected, can act as a valuable source of data for fundamental R&D on all fish species; particularly with respect to population dynamics. Co-ordination from the national salmonid and coarse fish centres to provide a framework for data collection may be appropriate.
- 4.2** There is little doubt that pressures on freshwater ecosystems in England and Wales will continue to increase for the foreseeable future with the growing demands for water and

recreational facilities. This may result in increasing conflicts between anglers and those participating in other recreational activities. In Chapter 9 we have been hindered in assessing the relative benefits from different activities by not having enough information on the value of different fisheries. Research is therefore needed on the socio-economic value of all recreational activities that are dependent upon the freshwater environment, and there is therefore a need to develop methods to assess these values. There is also a need to investigate the impacts of all these recreational activities on fish and the environment.

There is a need to develop and improve methods to assess the socio-economic values of all recreational activities that are dependent upon the freshwater environment, and to investigate the impacts of all recreational activities on fish and the environment. (Recommendation 71)

- 4.3 There is a surprising shortage of information on the ecology of individual rivers. Where survey work has been undertaken, this has tended to deal with only a small section of the river or with only a few plant and animal groups. For example there is a tendency for fish to be treated separately from the invertebrate fauna. The nature conservation agencies' research into the conservation of whole river ecosystems was stimulated by the requirement of the EC Habitats Directive, which requires the designation of protected areas to conserve the habitats of a number of fish species. Survey work has focused on those rivers identified as potential designations. We are concerned that insufficient attention has been paid to other rivers which may be of national importance for conservation.

Research to identify the conservation value of individual rivers should be extended to cover all major catchments and should not be confined to those that are known to contain species and habitats of relevance to the EC Habitats Directive. Future research should be based upon an holistic view of environmental and fisheries management. (Recommendation 72)

- 4.4 Climate change may also have far-reaching effects on freshwater fisheries in England and Wales, not least through its effects on water temperature and flow regimes. It is likely to have a range of effects on native species and may result in certain species being eliminated from some waters while other introduced species become more successful. Determining appropriate strategies for coping with such changes will present particular difficulties for fisheries managers and will depend upon the availability of sound scientific advice.

Research should be conducted into the possible effects of climate change on salmonids and freshwater fish, but this should not be conducted in isolation from similar studies on other aspects of the freshwater environment. (Recommendation 73)

- 4.5 We have commented in Chapter 6 on the need to establish environmentally acceptable flow regimes. There is a clear need for further research in this area.

Research should be carried out to determine acceptable flow regimes and the needs of freshwater flora and fauna. (Recommendation 164)

- 4.6 As we emphasise in Chapter 6, we believe that it is essential that every effort is made to reverse historical damage to freshwater habitats and restore the productive capacity of freshwater systems.

There is a continuing need for studies of the wide range of factors that affect fish stocks in freshwater and of methods to reverse adverse effects, in particular historic damage. (Recommendation 74)

- 4.7 Chapter 11 of our report highlights the risks that movements of fish can create through the introduction of diseases and parasites. Disease control therefore remains a high priority, and studies are regularly undertaken to improve the identification of particular disease

agents and investigate their effects on populations. Both MAFF and the Environment Agency have identified the need to collect more information on the disease status of wild fish stocks, to describe the presence and distribution of disease agents throughout fisheries in England and Wales, and to evaluate ways of monitoring change. This requires the development of rapid, sensitive and quantifiable diagnostic methods. More generally continuing work is needed on pathogens and parasites, including work on: epidemiology and risk assessments; the transmission of diseases and parasites between wild and farmed fish; and disease control strategies.

MAFF and the Environment Agency should continue to conduct research on fish diseases, their identification, distribution and effects on wild stocks. (Recommendation 75)

Salmonids

- 4.8** The Environment Agency and MAFF both fund work on the development of assessment methods for salmonids in order to improve the conservation of stocks and management of fisheries. In particular, the Environment Agency has a comprehensive programme supporting the development, improvement and implementation of management measures using conservation limits, while MAFF's role (via CEFAS) in this area is mainly at a national and international level, through the development of methods used by ICES and NASCO. We believe that the further improvement of these methods is essential to the conservation and rational management of salmon stocks.

The Environment Agency and MAFF should continue to fund research to develop and refine the methods used to set conservation limits and management targets for salmon stocks, in co-operation with ICES and NASCO, and for sea trout. (Recommendation 76)

- 4.9** We were told that the Environment Agency has an extensive programme on the development of a River Fisheries Habitat Inventory, a salmon life-cycle simulation model, and a framework for salmonid management decision making. Essential supporting information is also being collected in studies of the status and trends in stocks, the use of catch statistics to determine fish stock size and the carrying capacity of salmonid streams; and methods for sampling smolts and counting adult salmon. CEFAS and the Environment Agency also collaborate in studies to obtain information on marine survival of salmon and levels of exploitation in marine fisheries. However, the current salmon management strategy is dependent upon having reliable information on the dynamics of individual river stocks, and similar information will be required on sea trout if the methodology is to be applied to that species. We therefore believe that there is a need to increase the number of rivers on which long-term population studies are conducted on salmon and sea trout.

Further work should be undertaken to update and develop methods for monitoring and assessing salmonid stocks, and the regulatory and management authorities should ensure the best co-operative use of resources in this area. There should be further long-term studies of the population dynamics of individual river stocks of salmon and sea trout as a basis for improved stock management on different river types. (Recommendation 77)

- 4.10** A wide range of research programmes has been funded to investigate factors affecting salmonid stocks during the freshwater phase of the life-cycle. These have included studies of the effects of sediments on salmonid eggs and embryos, the management of riparian vegetation, the impacts of low concentrations of various chemical contaminants on the physiology and behaviour of the fish and the effects of physical and chemical obstructions to fish movements. Knowledge in this area is also enhanced by a large number of practical

habitat improvement programmes conducted by research groups such as the Game Conservancy, and by river trusts and other riparian interests.

- 4.11 Dissemination of research results in this area is particularly important because results of these studies are most likely to be of direct relevance to riparian owners and fishery managers. We therefore support the development of advisory manuals such as the Environment Agency's guidelines on habitat management and suggest that other methods, such as leaflets, should also be employed to disseminate information on best management practice to interested parties.

Research is required on the impacts of human activities on salmonid stocks and the effectiveness of a wide range of habitat restoration methods. The results of the studies must be made readily available to all interested parties. (Recommendation 78)

- 4.12 We have noted the suggestions that reduced marine survival may be playing a major role in the current decline of salmon stocks, particularly of multi-sea-winter fish. We recognise the importance of continuing to monitor changes in the survival of migratory salmonids in the sea and the need to investigate the causative factors, such as the effects of sea temperature on growth, maturation and survival. Another problem is the possible by-catch of salmon in fisheries for marine species, one particular concern being the pelagic mackerel and herring fisheries in the Norwegian Sea; there is no direct evidence of such by-catches, but catches in these fisheries are so large that even if only a very small proportion was salmon it could have significant effects on stocks. More research here is clearly needed. However, studies of stocks in the open ocean are very expensive, and we would encourage the research groups and funding bodies to seek co-operation with other North Atlantic salmon producing countries in addressing these problems.

Research is required on the behaviour and distribution of salmonids in the sea and the factors impinging on them. There is a need to establish whether by-catches may be occurring in pelagic fisheries particularly in the Norwegian sea, and the necessary research should be undertaken in co-operation with other countries and bodies as soon as possible. (Recommendation 79)

- 4.13 The collapse of some sea trout stocks on the west coast of Scotland and the west of Ireland in the late 1980s underlined the limited state of knowledge of many aspects of sea trout biology and behaviour. Sea trout stocks in England and Wales have not been similarly affected but we have been told that MAFF and the Environment Agency have attached a high priority to improving understanding of sea trout and that this work is co-ordinated with programmes in Scotland and Ireland. The Environment Agency has been undertaking a three phase programme to collect and collate information on sea trout stocks in England and Wales, while the MAFF programme has concentrated upon aspects of the marine phase of the sea trout life cycle.

- 4.14 Further work is required on sea trout to provide a sound understanding of their ecology; in particular we have noted elsewhere (Chapter 10) the effects that interaction between trout and salmon may have on the development of conservation limits for both species. We are encouraged to hear that both MAFF and the Environment Agency are planning to investigate various factors relating to the distribution of salmon and trout (both migratory and non-migratory) in rivers in England and Wales and note that the results should be used to improve the development of conservation limits for both species.

Research should be conducted on sea trout to provide a sound understanding of their ecology and, in particular, of their relationships with salmon. (Recommendation 80)

- 4.15** The Welsh Region of the NRA published a management strategy for brown trout in 1993. The Environment Agency now has a project to develop guidelines for best management of brown trout and rainbow trout fisheries in order to support operational work and the completion and implementation of a brown trout strategy for England and Wales. A baseline inventory and description of trout fisheries in England and Wales is being developed to enable design of an effective monitoring programme for stocks and fisheries. There has been a widespread decline in wild brown trout stocks, particularly in the south-east of England, with many fisheries now reliant on the stocking of hatchery-bred fish to sustain catches. Local declines can be due to a combination of habitat problems and/or over-fishing by anglers. We have noted elsewhere the particular ecological importance of many wild brown trout fisheries, and we therefore recognise the need to investigate the effects of hatchery brown and rainbow trout on wild brown trout populations, including the effects of interbreeding, and the potential for habitat restoration to restore wild trout populations and associated fisheries.
- 4.16** We are pleased to see that a number of studies have recently been instigated on grayling, a species which presents particular management problems in some areas. The studies include a review of grayling status, ecology and current management practices and investigation of the factors causing variation in recruitment. We are aware of conflicting management practices with regard to grayling in some areas and believe that the effects of these activities should be investigated more thoroughly.

Wild brown trout and grayling fisheries should be supported by habitat management and research which underpins our understanding of their long-term sustainability. (Recommendation 81)

Coarse fish and eels

- 4.17** There has been a historical imbalance in the amount of applied research commissioned on coarse fish species relative to salmonids. Most of the monitoring and research on coarse fish is conducted by the Environment Agency, who have instigated a number of studies to support their Coarse Fish Strategy, including investigations of factors affecting coarse fish populations. However, we believe that there is a need to increase the research programmes on all coarse fish species and on the fish communities in different habitats.

There is a need to increase the research programmes on coarse fish communities in different habitats. Future research should be based upon an holistic view of environmental and fisheries management. (Recommendation 82)

- 4.18** The Environment Agency has initiated a programme to investigate the perceived decline in recent years in coarse fish stocks in large river fisheries in England and Wales. The Agency is working on the first phase of a major study of factors affecting coarse fish recruitment, and we were told that further studies are planned to provide better understanding of the changes in fish communities which occur in rivers that are recovering from domestic and industrial pollution. The Environment Agency is also evaluating methods of habitat restoration for coarse fish with a view to producing a practical manual on procedures and techniques, and is planning to develop a strategy for stocking of hatchery reared coarse fish, which will include advice on appropriate stocking practices. Research is also underway on behaviour and swimming speeds of various coarse fish species with a view to improving the design of fish passes.
- 4.19** However, we believe that there is a need to increase research efforts considerably to establish the specific habitat needs and behaviour of individual species and to investigate

other factors affecting the population dynamics of coarse fish species, both in flowing and still waters.

Fundamental research is required on all the coarse fish species in England and Wales, their habitat requirements, behaviour and population dynamics. Research is also required on the relationships between fish species within communities and on the factors causing species composition to change over time. (Recommendation 83)

- 4.20 Many coarse fish communities, principally in still waters, are heavily fished. The activities of anglers can therefore have significant effects on the fish and the environment. For example the use of large quantities of ground-bait may provide a major source of food for the fish, thus affecting the ecological balance in the fishery and possibly the health of the fish stocks. We were also told that species such as eels frequently pick up pink or yellow coloration of the flesh which is thought to derive from angling baits.

Research is required on the effects of angling practices, such as ground baiting, on fish and freshwater ecosystems. (Recommendation 84)

- 4.21 We have received evidence that recruitment of eels (elver runs) has decreased substantially over the past 10-20 years and there are consequent concerns about the state of the European stock. However, it is evident that there is currently very little information on which to base policies to regulate and manage elver and eel fisheries in a consistent and logical way. MAFF and the Environment Agency have begun to address this in a jointly funded research programme, and work in other European countries has been co-ordinated through EU Concerted Action programmes. Nevertheless there is clearly an urgent need to address a range of questions relating to eels in England and Wales. In particular better monitoring of eel stocks and fisheries is required, and research is needed on eel population structures and dynamics, the levels of exploitation on different life stages, and the effects of habitat loss and degradation on eels stocks in our rivers.

Research on eels should be continued in particular to elucidate the population dynamics of the species and to improve the monitoring of eel stocks. This work should be integrated with studies on eels in other European countries. (Recommendation 85)

- 4.22 There is a particular need for more information on the biology and status of a number of rare freshwater species that occur in England and Wales, such as shad, and species that are not generally targeted by recreational or commercial fisheries.

Research is needed to establish the distribution of rare and non-target fish species, to describe their ecology, and to investigate factors that may be limiting the size of stocks, such as the effect of obstructions. (Recommendation 86)

- 4.23 In addition, little is known about the potential effects of non-indigenous species on native fisheries and ecosystems, although there is considerable pressure from many fishery owners to permit the release of such species into their waters.

The Government should carry out research on the potential effects of various non-indigenous species on native fish and ecosystems. (Recommendation 87)

Part III – The value of fisheries

Chapter 9

Social, economic and recreational importance of angling

1 Introduction

- 1.1 In our terms of reference we were asked to take account of the need to maximise the economic, social and recreational benefits derived from salmon and freshwater fisheries. In Chapter 10 we have considered the economic and social significance of salmon, sea trout and eel net fisheries: in this chapter we consider the economic and social importance of angling.
- 1.2 The starting point in attempting to assess the significance of angling must be the number of anglers in England and Wales. In 1994 NOP carried out a survey of angling for the National Rivers Authority. This estimated that there were 2.3 million coarse anglers (which it defined as people who had fished during the previous two years) and 0.8 million game (salmon, sea trout and trout) anglers in England and Wales. There were also 1.1 million sea anglers. In total, there were 2.9 million freshwater and sea anglers in England and Wales. NOP estimated that, on average, coarse anglers spent £1,066 a year on their fishing (£225 on tackle, £45 on permits and £796 on the cost of fishing trips); the corresponding figure for game anglers was £1,093. On this basis, the total amount spent by anglers on their sport each year is some £3.3 billion. Labour's Charter for Angling stated the total sum was £5 billion.

2 Economic benefit of angling/tourism

- 2.1 We have no reliable means of estimating the total number of jobs supported by anglers' expenditure. It seems probable, however, that in England and Wales there are at least 12,000 full time equivalent jobs directly dependent on the sale of fishing tackle alone. We were informed that annual turnover of the companies operating in the angling tackle market is estimated to be £250 million and the total value of major items of fishing tackle, bait and magazines to be some £380 million. Overall it is clear that a substantial number of people are employed in fishing and angling related businesses that depend upon the good management of fisheries throughout England and Wales.
- 2.2 While the figures in the previous paragraphs provide a measure of the extent of the economic activity related to angling, they do not indicate the significance of angling to the economy. If angling were to disappear, but anglers spent the same amount of money in the

same areas on other recreational pursuits, the overall effect on the national economy would be slight. In reality, however, the local and transitional effects of any major decline in angling would be substantial. As pointed out above, tackle dealers and manufacturers provide a considerable number of jobs and these would be affected, with a significant impact on some localities and individuals. This applies to both urban and rural areas.

- 2.3 Many anglers travel to fish, and, particularly in rural areas, make use of local accommodation, restaurants and other amenities. This expenditure generates a substantial transfer of resources from urban to rural areas and in some parts of the country makes a major contribution to the rural economy. We were not able to obtain an overall estimate of the scale of this transfer. We heard from one angling club on the Teifi in which 60 per cent of the members were tourists. The club submission stated that visiting anglers each spent around £1,000 a year, with 10 per cent spent on club fishing permits and the rest on such items as travel, accommodation, food and drink and fishing tackle. Most of this money would be spent in the Teifi Valley, and a research study estimated that in 1992 the overall expenditure by visiting anglers in the Teifi was in excess of £800,000 a year. In the course of our visit to the River Tweed, we were told that fisheries are estimated to be worth some £13m to the local economy and support the equivalent of 520 full time jobs – although in practice the number of people whose jobs involved some element of fisheries work was much larger. In these situations fisheries made a significant contribution to the overall viability of many jobs and made it possible for farmers, landowners and others to retain workers who would otherwise be unaffordable.
- 2.4 More generally, we were informed that inland fisheries are presently contributing around £35 million per annum to the economies of rural Wales. Wales Tourist Board estimates that around half of this comes from tourists, the balance representing a transfer of wealth from people in urban parts of Wales to those in rural Wales. Fishing, therefore, represents a relatively small component of Wales's £1.9 billion tourism industry which employs 90,000 people (almost ten per cent of the workforce). However, the rural employment that fisheries expenditure supports is of particular importance to the economically depressed areas of West Wales and The Valleys, which is now an European Union Objective 1 area.
- 2.5 We conclude that expenditure by visiting anglers helps to sustain employment in parts of England and Wales where the economy is most fragile, jobs are difficult to create and wages are generally well below average. Agriculture is the only major source of employment in many of these areas, but at present farming is under great pressure. Many farmers are anxious to diversify their activities and develop alternative sources of income. Fisheries can provide opportunities for this, either by providing accommodation and meals to visiting anglers and their families or, for those with suitable waters, by developing angling opportunities.
- 2.6 Our visit to Ireland provided a striking example of the contribution that angling can make to the rural economy. The Irish government told us that visiting overseas anglers were estimated to spend around £80m a year, with most of this spent in rural areas (which also benefited from spending of £20m by visiting Irish anglers). The Irish government recognises the contribution this makes to the national economy, and is taking active steps to promote salmon and freshwater fisheries in Ireland and thus the attractiveness of Ireland as a destination for visiting anglers. Ireland took full advantage of the Objective 1 status accorded it by the European Union until 1999 to attract EU Structural Funds for the development of angling tourism. This was done through the development of a special scheme, the Tourist Angling Measure, which involved the spending of £17m over a 5 year period on improving both salmon and coarse fisheries (in addition to the £11m a year spent

by the Irish Government on the regulation and management of inland fisheries). For salmon and sea trout, the focus has primarily been on habitat improvement while the emphasis for coarse fisheries has been on improved access and angling facilities. We noted that, in terms of government spending on inland fisheries, the per capita spend in England and Wales is approximately £0.14 compared with over £3 in Ireland.

- 2.7** We learned from our visit to Ireland that the benefits of fisheries to rural areas are not confined to areas in which salmon and sea trout fisheries predominate. Coarse angling provides alternative sources of income to farmers in many parts of England and Wales, either through offering improved facilities for angling on rivers or through the improvement or creation of stillwater fisheries.
- 2.8** It is important that the economic value of salmon and freshwater fisheries in rural areas is properly recognised in the development and implementation of Government policies on the countryside and rural economy. Such recognition is needed, for example, in planning guidance, in tourist promotion and agricultural policy. In particular, the potential contribution fisheries can make to rural economies should be taken into account in the Rural Development Plans that the Government and the National Assembly for Wales are preparing for submission to the European Commission: we recommend in Chapter 6 a number of measures to benefit fisheries which we believe should be eligible for funding under the EC Rural Development Regulation. In addition, in Cornwall and West Wales and The Valleys, which now have Objective 1 status, such measures should be supplemented by more wide ranging schemes to improve fisheries through habitat restoration, together with measures to encourage and facilitate angling, in order to enhance the contribution that angling tourism makes to the local economy. The Irish Tourist Angling Measure represents a useful model. Similar schemes are needed in Objective 2 areas, modelled on the schemes introduced under the former Objective 5(b).

The contribution that salmon and freshwater fisheries can make to local economies, particularly in remote areas, should be recognised in the development and implementation of all Government policies. (Recommendation 188)

The Rural Development Plans for England and Wales should recognise the potential of fisheries to improve rural economies. In Cornwall and in West Wales and The Valleys an Objective 1 scheme should be introduced to encourage angling tourism through the improvement of fisheries and the development of angling opportunities in urban and rural areas. Similar schemes should be introduced, where appropriate, in Objective 2 areas. (Recommendation 189)

- 2.9** The promotion of angling, and in particular the development of improved opportunities for angling, would provide additional employment in other parts of the country including urban areas. Better data would make it easier to judge the scale of this improvement, and would also help ensure that appropriate policies for the improvement of fisheries and angling opportunities were developed.

The Government, through its agencies, should extend its research into the socio-economic aspects of salmon and freshwater fisheries in order to determine the contribution that these fisheries make to employment in England and Wales and their potential for creating further sustainable jobs through suitably targeted fisheries improvement and development work. (Recommendation 190)

- 2.10** The Environment Agency informed us that it is undertaking research to establish the economic value and importance of inland fisheries; we welcome this and would like to see this research extended.

- 2.11 This research would be simpler to undertake, and the results more reliable, if there were better data on visiting anglers. Although many owners and angling clubs do retain information about visiting anglers, we have seen no published guidance on how they should do this. If more consistent data sets were available, it would be easier for them to evaluate the benefits of public investment in inland fisheries.

Tourist Boards and the Environment Agency should develop and promote best-practice guidance for the collection of data on visiting anglers. (Recommendation 191)

3 Social and recreational benefits of angling

- 3.1 As well as its fisheries' duty, the Environment Agency has a general duty to have regard to, and promote, recreation in carrying out its various functions (the Environment Act 1995). The Environment Agency's recreational responsibilities extend to all inland and coastal waters and associated land, and the Environment Agency uses the term 'recreation' to cover all aspects of water-related leisure activities, from picnicking by the water side to water sports such as canoeing and water ski-ing, as well as angling. From the evidence put to us we noted, however, that there is considerable uncertainty about the relationship between the Environment Agency's duties on fisheries and on recreation, as well as over its role in relation to angling. The Ministry of Agriculture, Fisheries and Food told us that it does not consider that its own responsibilities in relation to salmon and freshwater fisheries extend to the promotion of angling. We note that angling as a sport comes under the Department of Culture, Media and Sport. The Environment Agency, in turn, feels that the promotion of angling is consistent with its fisheries as well as its recreation duty and funds such activities from its fisheries budget. The Countryside Agency (in England) and the Countryside Council in Wales (CCW) have a statutory duty to provide facilities for the public to enjoy the countryside, including opportunities for open-air recreation and the study of nature, but this duty has not been implemented to promote angling.
- 3.2 The objectives we recommend for Government involvement in the management and regulation of freshwater fisheries include enhancing the contribution they make to the rural economy and their social value. As we make clear in the rest of this chapter, we believe that expanding opportunities for angling is essential if these objectives are to be met. We wish, therefore, to see the promotion of angling as an integral part of the Environment Agency's function in relation to salmon and freshwater fisheries.

However, this should not be seen as over-riding its obligations to conservation or to users of other water related recreational activities.

The promotion of angling, and in particular opportunities for angling, should be an integral part of the Environment Agency's function in relation to salmon and freshwater fisheries, and funded accordingly. (Recommendation 9)

- 3.3 In its evidence to us the Moran Committee took the view that it was wrong for the environmental regulator to have a duty to promote recreation; it argued that the Environment Agency's recreation duty should be limited to waters and land under its direct control. The Committee was concerned that in the exercise of its recreational duty the Environment Agency did not take an even-handed approach and seemed to wish to promote recreational activities such as canoeing even where these conflicted with angling. We note this concern, and, while a recommendation about the Environment Agency's recreational duty in general would go beyond our terms of reference, we wish to emphasise that angling must not be ignored by the Environment Agency in the exercise of its recreational duty. On the contrary, we believe it to be essential that the Environment

Agency take account of the importance of angling in the exercise of all its duties and functions.

- 3.4** As well as the general recreational benefits of angling, it can have more specific benefits to society. There is a wide range of angling available in towns, including inner cities, and angling can provide low cost, easily accessible opportunities for recreation for people who may find it difficult to afford, or participate in, other recreational activities. It can be of particular benefit to young people. Angling is also an activity that can, provided the right facilities are available, be enjoyed by those with physical disabilities.
- 3.5** The Environment Agency already promotes the development of fisheries and of angling opportunities in urban areas. Projects in its urban fisheries programme have: created new stillwater fisheries on land in public ownership, in partnership with the local authority and angling clubs; restored some poor quality urban stillwaters; and increased the number of fishing sites on existing fisheries in public land in urban areas. For example the Environment Agency has an urban fisheries development programme with the Parks Department of Liverpool City Council and other cities of the north west to improve angling opportunities in urban parks. We learned that there is a serious shortage of coarse fishing opportunity in some urban areas, and notably around Cardiff where the Environment Agency informs us that fishing licence sales per thousand population are lower than in any city in England and Wales. While we regret the construction of the barrage, the freshwater lagoon behind the Cardiff Bay Barrage has potential as a coarse fishery and we believe that developing such a fishery would be of value.
- 3.6** The Environment Agency has also taken steps to encourage young people to take up angling including for example, working with the Scout Association to launch the Scout Association Angling Proficiency Badge; holding numerous training days in association with angling clubs, the police etc., and contributing to campaigns such as “Take a Friend Fishing” and “Give Fishing a Go”. It has also provided opportunities for angling for the disabled (for example through increased provision of wheelchair access and car parks).
- 3.7** We welcome these initiatives, which we would like to see expanded. They are fully consistent with the objectives we recommend for Government involvement in the management of fisheries, and so should be publicly funded – we can see no justification for funding activities of this kind from income from rod licence duties.

The Environment Agency should expand its efforts to develop fisheries and promote angling in urban areas, to improve access to angling for the disabled and to promote angling among young people. Government should provide additional funding for these purposes. (Recommendation 10)

- 3.8** We are not suggesting that all work in these areas should be funded through Government Grant-in-Aid to the Environment Agency. There are many other organisations active in urban regeneration and working with young people, and the Environment Agency should work with such organisations to ensure that fisheries and angling are taken into account in the plans they develop. Many children and young people are interested in invertebrates and plant life in and around water as well as fish. Some angling training programmes bring in naturalists to ensure that every opportunity is taken to enthuse young people with a love of nature and help them to take responsibility for their own environment. We would encourage this.
- 3.9** At present anyone over the age of 12 who wishes to go fishing with a rod and line requires a rod licence. It was suggested to us that this was one of the factors that discouraged people from trying angling, and that it particularly served to discourage young people from taking

up the sport: in no other sport did a juvenile commit a criminal offence simply by participating without a licence. While we support the retention of rod licences, we agree that more needs to be done to encourage people, particularly teenagers, to become anglers.

- 3.10 One solution would be to introduce instructor licences, valid for a limited period, which would permit beginners under qualified instruction to fish without needing to hold an individual licence. Such a licence could be used to hold introductory angling courses or to encourage people to try angling during an activity holiday. We were pleased to note that tuition is becoming more readily available. There are a number of initiatives including STANIC registration for salmon and trout anglers, the WSTAA coaching scheme, and the new National Federation of Anglers' Education Scheme that has so far produced over 200 qualified coaching personnel. We would also support raising the minimum age for a rod licence to 16.

Instructor rod licences should be introduced to enable beginners to fish without having to hold an individual rod licence, and the minimum age at which a rod licence is required should be raised to 16. (Recommendation 11)

4 The development of angling

- 4.1 It was suggested to us that the development of angling would be assisted by a more co-ordinated approach by the leading angling organisations. The Moran Committee proposed that the Environment Agency should establish a committee, on which national fisheries and angling bodies should have a place, with which the Environment Agency could discuss fisheries problems and policies. The Moran Committee itself showed how diverse organisations can work together for the benefit of angling, and we see advantages in this approach. An independent anglers' consultative forum would provide the Environment Agency, and Government, with opportunities to sound out the main angling and fisheries organisations on the development of new policies not only on fisheries but also on wider issues, and would also encourage member organisations to co-ordinate their approach. Such a forum could also be of help to the Environment Agency and national conservation agencies by providing a valuable interface with angling organisations. It will be important, however, for any such forum to be seen to represent the views of ordinary anglers, and indeed it should be promoted and established by anglers themselves and not by Government. This latter point is important bearing in mind the failure of the National Anglers' Council, which was established with Government support. Any new body should be established by anglers for anglers.

We would encourage anglers and angling organisations in England and Wales to establish an anglers' consultative forum to give advice to the Environment Agency and Government on the development of policies concerning angling. (Recommendation 22)

- 4.2 Angling is also a competitive sport, and a great many anglers participate in fishing matches on a regular basis. We received a good deal of evidence suggesting that angling as a sport did not receive the recognition and funding it deserved from Sport England or the Sports Council for Wales, given the number of participants and the international success attained by English and Welsh anglers. While the promotion of angling as a competitive sport is outside our terms of reference, we believe that the two Sports Councils could do more to encourage angling as a widely enjoyed recreational sport and to promote angling excellence.

The Sports Councils in England and Wales should provide greater financial support for the encouragement of angling and the promotion of angling excellence. (Recommendation 23)

5 Angling and other recreational activities

- 5.1 Anglers inevitably interact with other users of water-based recreational facilities. Increased leisure time and disposable incomes over the past 40 years have resulted in substantially increased demand for leisure and most activities associated with water-based recreation have become more popular over this period. Although inland water space has increased through creation of flooded mineral workings and reservoirs, the availability of rivers and canals has been static. Overall, there has been increased competition for water space between users and greater concern from conservationists over the scale of the impact of recreational activities on the environment.
- 5.2 We received a considerable amount of evidence, both from angling organisations and from those representing other recreational activities, relating to this increased competition. The British Canoe Union, for example, argued for a public right of navigation on all navigable watercourses, which for canoes means a minimum depth of some 15 cms. The Inland Waterways Association stressed that canals were constructed for the purpose of navigation and went on to point out that intensive fishing activities, such as occurs during matches, can cause considerable problems for boaters and for walkers and, where permitted, cyclists using canal tow-paths. Angling interests, on the other hand, claimed that boaters often disregarded the rights of anglers and that navigation authorities and other recreation interests paid little regard to anglers' legitimate concerns. It was also claimed that British Waterways did not take adequate account of the interests of anglers although British Waterways said that they were addressing these.
- 5.3 Sport England, in its evidence to us, told us that it was its policy that everyone should have access to a range of activities based on natural resources within a reasonable distance of their home. For water based activities, the availability of water space was a crucial issue, and in its view a more equitable balance across different activities was needed. In this context Sport England argued that in revising fisheries legislation it was no longer appropriate to consider fisheries alone: legislation affecting fisheries should be an important element in encouraging the more equitable balance it was seeking. It was in favour of more effective management of different water based activities by space and time zoning, and wanted a legislative framework that would make this possible.
- 5.4 We are far from convinced that fisheries legislation is the appropriate vehicle to attempt to resolve conflicts between user groups. We note that there are no provisions in existing fisheries legislation that give anglers preferential rights of access. The ownership of fishing rights and private rights of access are long standing rights under English law. Any proposal to amend them would need to be considered in this wider context, not simply as a fisheries issue. Those bodies that wish to make water-based recreation more widely available need to take into account the legal rights of existing users such as anglers. Public funds should not be used to promote access to waterways at the expense of anglers.
- 5.5 The last point is of relevance for the Government's plans to legislate to permit access to parts of the countryside. If this were to include an unfettered right of access along all watercourses, fisheries interests, including those of anglers could be adversely affected. We would, therefore, wish to see any increased right of access to land along watercourses involve consideration of individual proposals on a case by case basis at the local level, with all those who have legal rights in relation to the land and watercourses in question fully consulted. The same should apply to any proposals to increase rights of navigation.

The Government should not legislate for unrestricted public access to land along watercourses or onto the water itself. If Government decides that there are circumstances in which it might wish to improve public access to such land and water, this should be considered locally on a case by case basis and there should be full consultation with all those who have legal rights. (Recommendation 192)

- 5.6 Other recreational activities can have an impact on the environment. We do not consider that angling should be singled out for regulation and do not think that the powers in Section 103(3) of the Environment Act 1995 should be used to restrict angling if other activities are not similarly restricted. There will be occasions when a particular angling practice may have an adverse impact on the environment – as was claimed to be the case with the use of lead shot and its impact on swans – and in such cases we agree that action should be taken to halt the practice in question. But in other cases, where the adverse impact is caused by excessive human activity rather than by a specific angling practice, any restrictions should be imposed under general environmental, not fisheries, legislation. In this connection we note that British Waterways is developing a research programme with the Environment Agency and the RSPB to consider the impact of recreational activities on waterway ecology. The results of this work may be important for the future regulation of such activities. It is also important to note that fisheries stocked artificially for angling purposes can benefit the environment by reducing the pressures on natural waters.
- 5.7 Some of the problems that anglers can cause for the environment are the result not of angling practices but of thoughtless behaviour. Anglers need to be aware of the impact that angling can have on the environment, and how best to reduce this. They should also be made aware of the consequences of practices such as discarding tackle and leaving litter. As well as damaging the environment, and creating hazards for wildlife, these practices tarnish the image of angling.
- 5.8 We agree that there is a need to educate anglers on these points. We noted that some angling organisations had produced codes of conduct and that the Environment Agency had published a simple leaflet addressing many of these points. We support the latter and suggest this could be distributed with every fishing licence.

Part IV – Fisheries regulations

Chapter 10

The regulation of fishing

1 Introduction

- 1.1 The regulation of fishing is at the core of current fisheries legislation. The 1975 Act contains rules for the conduct of lawful fisheries and prohibits unlawful methods of fishing. For lawful fisheries, rules cover both the time when fishing can take place and the methods that may be used. In the past, when fish caught were usually killed, such rules were needed to protect fish stocks from over exploitation. This remains the primary reason for regulating salmon and sea trout fisheries and eel net fisheries. For other fisheries, however, the position has changed.
- 1.2 In this chapter we look first at the prohibition of unlawful methods of fishing, and then at close seasons, focusing in particular on the arguments put to us for and against retaining a close season for angling for coarse fish. We then consider how lawful fishing for the different types of fish found in freshwater can best be regulated.

2 Unlawful fishing methods

- 2.1 The Salmon and Freshwater Fisheries Act 1975 expressly prohibits the use of a wide range of methods to take fish. Section 1, for example, forbids, among other things, the use of “an otter lath or jack, wire or snare, a crossline or setline, a spear, gaff, stroke-haul, snatch or other like instrument” for the purpose of taking or killing salmon, trout or freshwater fish. Other parts of the Act (Sections 3-7) prohibit the use of other methods or specific types of net. These provisions have remained in force without substantial modification since Victorian times and some of the terms used are not readily comprehensible nowadays. More seriously, the list of prohibited items is not exhaustive, and the Environment Agency told us that there have been occasions when poachers have used methods other than those listed in the Act. In such circumstances the Environment Agency’s only recourse is to try to prosecute those concerned for using an unlicensed instrument under Section 27 of the Act. There is, however, some uncertainty as to whether Section 27 can be used with regard to an instrument that is not capable of being licensed. We believe that it would simplify matters and make the law easier to enforce if the prohibition of unlawful methods was broadened and all these various provisions were consolidated.

New fisheries legislation should prohibit the use of any instrument or device other than rod and line for the taking of any fish in freshwater unless its use is authorised by the Environment Agency.

Licensing would be a form of authorisation. It should also be an offence to possess any unauthorised instrument or device with the intention of using it to take fish. (Recommendation 96)

- 2.2 The 1975 Act contains other provisions intended to protect fish from undesirable practices. Section 2 prohibits the use of any fish roe, or buying, selling or possessing any salmon or trout roe, for the purpose of taking salmon, trout or freshwater fish. We understand that there is an illegal market for preparations of salmon roe as a bait for salmon and sea trout and that any relaxation of the prohibition on the use of this could encourage the killing of gravid salmon to obtain roe. We see no need, however, to retain the ban on the use of roe of other fish species; we understand that baits containing roe are commercially available, and we would like to legitimise the use of these.

It should no longer be illegal to use roe, other than that of any salmonid fish, as a bait, but the use, sale, purchase or possession of the roe of any salmonid fish for the purpose of taking salmon, trout or freshwater fish should be prohibited. (Recommendation 97)

- 2.3 The same section also prohibits knowingly taking, killing or injuring any “unclean or immature” salmon, trout or freshwater fish. ‘Unclean’ is defined as being a fish that is about to spawn or has recently spawned and has not recovered from spawning. The term ‘immature’ is defined in the Act only for salmon, where it refers to a fish of less than twelve inches in length. However, local byelaws prohibit the killing of trout below certain sizes in some parts of the country. While we can see merit in retaining a general prohibition on the killing of parr and smolts, for other species we believe that this is something best left to byelaws. Although there are difficulties in prosecuting for taking gravid fish (which would be reduced by a clearer definition of the term ‘unclean’), we would wish to retain the ban on taking or killing gravid salmon and sea trout and kelts; however, we doubt that a more general prohibition on taking or killing gravid fish serves any useful purpose now that coarse fish are almost invariably returned alive. Retaining this ban on coarse fish would also run counter to our approach on close seasons.

The current protection for salmon parr, salmon and sea trout smolts, gravid salmon and sea trout, and salmon and sea trout kelts should be retained. Any measures needed to protect undersized and gravid fish of other species should be implemented through byelaws. (Recommendation 98)

3 Close seasons for angling

The present legislation

- 3.1 Close seasons on angling for salmon have long been included in salmon fisheries legislation¹⁴ and powers to impose a close season on angling for coarse fish were introduced in the Freshwater Fisheries Act of 1878. At that time it was customary for anglers to kill fish they caught, and the rationale behind the introduction of close seasons was clear: to protect fish when they were spawning. Circumstances have changed considerably since then. Angling is now a recreational pursuit and coarse anglers almost invariably return alive the fish they catch; the catch no longer provides a valuable supplement to the table. Even in salmon and sea trout fisheries, increasing numbers of fish are released. At the same time, other recreational pressures on the freshwater environment have increased, alongside a growing recognition of Society’s responsibilities for

¹⁴ (close seasons for salmon net fisheries are dealt with in Section 10)

environmental stewardship. This has led some people to place increased value on the role the close season plays in reducing possible pressure from anglers on other forms of wildlife.

- 3.2** Current provisions on close seasons are set out in Schedule 1 to the Salmon and Freshwater Fisheries Act 1975. This places a duty on the Environment Agency to impose annual close seasons for salmon, sea trout and brown trout. The close season for fishing with rod and line for salmon must have a minimum duration of 92 days and for trout of 153 days, and, if byelaws do not specify otherwise, it runs for salmon between 31 October and the following 1 February and for trout between 30 September and the following 1 March. For freshwater fish, eels and rainbow trout, but not brown trout, the Environment Agency has the power to dispense with a close season altogether. However, if a close season is imposed for freshwater fish or rainbow trout, it must have a minimum duration of 93 days. The close season for freshwater fish runs from 15 March to 15 June inclusive unless alternative dates are set by byelaw. There is a specific provision for byelaws authorising angling for eels at any time of the year.
- 3.3** In 1989, the NRA inherited different close seasons for coarse fish from the former water authorities; over most of the country the close season applied to all waters, in the north of England there was a close season on rivers and streams but not stillwaters or canals, and in Devon and Cornwall and parts of North Wales there was no close season at all. In these circumstances, the NRA proposed a uniform close season on all rivers, streams and canals and to dispense with the close season on all lakes, ponds and reservoirs. These proposed changes were subsequently agreed in February 1995 subject to certain modifications. The principle modifications were:
- to retain the close season on lakes, ponds and reservoirs situated in certain SSSIs; and
 - to retain the status quo for canals, so that no close season was introduced on canals which did not then have one.
- 3.4** In March 1997, the Environment Agency introduced a national byelaw dispensing with the close season for rainbow trout in all stillwaters.

The role of the close season

- 3.5** In formulating our recommendations on the use of close seasons, we have looked at the possible roles that close seasons can play, both in the management of fisheries and in the more general protection of the environment.
- 3.6** In fisheries terms, the effect of a close season is to halt angling effort by closing a fishery for a period of time. Close seasons are thus one of a range of measures that can be used to reduce angling effort and so protect fish stocks, and need to be seen in this context rather than in isolation. Halting angling effort may also have other environmental benefits, but here the benefits of reducing pressure from anglers on sensitive environments needs to be considered in the light of the other pressures on those environments: restricting access by anglers is of little value if there are greater pressures on the environment from other users whose access remains unrestricted. It is important to note that imposition of a close season could have an effect on stock selection through over-exploitation of one stock component; a possible illustration is given in paragraph 8.10.
- 3.7** In the course of receiving evidence, we were advised of several situations where imposition of a close season might be an appropriate fisheries management measure:

- fish may be vulnerable at spawning time, particularly if they congregate to spawn and behavioral changes make it easier to catch them although it was also suggested to us that in most cases spawning fish did not feed and were thus difficult to catch. It was suggested that releasing fish did not necessarily resolve this problem because gravid fish are particularly susceptible to damage from handling, which could reduce their chances of survival or of spawning successfully; and that even if fish were not caught, disturbance by anglers would have an adverse effect on spawning;
- where there was a need to reduce exploitation of particular fish stocks, particularly in fisheries where the fish were usually killed, close seasons were a useful way of reducing angling effort.

- 3.8 We concluded that these are both valid roles for a close season. However, in relation to coarse fish it was put to us that there was no scientific evidence to support the claim that they were particularly vulnerable at spawning time or that angling during spawning caused damage to fish stocks or individual fish. It was pointed out that the lack of such evidence had led to the lifting of the close season on enclosed waters; while it still remained on some canals there was no evidence that the lack of an close season on others was having any adverse effect for fish. It was also pointed out that most other countries, including Ireland, did not have a close season for coarse fish. Again, we were told that there were no apparent adverse effects.
- 3.9 Evidence was put to us concerning the wider environmental benefits of the coarse fish close season. It was argued that this was broadly coincident with the breeding season for other types of wildlife, notably riverine and aquatic birds, and it was suggested that the close season benefited these species by limiting disturbance while they were breeding. However, we were unable to obtain any conclusive evidence on this point. Work undertaken by the British Trust for Ornithology¹⁵ on behalf of the Environment Agency showed no adverse effect on breeding bird numbers in the absence of a close season, although the authors of the report emphasised that the results did not in themselves prove that there were no adverse effects on breeding success. There is some limited evidence that the presence of anglers on still waters may reduce bird breeding success, but we are not aware of any dedicated study of the relationship between close seasons and breeding success for rivers or canals. Furthermore, it was pointed out to us that the close season for coarse fish coincides with the open season for game fishing: in many waters, only a total ban on fishing could have the effect desired by some conservationists.
- 3.10 It is also claimed that the imposition of a close season during the spring allows bankside vegetation to recover from the damage inflicted on it by anglers over the rest of the year, and that this is particularly valuable at a time when many plants are flowering and growth is at its maximum. Against this, anglers' representatives argued that the close season increased the burden of bankside maintenance by increasing the efforts needed to open up angling pegs when the season opened, and that the presence of anglers throughout the year would reduce the environmental impacts of maintenance. Anglers' representatives suggested that the steady level of human presence throughout the year caused less disturbance to wildlife than a sudden influx of anglers at the opening of the season and that the presence of anglers provided a "neighbourhood watch" function whereby any problems – such as pollution incidents – were readily detected and illegal activities discouraged.

¹⁵ BTO Research Report 211, November 1998 "A comparison of breeding bird numbers along canals with and without a close season of fishing"

- 3.11** Those in favour of the abolition of the coarse fish close season, in part or totally, also drew our attention to a number of social factors. In parts of the country there is concern that numbers of anglers are going down; there are particular worries about the low number of young people taking up the sport. It was suggested to us that removal of the close season should be one factor in addressing this decline. It was also pointed out to us that the current trend of improving public access to the countryside does not sit well with claims that a close season for angling is necessary to protect wildlife. The contradiction between these two policies was drawn into even sharper relief by the observations that angling, unlike other rural pursuits, can be undertaken only upon payment of a licence fee. We were asked whether it was fair that those who pay into public coffers for their sport should be the most restricted in exercising it.

Recommendations for change

- 3.12** Having considered all these various arguments, we conclude that close seasons can serve a useful function, but that the present legislative provisions are unnecessarily complicated.

The present statutory provisions on close seasons should be replaced by a power to impose close seasons either by Order or by byelaw. (Recommendation 99)

- 3.13** We also concluded that the need to conserve fish stocks should be the primary reason for imposing a close season, and that this should be assessed on the basis of the best available scientific information.

The power to impose a close season for angling should be exercised where evidence shows that there are serious risks of damage to fish stocks which can be addressed by this means. (Recommendation 24)

- 3.14** In our view, the application of this recommendation should lead to the retention of close seasons for salmon, sea trout and wild brown trout. For these fish, close seasons serve a useful purpose in reducing exploitation. Moreover, these species are vulnerable to disturbance when spawning, and angling at this time could lead to disturbance of spawning gravel and damage to redds.
- 3.15** For stocked brown trout and rainbow trout in still waters we do not think that there will normally be a case for a close season. On rivers much will depend on the level of stocking and on whether or not there is also a naturally breeding brown trout population. There may also be a case for a close season for grayling.
- 3.16** For coarse fish, we do not consider there is a case for reimposing the close season on still waters. From the evidence before us, we have also concluded that there is no justification for a general close season on canals. There may be particular instances where a close season is necessary, for example, where a canal is an SSSI because of its fish fauna, but these are likely to be uncommon.
- 3.17** Evidence in relation to coarse fish in rivers is less conclusive. This is partly because of the greater variety of types of river in comparison with types of canal and partly because it has not been possible to make proper comparison between rivers with and without a close season. Nevertheless, we were still struck with the lack of evidence in support of a close season for the conservation of coarse fish. As with canals, we think that there will be relatively few situations in which a close season will be beneficial. In most cases it is probable that there will be no clear scientific evidence about the consequences of lifting a close season; we conclude in such cases a close season should not be retained automatically on a precautionary basis. Instead, we suggest that a risk assessment should be carried out

based on the best available information, and that a close season should be imposed only where it is concluded that any detriment that might result from its absence could not be reversed by its subsequent introduction. It is implicit in the suggestion that there should be a proper monitoring regime.

- 3.18 In determining the timing and period of the close season, the Environment Agency should also consider the interests of fishing communities and other socio-economic factors. It should also, as at present, take into account the need to further conservation more generally. We consider that these requirements are useful refinements of the Environment Agency's powers. However, we do not think there is justification for imposing close seasons solely because of their wider conservation benefits.
- 3.19 Freshwater habitats, including canal and river banks, are important components of the country's biodiversity. Because of the inherent fragility of freshwater habitats, wildlife will be vulnerable to excessive human interference. Potential environmental problems include damage to habitat through trampling, water pollution and disturbance to animals, especially during the breeding season. Any recreational activity that involves visiting a freshwater site could, in theory, have an adverse impact.
- 3.20 For this reason restrictions on access might provide environmental benefits in the form of a reduction in disturbance to wildlife during the breeding season by providing a period of time for natural, unassisted habitat restoration. However, we have not seen any conclusive scientific evidence to justify a general presumption in favour of a close season for angling on these grounds.
- 3.21 Moreover, the benefits outlined here will materialise only if access to freshwater habitats by other users is also restricted, and for this reason we do not think it right to single out anglers for control. It seems to us that it is the availability of a legal mechanism for imposing a fisheries close season that has led to arguments for using this mechanism to restrict anglers' access to various habitats. If it is necessary to prevent access to a water body for wildlife conservation reasons, the restrictions should apply to all recreational users (including game anglers) and not just to coarse anglers. Moreover, such restrictions should be provided for in general environmental legislation and not fall, by default, to fisheries law.

If any powers are considered necessary to control access to freshwater habitats for conservation purposes they should be contained in general environmental legislation. (Recommendation 100)

- 3.22 Ideally all the changes we are recommending would be introduced at the same time, following the adoption of new primary legislation. However, we consider that in most cases the existing byelaw-making powers could be used to achieve the same practical results. Given the anomalies that exist in the application of the current arrangements to canals, we suggest that action here should have priority and that the coarse fish close seasons on canals should be removed as soon as possible. The case for lifting the close season on rivers is less clear cut and may prove more controversial and we realise it may not be possible to proceed here as quickly.

Byelaws should be introduced to abolish the close season for coarse fish on canals and rivers except where its retention is necessary to avert serious risk of damage to fish stocks. (Recommendation 25)

- 3.23 Pending any environmental legislation to control access to freshwater habitats, we believe that Section 7 of the Environment Act 1995, which requires the Minister and the Environment Agency to exercise their powers so as to further conservation, provides sufficient safeguard to prevent the removal of the close season under this recommendation

where there are grounds for retaining it for wider conservation purposes, for example, where there is a protected area designation for features other than the fish fauna.

4 Coarse fish

- 4.1 Coarse fish are nowadays almost invariably returned to the water alive; existing rules on angling for these species are thus not intended to limit exploitation. Their principle purpose is to reduce the possible impact of angling on fish and fish stocks: for example, use of unsuitable landing and keep nets and leaving rods unattended could harm fish and cause mortalities. For this reason regulating fishing for coarse fish is less complicated than for those species which are frequently killed (with the exception of the close season, which is dealt with in the preceding section) and can be dealt with succinctly. Most of the problems that face coarse fish are not caused by anglers, and are covered in other chapters of our report.
- 4.2 In none of the evidence submitted to us was it argued that regulation of angling for coarse fish is no longer necessary. We conclude that there is general support for rules on angling for coarse fish, even in fisheries where fish are not killed. We note that at present these rules are contained in a mixture of general and local Environment Agency byelaws; in some cases different rules apply, for no obvious reason, in different parts of the country. The Environment Agency is in the process of harmonising the local byelaws by replacing them with general ones; while we recognise that this will not always be appropriate and that in some circumstances local conditions require local rules, in most cases we believe that anglers will find it helpful if the same rule applies wherever they fish.
- 4.3 We did discuss whether byelaws are the most appropriate mechanism for introducing rules on angling, or whether it would be better to leave these to voluntary codes of practice. We conclude that there is, indeed, a case for legally binding regulations in the form of byelaws; however, these need to be straightforward and enforceable, and in some cases could usefully be complemented by codes of practice. For example, frequent capture and release of individual large specimen fish may harm the fish and weaken this component of a particular stock. This is not a problem which we believe can be addressed by byelaws, but a Code of Practice backed up by action by fisheries managers at the local level could well be appropriate.

There should be a framework of common rules on angling for coarse fish in England and Wales, implemented by means of byelaws. These need to be straightforward and enforceable, and if necessary they should be complemented by Codes of Practice, agreed with the relevant angling organisations. Local byelaws should be used to deal with local problems. (Recommendation 26)

5 Trout

- 5.1 Fisheries for non-migratory trout can take a variety of forms. At one end of the spectrum are stillwater trout fisheries stocked with rainbow trout, while at the other are wild brown trout fisheries on isolated upper reaches of upland rivers.

Stillwater and stocked trout

- 5.2 Fishing for stillwater trout is by far the most common type of game angling in England and Wales. The Environment Agency told us that stillwater trout fisheries provide fishing for some 300,000 trout anglers and that at least 700 commercial stillwater trout fisheries had been created over the last 25 years. These fisheries are reliant on stocking with both

rainbow and brown trout, and the trout rearing industry provides around 4,000 tonnes of trout a year, some 30% of total farmed trout production in England and Wales. A number of river fisheries, including famous chalk stream ones, are also largely reliant on stocking. Overall, commercial trout fisheries provide substantial employment opportunities, both in running the fisheries and in fish farms, as well as recreational opportunities for anglers.

- 5.3 In these fisheries the regulation of angling is not intended to protect the stocks from over exploitation but to allow reasonable allocation of the catch. Stock levels are maintained by stocking, and the bag limits that many fishery owners impose are intended not for conservation purposes but to provide a satisfactory level of sport and to ensure a satisfactory return on their financial investment (the issues raised by stocking are dealt with in Chapter 11). Angling practices are governed by local codes of practice and rules imposed by the owner or by the club, and byelaws regulating angling are of limited relevance.

Wild brown trout

- 5.4 Wild brown trout are highly prized by anglers and are of high conservation value. In Chapter 5 we discuss the status of wild brown trout stocks in England and Wales. Conserving these stocks will require action to protect their habitats and to prevent stocking with trout of different origins. Over-exploitation can, of course, also threaten naturally breeding trout stocks, and limits may well be needed on the number and size of trout that can be killed. While in many cases fisheries owners will be ready to impose such limits, the Environment Agency should be prepared where appropriate to use local byelaws to control exploitation of naturally breeding brown trout stocks.
- 5.5 Byelaws may be particularly valuable where resident brown trout and sea trout form a single breeding stock. In these circumstances brown and sea trout need to be managed together, and brown trout should be covered in the expanded Salmon Action Plan we recommend in paragraph 12.7 below.

6 Eels

Eel stocks

- 6.1 Details of the life-cycle of eels are covered in Chapter 5. Eels are caught as elvers and, as yellows and silvers, by anglers and in commercial net fisheries. Most anglers release the eels they catch, and angling is not a significant source of eel mortality. However, elvers and eels caught in commercial nets are removed from the fishery and, as in other fisheries in which fish are killed, there is a need to regulate exploitation.
- 6.2 Regulation of elver and eel fisheries is made more difficult by the fact that there is a single European stock; this means that regulating eel fisheries on individual rivers may have little, if any, impact on recruitment: indeed, even at the European level the relationship between exploitation, adult survival and recruitment is not known. Nevertheless, there is strong evidence that eel numbers are declining.
- 6.3 ICES¹⁶ has advised that eels stocks are outside safe biological limits and that the current fishery in Europe is not sustainable. Although the data are limited, ICES has concluded that fishing mortality is probably high both on juvenile and older eels and they noted that

¹⁶ ICES/ACFM response to request for advice by EC on European Eel, Nov 1999

catches and other indices of abundance have declined in nearly all catchments in recent decades. ICES has therefore recommended that ‘a recovery plan should be implemented for the eel stock and that the fishing mortality be reduced to the lowest possible level until such a plan is agreed upon and implemented.’

- 6.4 To be effective, action to reduce exploitation needs to be undertaken on a European basis. We understand that the European Commission has held initial discussions on what measures are needed in the European Union to conserve the eel stock, and it will now be considering how to take matters forward in the light of ICES advice.

Measures to reduce exploitation of eels at all stages in their life-cycle and to develop a stock recovery plan as part of a wider European Management Programme should be pursued urgently as a matter of priority. (Recommendation 28)

Regulation of eel fisheries in England and Wales

- 6.5 In the Salmon and Freshwater Fisheries Act 1975 eels are dealt with as a separate category of fish and are not automatically covered by provisions dealing with salmon, trout and freshwater fish. As a result, the level of protection afforded to eels is in some respects inadequate. For example, eels are not covered by the provisions of Section 1 of the Act, which prohibits the use of a wide range of methods to take or kill salmon, trout or freshwater fish. We would like to see this changed.

In future legislation, eels should be treated in the same way as other fish except where special provisions are needed. (Recommendation 101)

- 6.6 The Environment Agency has a duty to maintain, improve and develop eel fisheries and is required to regulate fishing for eels by a system of licensing, unless it is excused from this by the Minister. The Minister has exercised these powers, at the request of the Environment Agency, to excuse it from licensing fishing for eels by rod and line in defined tidal waters, and from licensing nets in coastal waters in the Anglian region.
- 6.7 The Environment Agency’s powers to regulate eel fisheries extend to the six mile limit, but in practice it does not often exercise them in coastal waters; as noted above it is formally excused from doing so in Anglia. The legislation does not define “eel” (except insofar as to make it clear that it also covers elvers), so there is scope for confusion as to whether fishing for conger eels is covered by provisions on eel fisheries. We would like to see this confusion resolved, and eel fisheries properly regulated in coastal waters.

*In future freshwater fisheries legislation the word “eel” should be restricted to the genus *Anguilla* and the Environment Agency should regulate fishing for eels in all waters within its jurisdiction. (Recommendation 102)*

- 6.8 We were told that there are a number of weaknesses in the current legislation for the regulation of fishing for eels. It is currently not possible to limit the number of eel net licences issued: the Environment Agency is obliged to issue them on demand. In our view it is important to be able to limit the size of eel net fisheries.

New legislation should contain the necessary powers to limit numbers of eel nets, traps and other devices used for catching eels in specified areas. (Recommendation 103)

- 6.9 A major weakness in the management of eel net fisheries is the lack of adequate data on catches. The Environment Agency is seeking confirmation of a byelaw requiring all licence holders to make catch returns, but we doubt whether this on its own will be enough to

overcome the long tradition of secrecy among eel netmen and provide the Environment Agency with accurate information on catches, particularly of elvers. In this situation, the Environment Agency needs to consider how to improve catch data.

The Environment Agency should consider as a matter of urgency ways of improving information on catches of eels and elvers. (Recommendation 29)

- 6.10** One solution would be to require all sales to be made through licensed dealers, who would be obliged to furnish accurate statistics on deliveries to them.

Government should explore the practicalities of introducing a legal requirement for all sales of eels and elvers to be made to licensed dealers and, if such a requirement is feasible, introduce the necessary legislation. (Recommendation 104)

Elvers

- 6.11** Elvers are caught in many estuaries in UK and Europe and are sold for human consumption, on-growing in farms and stocking into waters with depleted populations. In a few cases eels are ranched, with the intention of recapturing all the surviving adult eels. High demand for elvers, particularly in the Far East, has pushed prices to extraordinary levels in some recent years: we were told that they had reached over £250 per kg, although they have fallen back to £35 per kg in 1999. High prices have led to a virtually uncontrolled expansion of fishing for elvers in some estuaries: while a licence is needed to use an elver dip net, these are not expensive (the price ranges from £11 to £33) and are issued on demand. In 1997 the Environment Agency issued some 2000 licences to fish for elvers, and we were given an estimate for current catch levels of around 10 tonnes – or 30 million elvers.
- 6.12** We were told that regulation of elver fisheries was extremely difficult, with rivalries between elver netmen, trespassing and illegal activities creating an atmosphere of lawlessness and making it impossible to establish the size of catches. Despite the lack of detailed information, there is good evidence from a number of major elver fisheries throughout Europe of a long-term decline in elver recruitment (Chapter 5) and in 1998 elver catches were reported to be down by 60 per cent on the previous year and to be the lowest ever recorded.
- 6.13** Given the current state of knowledge it is not possible to establish whether uncontrolled elver fishing poses a threat to eel stocks generally. However, sustained excessive exploitation of elvers in particular estuaries will undoubtedly lead to a decline in eel numbers in those river catchments. This is not just of concern to anglers and eel netmen: eels, as predators and scavengers, are a key part of the ecosystem and are themselves an important component of the diet of such predators as otters and herons. In addition, elvers provide a significant source of food for many other species in the spring, at a time when demands of the breeding season are at their height. For these reasons, we consider that it is essential to improve control of elver fisheries and introduce measures to reduce exploitation in certain estuaries.
- 6.14** Given the uncertain state of our knowledge about elver and eel stocks, it would in our view be a sensible precaution to prevent development of elver fisheries in estuaries where fishing for elvers is not currently practised. We understand that the Environment Agency is currently considering introducing a measure along these lines. In existing elver fisheries the Environment Agency should explore ways of reducing exploitation by, for example,

periodically closing the fisheries in line with the advice from ICES which we endorse in paragraph 6.4 above.

A ban on fishing for elvers, other than in rivers and estuaries where it is currently practised, should be introduced as rapidly as possible. (Recommendation 30)

- 6.15** We have already recommended the introduction of new powers to limit numbers of net licences. When this power is available it should be used to limit the number of elver nets that are licensed in each elver fishery.

Adult eel net and trap fisheries

- 6.16** Commercial eel fisheries exploit both yellow eels and migrating silver eels. These fisheries offer significant seasonal and supplementary or part time income to about 300 fishermen, and the current annual catch in England and Wales is estimated at about 150 tonnes with a first sale value of about £600,000. Fishing is predominantly by fyke nets; in 1997 the Environment Agency issued licences for some 3,600 of these, together with licences for some 1,000 other small traps, 10 trawls and 34 fixed traps.
- 6.17** The measures we have already recommended should improve both management and control of these fisheries. As most freshwater eel net fisheries target resident populations, effort controls, over and above limits on the number of nets used, are unlikely to prove effective. However, where nets or traps target migratory silver eels consideration should be given to measures such as close times. We are also concerned that as eels stocks decline there may be increasing pressures to take smaller individuals; this could be prevented by introducing a minimum landing size in the fishery. Similarly, it may become necessary to protect the larger, female eels, which remain in freshwater for longer than the males and are therefore more vulnerable to the fisheries, by also imposing a maximum size limit. With both these measures in force, eels could be retained only if they were between the minimum and maximum size limits.

Consideration should be given to imposing minimum and maximum size limits for eels taken and retained in net and trap fisheries. (Recommendation 31)

- 6.18** As with the elver fishery, enforcement of existing regulations is difficult. One change that we think might improve control of the fishery would be to issue licences to individuals, with each licence stating how many nets, and of what type, the licence holder was entitled to use. The limitation on the number of nets we are recommending above will also need to apply to individuals and, as with salmon, the regulator will need powers of selection.
- 6.19** We were told that by-catches of other freshwater fish were a problem in some areas. The Environment Agency has introduced byelaws to try to minimise these and to ensure that any fish caught are released unharmed, but it is essential that these rules are consistently applied and enforced. The design and placing of fyke nets are two of the factors that are likely to contribute to this problem.

The Environment Agency should review all the factors likely to lead to by-catches in eel net and trap fisheries of other fish, with a view to providing consistent guidance on how by-catches can be reduced to the minimum. This should then be used to develop rules on the design of fyke nets, and the locations in which they are used, that can be enforced through byelaws and conditions on net licences. (Recommendation 32)

- 6.20 Fyke nets can also prove highly dangerous to otters. We were, therefore, pleased to learn that the Environment Agency has applied for the introduction of a byelaw requiring otter guards to be fitted to all fyke nets and eel traps; we fully support this initiative.

7 Salmon: the key issues

- 7.1 The objective of regulating the exploitation of salmon is to ensure that sufficient numbers survive to spawn; if exploitation is permitted to increase too much, stocks will collapse. We agreed that there were four key issues to be decided on regulating exploitation:

- how to determine an acceptable level of exploitation;
- how to deal with mixed stock fisheries;
- how to control exploitation to ensure that the agreed level is not exceeded;
- how to allocate the salmon resource between different interests.

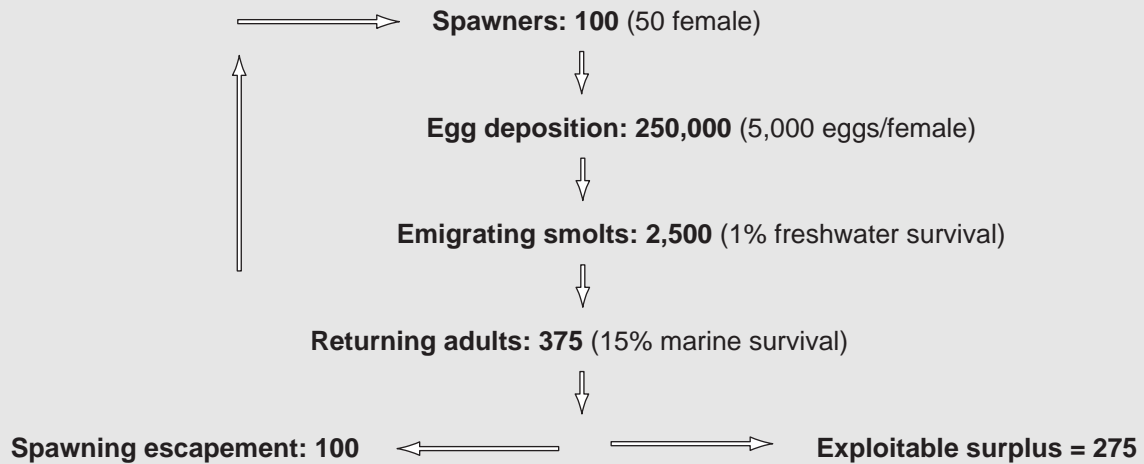
8 Determining an acceptable level of exploitation for salmon

Conservation Limits

- 8.1 For a salmon population to remain stable, the number of offspring that survive to spawn as adults must, averaged over a number of years, equate to the spawning stock which produced them. In practice, the number of fish that return to the river in any one year will normally be much greater than this, and the surplus can therefore be exploited without reducing the population. A hypothetical example is shown in Box 6. Thus if the population is exploited at a steady rate it will reach an equilibrium size, although there may be considerable variation from year to year. If the exploitation rate is very low, the equilibrium stock size should be close to that dictated by the maximum number of juveniles that the river can support (its natural carrying capacity). If the exploitation is maintained at a higher rate the stock will reach equilibrium at a smaller size; in such circumstances the stock size will be limited by the number of spawners and not by the available space in the river for juveniles. If the exploitation rate is increased still further it will eventually reach a critical level which cannot be sustained, and the stock will collapse. If other factors do not change, it is therefore the level of exploitation which determines the average size of the stock over a period of years. Thus, in order to determine the acceptable level of exploitation, managers must first define the spawning stock size that they wish to maintain for conservation or other management purposes.

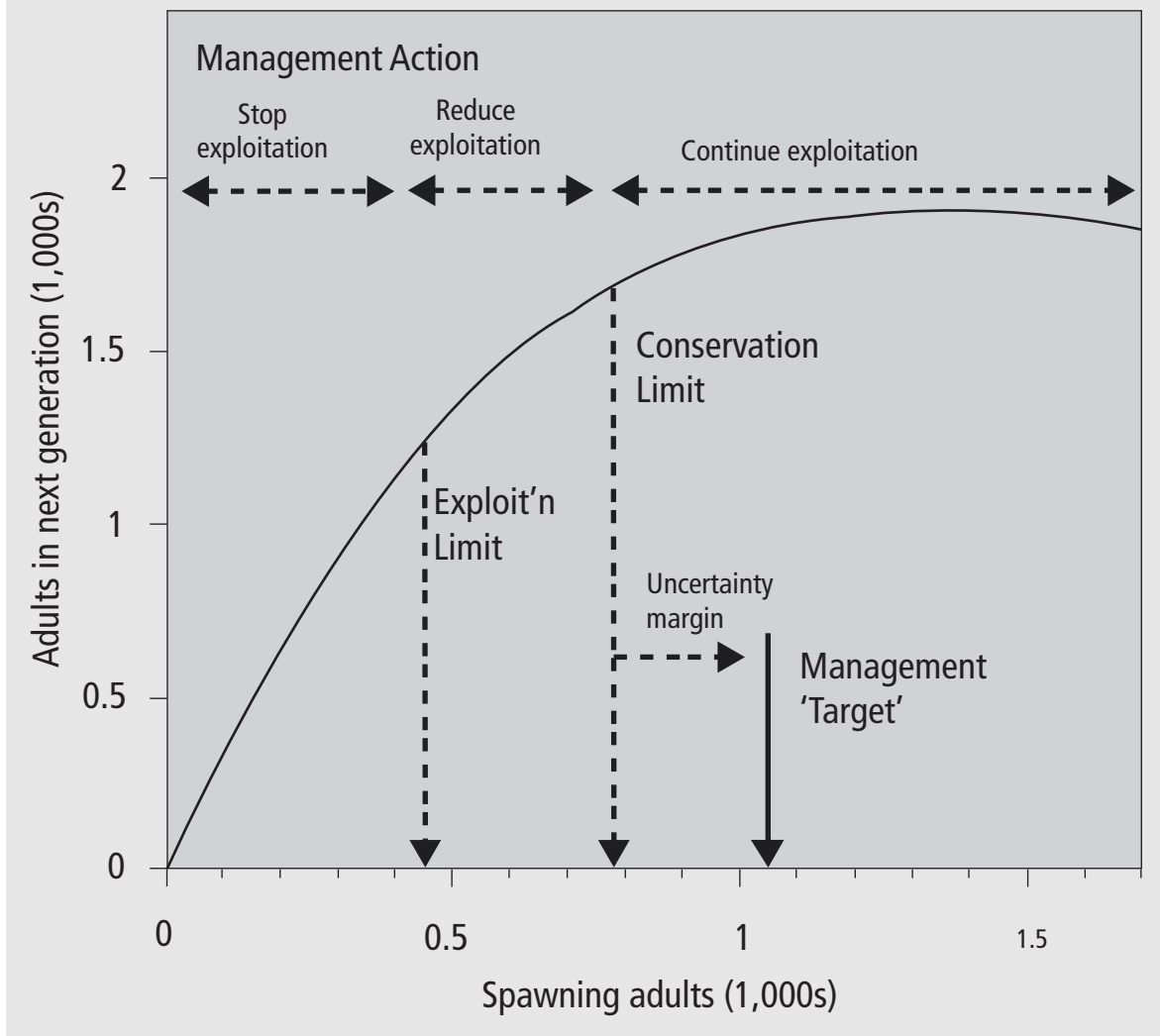
Box 6

Hypothetical example of the numbers of individuals in a salmon population at different stages in the life-cycle; the survival rates given will not be typical of all populations



- 8.2 ICES and NASCO have proposed that a minimum spawning stock size should be defined for each river in order to ensure the conservation of salmon stocks. These 'conservation limits' are therefore threshold levels below which the spawning stock should not be permitted to fall. Salmon runs can be very variable and so it is not possible to guarantee that stocks will always remain above their conservation limits. Failure to exceed conservation limits in a single year may not mean that there is a problem. Similarly, exceeding conservation limits does not mean that there is not a problem, but if conservation limits are to be effective there must be a high probability of their being exceeded. Exploitation should therefore be controlled to ensure that there is a high probability that the spawning escapement exceeds the conservation limit each year. The principles of this management approach are summarised in Box 7 and explained in more detail in Appendix 1 to this chapter.

Box 7 Salmon management reference points:



- 8.3 This ICES/NASCO approach has been endorsed by Ministers in a formal Direction to the Environment Agency. The Environment Agency is therefore setting conservation limits for all the main salmon rivers in England and Wales. We note that some confusion has been caused by the fact that the Environment Agency refers to these conservation limits as 'spawning targets', giving the impression that this was the stock size that they were aiming 'at' rather than a level that they wished to exceed. However, this is clearly not the case because their compliance procedures for meeting conservation limits are designed to ensure that the spawning escapement for any stock will be above the conservation limit in at least four years out of five.
- 8.4 We have heard concerns about the principles adopted by the Environment Agency for establishing conservation limits. The Environment Agency has followed the advice of ICES and NASCO in setting the conservation limit at the stock size known as the "maximum gain point". This is the stock size at which the catch can be maximised – provided that the stock is maintained at this size. If, however, the stock falls below the maximum gain point, the number of returning fish and catches will decline rapidly. For this reason, and given the variability in salmon runs, the use of a maximum gain point as a target level for a stock is not the optimal strategy. However, as we point out above, the conservation limits recommended by ICES, and adopted by the Environment Agency, are not target levels. A

- conservation limit is the minimum threshold level below which a stock should not be permitted to fall. In practice, if conservation limits are to be met, stocks will need to be maintained at a level higher than the maximum gain point, closer to the level which gives maximum smolt production.
- 8.5** Some of the criticism we received of the Environment Agency's approach seems to be based on the misapprehension that setting conservation limits at the maximum gain point implies that the stock will be managed to maximise catches, which would tend to favour net fisheries; rod fisheries would be better served by a lower exploitation rate at a large stock size. But as we point out above, this is not the case and it is Government and Environment Agency policy to seek to maintain salmon stocks at a level above the maximum gain point. In addition, the stock level at which a conservation limit is set does not in itself have any implications for the allocation of the resource between rods and nets; this will be determined by the regulatory measures imposed on these fisheries. (Allocation of the resource is discussed in Section 11 below).
- 8.6** We have also received evidence suggesting that the Environment Agency's conservation limits are currently too uncertain to be used in the management of salmon fisheries. We recognise the difficulties in setting conservation limits for individual rivers and determining whether they are met. The relationship between the number of spawning fish in one generation and the number of adults produced in the next generation is complex. Fisheries scientists have well-established mathematical methods for describing this relationship for any particular stock, but the procedure depends upon collecting data over many generations of the fish. For example, it has been necessary to operate trapping facilities on the River Bush (Northern Ireland) for more than 20 years to begin to understand the relationship for that particular river stock. It is clearly not practicable to collect such data for many stocks, and managers must therefore rely upon the best available information.
- 8.7** The Environment Agency has developed methods to adjust the estimated conservation limit for the River Bush to other rivers by taking account of some of the differences between the rivers (for example, river size and altitude), but further work is required to take account of other factors. For example, if there is also a stock of sea trout in the river, the juvenile trout may compete with the young salmon for food and space and thus reduce the potential size of the salmon stock. The presence of sea trout could therefore lead to unrealistically high conservation limits for salmon if this is not taken into account in the assessment.
- 8.8** We conclude, therefore, that the credibility of conservation limits is highly dependent upon the reliability of the data and the rigour of the supporting analysis. Accordingly, the process of setting and using conservation limits needs to take account of the deficiencies in the data and must be subject to continuing review. We agree that for practical purposes conservation limits need to be set on a river catchment basis; however, tributaries in large catchments may have their own distinct sub-stocks, and the Environment Agency needs to be aware that catchment conservation limits could disguise problems with particular sub-stocks and should be ready to take remedial action.
- 8.9** Despite all the difficulties and reservations we outline above, we conclude that conservation limits represent the best practicable way of using scientific principles to ensure that exploitation of salmon stocks in individual rivers does not exceed acceptable levels. However, we believe that it would assist in the implementation of this approach if the Environment Agency also provided estimates of the higher 'target' stock size that it considers it necessary to aim at in order to achieve their objective of exceeding the conservation limit in four years out of five. We also note that since exploitation may be

permitted to continue even when the stock size falls below the conservation limit, consideration should be given to setting a further lower limit below which no exploitation would be permitted.

Conservation limits for salmon should continue to be used to define thresholds below which the number of spawning salmon in each river should not be permitted to fall. To be acceptable, conservation limits must be realistic and credible and should be subject to continued review and development and be updated as necessary. The Environment Agency should provide estimates of the higher target stock sizes it will aim to achieve in order to ensure that conservation limits are met four years out of five, and should consider developing further lower limits below which no exploitation would be permitted. (Recommendation 34)

- 8.10** Salmon stocks in rivers usually comprise both grilse (one-sea-winter salmon) and multi-sea-winter salmon, and the age at which fish return is partly under genetic control. Over-exploitation of one stock component, particularly if other factors are also depressing it, could result in the permanent loss of some genetic characteristics. For example, excessive exploitation of multi-sea-winter fish could result in stocks becoming permanently dominated by grilse.
- 8.11** We noted that in England and Wales, as elsewhere in the North Atlantic, multi-sea-winter salmon are at historically low levels, and ICES is recommending that extreme caution should be exercised in the management of these stocks. In our view there can be little doubt that multi-sea-winter salmon stocks, and particularly stocks of spring salmon (those multi-sea-winter salmon that return early in the year), in England and Wales are below safe threshold limits in all rivers. It is against this background that the Environment Agency introduced measures, which have been approved by the Government, to halt all exploitation of salmon in England and Wales before 1 June each year. These measures are discussed further in paragraphs 10.13 and 10.14. We support these measures which we believe to be justified.
- 8.12** Since grilse and multi-sea winter stocks are often exploited in different fisheries for example, the West Greenland fishery exploits only potential multi-sea-winter salmon, NASCO has requested that separate conservation limits be set for these stock components on individual rivers. This is not something that the Environment Agency has generally yet attempted to do in England and Wales, partly because of the difficulties of deciding upon the appropriate proportions of these stock components to set as a baseline. We agree that it is essential to try to maintain maximum genetic diversity within salmon populations, taking into account sea age, run timing and the structure of particular populations; we also agree that the best way of doing this is through scientifically based conservation limits.

When and where appropriate, the Environment Agency should develop and apply separate conservation limits for one-sea-winter (grilse) and multi-sea-winter salmon. (Recommendation 35)

- 8.13** Given the difficulties of devising such limits, we accept that at present measures need to be taken on a pragmatic basis to ensure that one-sea-winter and multi-sea-winter salmon stocks are protected. Currently the focus is on conserving multi-sea-winter salmon, but the situation might change; we note that in the first half of this century multi-sea-winter salmon were much more prevalent than they are now and that, in many parts of England and Wales in 1999 there has been a marked decline in grilse catches.

Implementation

- 8.14** In England and Wales, conservation limits are being implemented through Salmon Action Plans which are being developed by the Environment Agency for all main salmon rivers; 68 Salmon Action Plans are due to be finalised by 2002. For each river these set out the measures needed to maintain stocks above the conservation limit or to restore them to the level needed to achieve this objective. Local interests are consulted over Salmon Action Plans before these are finalised. We regard this as an essential feature of the plans, and we emphasise that such consultations must be genuine and that full account must be taken of the views of those consulted; the plans and the conservation limits they contain should have the support of local anglers, netmen, fisheries owners and other interest groups. It is also important that Salmon Action Plans remain living documents, subject to continuing review and development, and that limits and targets are updated as necessary to take account of environmental changes and other factors.

When the Environment Agency publishes the conservation limits for each river it should explain the sources of data and the calculation of those limits to encourage local ownership of resulting management strategies. (Recommendation 36)

- 8.15** We believe that Salmon Action Plans should set out the procedures that will be followed if it becomes apparent that conservation limits are not being exceeded. We note in this connection that the precautionary approach to salmon management adopted by NASCO recommends that the management procedures to be taken in the event of a failure to meet conservation limits should be agreed beforehand. We fully endorse this approach. The key feature of such procedures is the identification of the reasons why stocks are below the conservation limit, followed by implementation of appropriate remedies. Reduced exploitation is not the only possible response: if, for example, habitat degradation is the principle culprit, habitat improvements as part of a stock rebuilding programme are likely to be needed.

Salmon Action Plans should set out the procedures to be followed if stocks in a particular river do not exceed their conservation limits. Local interests should be fully consulted and their views taken into account before the procedures are finally established. (Recommendation 37)

- 8.16** We have referred elsewhere in the Report to the importance of monitoring. The difficulties we have noted with the implementation of conservation limits emphasises the importance of carrying out adequate long-term monitoring.

Data requirements

- 8.17** Given the importance of adequate data for the calculation and implementation of conservation limits, and more generally for the management of the salmon stocks, we considered how data collection might be improved. In doing so, we recognised the importance of reliable, consistent and compatible data and the need to collect and apply such data carefully. We agreed that continuity of data, and particularly long term data sets, and monitoring were essential in view of the complex life-cycle of salmon. Monitoring and data collection need to be at levels sufficient to enable conservation and management objectives to be met. Box 8 below sets out some of the current programmes being undertaken in the UK and Ireland.
- 8.18** We consider that more fish counters, to count numbers of returning adults, are desirable, but we note that it is essential that all counters are frequently validated and properly maintained and operated and that data from them are made quickly available to managers.

This all has resource implications, which need to be taken into account at the outset; it is not enough simply to install counters without ensuring adequate provision to run them effectively. We also conclude that additional facilities for estimating the numbers of both emigrating smolts and returning adults on selected rivers (sometimes called index rivers) would be desirable combined with properly targeted juvenile surveys.

Steps should be taken to improve the quality and reliability of data collected for salmon management. (Recommendation 38)

Box 8 Monitored salmon populations

There are a number of rivers around the North Atlantic that are intensively monitored to provide detailed information on the dynamics of their salmon populations and, in some cases, to act as an indicator of the status of stocks within a region. These rivers include the Bush in Northern Ireland, the North Esk in Scotland and Burrishoole system in Ireland. The monitoring programmes on these rivers include the use of: smolts traps to allow emigrating fish to be sampled and marked; adult traps and counters to allow returning fish to be assessed and examined; and additional sampling to monitor the production in freshwater. There are currently no rivers in England and Wales on which such comprehensive monitoring is conducted. Data have been collected for more than 20 years on the River Bush, and this has permitted scientists to describe the effects that changes in the spawning stock can have on the recruitment in the next generation. This information is being used to assist in setting conservation limits for rivers in England and Wales, and in Ireland.

In addition to improving our understanding of the population dynamics and natural fluctuations of stocks, these studies can provide information on the impacts on stocks of natural factors, such as short-term droughts and longer-term climatic change, and human activities such as abstractions and discharges. This in turn will provide a more robust scientific framework within which management decisions can be taken.

9 Mixed stock fisheries

Home waters

- 9.1 Mixed stock fisheries – net fisheries which exploit salmon from a number of different river stocks – make it very difficult to determine the level of exploitation of each of the individual stocks involved. Even if the overall level of exploitation in the fishery appears to be satisfactory, exploitation of one particular river stock could be too high. For this reason, it is widely accepted that mixed stock fisheries are undesirable, and in England and Wales it is Government policy to phase these out. We endorse this approach.
- 9.2 We note that this policy is not applied to estuary net fisheries exploiting fish from a small number of rivers, which technically are mixed stock fisheries; an example is the fisheries in the common estuary of the Tamar, Tavy and Lynher rivers. We agree that this is a reasonable approach as in such cases it is possible to assess levels of exploitation of the different river stocks and to ensure that all are maintained at satisfactory levels. Where the conservation limit for one river stock was not being exceeded, however, application of the precautionary approach would require the imposition of the necessary management measures to all the net fisheries in the common estuary.

9.3 The largest mixed stock fishery in England and Wales is the North East coast salmon drift net fishery. This currently takes about 50 per cent of the total catch of salmon in England and Wales. It also takes nearly 20 per cent of the catch of salmon of English and Welsh origin since 80 per cent of the salmon caught in this fishery have been estimated to be of Scottish origin.¹⁷ This fishery, together with net fisheries in Eastern and North Eastern Scotland, was the subject of a detailed review following the passage of the Salmon Act 1986. In 1991 the report of the review¹⁸ was presented to Parliament by the then Minister of Agriculture, Fisheries and Food and the Secretary of State for Scotland. The report concluded that the review had not produced evidence of an immediate threat to stocks and thus any justification for depriving existing licensees of their licences at a stroke. It also concluded, however, that it would aid and improve the management of individual east coast salmon and sea trout stocks if the North East coast drift net fishery were to come to an end and that it would be desirable to phase it out. It proposed that this should be done gradually so as not to cause unnecessary hardship. The phase out of the fishery started in 1992, since when the number of licences has fallen from 142 to 72 in 1999, a reduction of 49 per cent; it is probable, however, that the level of exploitation of the stocks affected by the fishery will have fallen by somewhat less. We received conflicting evidence about this fishery, with the netsmen's representatives arguing that the phase out was unjustified, and many angling interests arguing for it to be closed immediately. We do not consider that a case has been made for either of these extreme options. We conclude, however, that it would be desirable to accelerate the phase out and we recommend compensation be offered to netsmen to encourage them to leave the fishery on a voluntary basis as soon as possible. We also recommend that a similar approach should be adopted to other mixed stock fisheries being phased out in England and Wales.

The phase out of mixed stock salmon net fisheries in England and Wales should be accelerated, and to achieve this compensation should be offered to netsmen to encourage them to leave these fisheries on a voluntary basis as soon as possible. (Recommendation 39)

9.4 A number of those giving evidence argued that the Government should provide the bulk of any compensation. We concluded, however, that accelerating the phase out of the fishery would have substantial economic benefits for rod fisheries and that those who benefited, in particular riparian owners and anglers in both England and Scotland, should contribute a major share of the cost. The Government should, however, provide substantial funds on a pump-priming basis and should be ready to take the lead in setting up the necessary arrangements for collecting funds and compensating netsmen.

The Government should provide substantial pump-priming funds to launch compensation arrangements designed to accelerate the phase out of mixed stock salmon net fisheries on a voluntary basis, and should take the lead in setting up these arrangements. (Recommendation 40)

¹⁷ 17 Returns of salmon to rivers in North–East England have increased rapidly following the improvements in water quality in some of the estuaries, particularly the Rivers Tyne, Wear and Tees. Tagging of adult salmon in the coastal fishery in the 1970s suggested that 94 per cent of the fish at that time were returning to Scottish rivers. Tagging of smolts and parr in the English rivers in the 1980s suggested that their contribution to the coastal fishery had increased to about 20 per cent. This contribution may have increased further in the 1990s but no more recent estimate is available

¹⁸ Salmon Net Fisheries: Report of a review of salmon net fishing in the areas of the Yorkshire and Northumbria regions of the National Rivers Authority and the salmon fishery districts from the River Tweed to the River Ugie – 17 October 1991

Distant waters

- 9.5 English and Welsh salmon stocks are also exploited by mixed stock fisheries within the jurisdiction of other countries. Of these the Irish drift net fishery and the fishery off West Greenland have the greatest impact; English and Welsh stocks are also subject to limited exploitation in the Faroe Islands long line fishery and in Scottish and Northern Irish waters.
- 9.6 Discussions are currently underway between scientists from CEFAS, the Environment Agency and the Irish Marine Institute to agree estimates of exploitation in the Irish drift net fishery for selected English and Welsh stocks based upon tagging studies conducted in recent years. Provisional estimates of the levels of exploitation prior to 1997 vary substantially between stocks in different areas and from year to year. However, estimates are generally low (~1 per cent) for stocks in the North East of England, higher (at around 5 to 15 per cent) for rivers on the west coast of England and in Wales, and highest (perhaps 10 to 20 per cent) for stocks from English south coast rivers.
- 9.7 In 1997 the Irish Government introduced a number of restrictions on the Irish drift net fishery. It has not yet been possible to assess the effects of these measures on the exploitation of English and Welsh stocks. While we welcome these restrictions, we believe that this mixed stock fishery should be phased out, as is being done for similar fisheries in England and Wales. We note that the Government has urged the Irish government to adopt such a phase-out, and we strongly support the Government's efforts.

The Government should continue to press the Irish government, by all available means, to take all practicable measures to reduce the impact of the Irish drift net fishery on English and Welsh salmon stocks. (Recommendation 41)

- 9.8 NASCO sets quotas for both the West Greenland and Faroe Islands fisheries. For West Greenland, the quota is calculated according to an agreed methodology which links it to the state of North American multi-sea winter stocks; as the current advice from ICES is that these stocks are below their conservation limit and should not be exploited, the quota for 1999 permits only catches in the local subsistence fishery, which is estimated to take around 20 tonnes. No commercial exports of salmon from Greenland are currently permitted. For the Faroe Islands the quota is set at a much higher level (300 tonnes in 1999), but from 1991-1998 the quota has been bought out. Licences for a commercial salmon fishery have not been issued and only a small research fishery operates, taking less than 10 tonnes per year. No buy-out has been arranged for the 1999/2000 fishing season, and it is unclear whether, if licences were issued, there would still be a demand for them, given the present low level of salmon stocks.
- 9.9 While we would also like to see these mixed stock fisheries phased out, we recognise that both fisheries are expressly permitted under the NASCO Convention, and that both Greenland and the Faroe Islands are heavily dependent on fishery resources. We consider it important, however, that the Government should continue its efforts, through the EU, to ensure that quotas for both fisheries are set at the lowest achievable levels.

The Government should continue to do its best to ensure that NASCO sets quotas for the West Greenland and Faroe Islands salmon fisheries at the lowest achievable level. (Recommendation 42)

- 9.10 We noted that in some years the quotas for the West Greenland and Faroese fisheries have been bought out by a private organisation, the North Atlantic Salmon Fund. The Government has so far taken the view that the cost of such compensation arrangements should be met by private interests. While we accept that in some circumstances a public

contribution to compensation arrangements could be useful, we consider that public money is better spent closer to home – for example by helping to accelerate the phase-out of our own mixed stock fisheries.

10 Regulating exploitation of salmon

Quotas and effort control

- 10.1** The two basic methods of limiting exploitation in legal fisheries are quotas and effort control. Quotas limit catches to a fixed quantity. They therefore provide a clear quantitative limitation on the size of the catch. Quotas have the disadvantage, however, that because salmon abundance varies from year to year, and variations are not easy to forecast in advance, in years when stocks are low catching a fixed quantity of fish may result in the level of exploitation being too high. Thus with a quota exploitation tends to be high when stocks are low and vice-versa. This disadvantage can, however, be reduced by adjusting quotas in-year providing technical means are available to enable numbers of returning adults to be estimated during the season. Effort controls, on the other hand, attempt to control exploitation by limiting the time that fishermen can operate and the efficiency of their gear. This tends to stabilise the level of exploitation so that catches increase with stock abundance. Although effort controls still tend to result in over-exploitation when stocks are low, the effects are not as great as with quotas.
- 10.2** There is no provision in existing salmon fisheries legislation for quotas, and there was little support for quotas from those who gave evidence to us. During our visit to Ireland the Irish Government's plans to introduce quotas were explained to us; the objective is primarily to allocate the resource rather than to restrict exploitation. Overall, we can see few advantages in moving to a quota based system for controlling exploitation in England and Wales (particularly bearing in mind our recommendation for speeding up the phase out of mixed stock net fisheries). However, we recommend below that limits on catches, by both rods and nets, should be included in the carcass tagging scheme we wish to see introduced.
- 10.3** We believe that effort controls should remain the principal method of controlling legal exploitation of salmon. For nets there are currently two legal routes for the introduction of such controls. Numbers of licensed nets can be restricted using Net Limitation Orders made under Section 26 of the Salmon and Freshwater Fisheries Act 1975, and restrictions on the design and use of nets can be introduced by byelaw.
- 10.4** It was pointed out to us that Net Limitation Orders have a number of weaknesses. On their own they are of limited effectiveness in reducing levels of exploitation quickly, since they cannot be used to remove licences from licence holders who are dependent on fishing for their livelihood, even if stocks are threatened by over-exploitation. The situation is exacerbated by the fact that the Courts have given a very broad interpretation to the phrase 'dependent on fishing for their livelihood'.¹⁹ In addition, a single objection from an existing licence holder, even if the licence holder fishes only on a part time and occasional basis, triggers an automatic public inquiry. These defects could best be overcome by removing the power to introduce Net Limitation Orders and, instead, regulating licence numbers by byelaw. The byelaw-making powers should include specific provisions for reducing numbers of licence holders where this is necessary for conservation reasons.

¹⁹ Regina v South West Water Authority, ex parte Cox and Others (Queen's Bench Division, 10 December 1981)

Powers to introduce Net Limitation Orders should be removed; in their place the Environment Agency should have the power to limit net licence numbers through byelaws. These powers should specifically provide for licence numbers in a net fishery to be reduced immediately where this is necessary for conservation purposes. Byelaws limiting numbers of net licences should remain in force for not more than ten years, with the exception of those relating to the phase-out of mixed stock fisheries. (Recommendation 105)

- 10.5** The current legislation on Net Limitation Orders provides for the selection of applicants for licences when the number of applicants exceeds the number of licences available. This provision is made use of in some fisheries to ensure that full-time fishermen are given priority. The criteria used to select licence holders will become increasingly important if, as we recommend, it becomes possible to reduce licence numbers in a net fishery with immediate effect for conservation purposes. It is, however, essential that criteria are transparent and that local interests are involved in drawing them up.

Powers should be retained to select applicants to whom salmon net licences will be issued when numbers of applicants exceed the number of net licences available. Local interests should be fully involved in establishing the selection criteria, which should be transparent. Where appropriate full-time fishermen should be given priority. (Recommendation 106)

- 10.6** Close seasons and close times are important ways of restricting exploitation by nets. During the course of this Review exploitation of spring salmon by nets in England and Wales was banned by extending the close season until 1 June. Close times substantially reduce the time during the netting season when net fisheries can operate: for example, the North East coast drift net fishery is closed each weekend from 18.00h on Friday evening to 06.00h on Monday morning and each night from 20.00h to 04.00h.

The powers to introduce close seasons and close times for salmon net fisheries should be retained and these powers should continue to be used to control levels of exploitation. (Recommendation 107)

- 10.7** Another way of controlling exploitation by nets is to impose restrictions on the design and use of nets. In all net fisheries there are rules on the mesh size and design of the nets used. There are also rules on how nets should be used. For example, Section 3 of the 1975 Act makes it an offence to work any seine or drift net across more than three quarters of the width of a river or estuary, while local byelaws contain other provisions on the use of such nets. Netsmen are normally required to ensure that their nets are kept moving at all times and do not remain stationary. In our view these powers remain necessary. However, it would simplify future legislation if all provisions on the use and design of nets were dealt with through secondary legislation, with only the necessary enabling powers contained in primary legislation.

Powers should be available to the Environment Agency to impose restrictions on the design and use of nets, with the details left to the relevant byelaws. (Recommendation 108)

- 10.8** We have recommended in Section 3 above that close seasons for salmon rod fisheries should be retained. Existing legislation also provides powers to introduce a wide range of restrictions on angling methods. Restricting angling to fly fishing only and banning the use of natural and artificial prawns and of worms have all been used to reduce the efficiency of angling and hence levels of exploitation. It is also possible to ban angling in certain locations, such as below weirs. While the exercise of these powers is sometimes controversial, no one suggested to us that they should be removed. We believe that restrictions of this kind can play a useful role.

Powers to introduce restrictions on angling methods and areas where angling is permitted should be retained in future legislation. (Recommendation 109)

- 10.9** Under existing legislation (Section 212 of the Water Resources Act 1991) the owner or occupier of a fishery who believes that his interests have been adversely affected by a byelaw restricting the use or design of any instrument for taking fish may claim compensation from the Environment Agency. We are concerned that this provision may on occasion discourage the Environment Agency from proposing byelaws needed to conserve fish. Wild fish are not private property, and we do not think that compensation should be payable when action is taken in order to conserve a natural resource. This principle should apply equally to any reductions in net licence numbers made for conservation purposes in accordance with our recommendation in paragraph 10.4.

No compensation should be paid to owners or occupiers of fisheries, or other interested parties, for the effects of measures adopted for conservation purposes. Section 212 of the Water Resources Act 1991 should be repealed. (Recommendation 110)

Illegal fishing

- 10.10** It is also, of course, important to keep illegal exploitation of salmon under control. We were told that illegal fishing for salmon remains a problem. Recent estimates, made by the Environment Agency for ICES, of illegal catches expressed as a percentage of the declared catch, range from 5 per cent to 18 per cent for different regions in England and Wales. Moreover, illegal fishing does not simply have an effect on stocks: it reduces catch opportunities in, and hence the value of, legal fisheries.
- 10.11** The Salmon Act 1986 contains a number of measures intended to curb illegal fishing for salmon. In particular, it created an offence in England and Wales of handling salmon in suspicious circumstances – where the possessor knows, or where it would be reasonable for him to suspect, that the fish had been taken unlawfully – and it gave Sea Fisheries Committees the power to make byelaws within their districts to ban the illegal netting of salmon under the guise of fishing for sea fish. In 1996 the Salmon Advisory Committee published a report into the effectiveness of these measures:²⁰ it concluded that the measures have on the whole proved to be very effective. It noted, however, that salmon poaching remained a serious problem in some areas. The evidence that we received confirms that this is indeed the case, and we also received a number of proposals, in particular from the Environment Agency, for improvements to existing legislation. These proposals are considered in Chapter 13.

Catch and release

- 10.12** In recent years it has been increasingly common for anglers to release salmon that they catch: in 1998 catch returns to the Environment Agency indicated that around 30 per cent of salmon caught in England and Wales were released although this includes kelts and unclean fish. It is plain from the evidence we have received that catch and release, even on a voluntary basis, is an issue that arouses strong feelings among anglers. On the one hand there are those who can see no justification for ever killing a wild salmon, while on the other there are those who take the view that salmon angling is a form of hunting and that it

²⁰ The anti-poaching measures contained in the Salmon Act 1986 (published July 1996. Ref No. PB 2515)

is wrong to subject a wild creature to the stress of capture unless one intends to eat it. Our view as a Group fell between these viewpoints. We noted that where salmon stocks are above their conservation limit, releasing all salmon would not serve a useful conservation purpose. In these circumstances, the decision on whether to release or kill salmon caught is one that is best left to individuals. On the other hand, there is little doubt that the increased prevalence of catch and release is of benefit to salmon stocks on many rivers.

- 10.13** The compulsory release of all salmon caught raises rather different issues. During the course of our Review the Environment Agency published its proposed byelaws for the compulsory release of spring salmon caught before 16 June and these have now been confirmed by Ministers. While we did not seek evidence on these proposals, a large number of people submitting evidence to us commented on the issues they raised. These views varied considerably. While the majority supported the need for measures to reduce exploitation there was significant disagreement as to which sector (nets or rods) should be targeted. We received evidence from many anglers suggesting that there was a need to close net fisheries whereas netsmen took a contrary view.
- 10.14** Given the very serious decline in spring salmon stocks in England and Wales, we agree that action was needed to reduce substantially exploitation by rods as well as by nets. In these circumstances, compulsory release of all salmon caught was an alternative to closure; those opposed in principle to catch and release had the option of not fishing. (They would not, in any case, have been able to fish if rod fisheries had been closed). We noted, however, that catch and release was not fully equivalent to closure, since some fish that are caught will die before they can spawn, although the scientific evidence we have seen suggests that, with proper handling, survival rates of at least 80 per cent of fish caught and released are attainable. Nevertheless, there may be circumstances in which even this level of mortality is not acceptable; in such cases there will be no alternative but to close the fishery concerned.

Sale of rod caught salmon

- 10.15** We received a considerable number of representations advocating a ban on the sale of rod caught salmon; this is a policy supported by both the Atlantic Salmon Trust and the Salmon & Trout Association, as well as by the Environment Agency. We concluded there are three principal justifications for such a ban. In the first place, it would reduce opportunities for the disposal of illegally caught salmon. At present a poacher who wishes to persuade a potential purchaser of a salmon that he is a bona fide angler has only to purchase a salmon rod licence. Secondly, it would discourage anglers from killing large numbers of salmon for sale. We were told that a small minority of anglers account for a high proportion of the overall rod catch – Environment Agency data show that during the period 1995 to 1997 some 5 per cent of anglers accounted for about 45 per cent of the reported catch – and some of these undoubtedly fish on a semi-commercial basis, selling their catch. Finally, there is question of philosophy; we do not think that killing and selling large numbers of salmon is compatible with the recreational nature of salmon angling, although we see nothing wrong in anglers retaining limited numbers of salmon for personal consumption. For these reasons, we favour the introduction of a ban on the sale of rod caught salmon. Some of the advantages of such a ban will be overtaken if, as we recommend below, a carcass tagging scheme is introduced but this will inevitably take time.

A ban on the sale of rod caught salmon should be introduced as soon as possible; the position should be reviewed if and when a carcass tagging scheme comes into force. (Recommendation 43)

Carcase tagging

- 10.16** We also received numerous representations in favour of the introduction of a carcass tagging scheme. Under such a scheme a unique, identifiable and tamper-proof tag would be attached immediately to all salmon caught and killed in the wild. Such schemes already exist in Canada and France, and one is about to be introduced in Ireland.
- 10.17** This is not the first time that salmon tagging has been suggested in England and Wales. In the early 1980s a Salmon Sales Group was established by the Water Authorities Association to investigate various means of controlling the disposal of illegally caught salmon. The report recommended, among other things, that a tagging scheme should be introduced in Great Britain. However, the then Government concluded, after consideration of the proposal, that a salmon tagging scheme could not be made to work; the principal reason for this conclusion was the perceived problem of dealing with farmed salmon.
- 10.18** A carcass tagging scheme in England and Wales would have two principal objectives: to control poaching and to improve the standard of catch returns. So far as the first of these is concerned, the Environment Agency estimates that currently around 70 per cent of anglers submit catch declarations; a tagging scheme would be likely to improve both the quantity and the quality of the information obtained. Almost all licensed netmen make catch returns, but these are not always accurate: both under- and, in some cases, over-declaration, of catches takes place. A carcass tagging scheme would thus help improve the quality of data from net fisheries.
- 10.19** Carcass tags would also help control poaching. Anyone caught in possession of an untagged fish would be committing an offence, so poached fish would become easier to identify. Moreover, as it would be an offence to sell an untagged fish, poached fish would be difficult to dispose of through legal outlets.
- 10.20** A carcass tagging scheme would also help enforce a national bag limit. This is considered in more detail below.
- 10.21** We are, however, concerned that if a carcass tagging scheme covered only England and Wales its effectiveness in combating poaching would be much reduced since it would be possible to claim that untagged wild salmon had been caught in Scotland. For this reason, we hope that it will be possible to introduce a scheme throughout Great Britain.
- 10.22** The exclusion of farmed salmon from a tagging scheme will also create problems, in that it would make it possible to pass off untagged wild salmon as farmed fish: it will be difficult to prove that the seller should have known to the contrary. The Environment Agency told us for that reason that it would be desirable for a scheme to cover both farmed and wild fish. However, the proposed Irish scheme will not cover farmed salmon, and in Canada farmed fish have recently been exempted from tagging. Moreover, in 1998 the total catch of wild salmon in the UK was equivalent to only 0.14 per cent of total UK farmed salmon production and represented an even smaller proportion of the total UK trade in salmon (including imports from abroad). In these circumstances we doubt that the potential benefits, in terms of better control of illegal fishing for wild salmon, would justify the additional costs to the farmed sector. On balance, we do not think that the exclusion of farmed fish from a tagging scheme would render such a scheme unworkable. We also noted that it would not be possible to sell illegally caught salmon at a premium as wild fish, and that this would act as a disincentive to passing them off as farmed salmon.

- 10.23** Overall, we believe that a carcase tagging scheme, for both rods and nets, would make a useful contribution to salmon conservation, and we would like to see such a scheme introduced, preferably throughout Great Britain.

Legal powers to introduce carcase tagging should be contained in new salmon fisheries legislation; in the meantime, the Environment Agency and Government should develop detailed proposals for such a scheme. (Recommendation 111)

Bag limits

- 10.24** One way of reducing levels of exploitation in rod fisheries is through the introduction of bag limits. Under these, a limit is set on the number of salmon that an angler may retain. Once the limit is attained, the angler concerned either has to cease fishing or must release all subsequent fish caught. Bag limits can be set for any period; they are usually on a daily, monthly or annual basis. Bag limits are already used by the Environment Agency to limit salmon exploitation on some rivers: for example, on the River Torridge anglers may retain only two salmon over a period of seven days and seven salmon for the season as a whole. An analysis of catch returns by seasonal licence holders on different rivers shows that bag limits could lead to substantial reductions in numbers of salmon retained. This is illustrated in the Table 3 below, which shows the number of salmon that would have been retained if annual bag limits of between 1 and 5 fish had applied on the Rivers Esk, Tamar and Tyne in 1998 and throughout England and Wales in 1997; the table also shows the reduction, in percentage terms, that this would have meant in numbers of salmon caught and retained (assuming all salmon caught would have been retained).

	Esk		Tamar		Tyne		England and Wales	
Annual Bag Limit	Estimated number of salmon retained	Percentage reduction in catch	Estimated number of salmon retained	Percentage reduction in catch	Estimated number of salmon retained	Percentage reduction in catch	Estimated number of salmon retained	Percentage reduction in catch
1	7	(90%)	70	(83%)	243	(82%)	2,187	(81%)
2	29	(60%)	124	(69%)	435	(68%)	4,053	(64%)
3	40	(43%)	151	(63%)	627	(54%)	5,577	(51%)
4	44	(38%)	171	(58%)	771	(43%)	6,845	(40%)
5	49	(31%)	191	(53%)	896	(34%)	7,745	(32%)

- 10.25** We conclude that where there is a need locally to reduce exploitation on a river by rods, bag limits, in the form of a requirement to release all salmon caught once the bag limit is reached, can make a valuable contribution, although they may well be difficult to enforce, particularly when they apply over long periods. However, on individual rivers enforcement officers will often be able to make use of local knowledge, given that only a small minority of anglers are likely to exceed most bag limits. We would, in any case, expect the great majority of anglers to respect bag limits.
- 10.26** We also considered whether there was scope for a general bag limit, restricting the total number of salmon that any angler could retain in any season. For example, as only about 5 per cent of anglers catch more than five salmon a year, a general bag limit set at five fish would affect few anglers; on the other hand, it would lead to a considerable reduction in

the number of salmon caught and retained because 30 per cent of the annual rod catch of salmon is caught by anglers who have already caught five salmon. We conclude that, for the reasons that have led us to recommend a ban on the sale of rod caught fish, we would like to see an overall limit on the number of salmon that could be caught and retained in England and Wales by an individual angler in any one year. Having a general bag limit would be very difficult to enforce without a carcase tagging scheme.

Once a salmon carcase tagging scheme is in place, a general bag limit should be introduced. (Recommendation 112)

- 10.27** It would be anomalous to introduce a general bag limit for anglers while issuing unlimited numbers of carcase tags to netmen.

If and when a general bag limit is set for salmon caught by anglers the carcase tagging scheme should include a ceiling on the number of tags that can be issued to individual salmon netmen in any year. (Recommendation 113)

Dealer licensing

- 10.28** In the evidence we received there was a good deal of support for a dealer licensing scheme for salmon. The Salmon Act 1986 contains powers for the introduction of dealer licensing; after the passing of the Act the then Government issued a consultation paper setting out ideas for introducing such a scheme. This consultation showed that there would be considerable difficulties in operating dealer licensing (it was, in particular, strongly opposed by many fish farmers and traders), and it was decided not to go ahead.
- 10.29** Over the past decade these potential difficulties have increased. Sales of farmed salmon and the proportion of total salmon sales accounted for by farmed salmon have both risen steadily; as is pointed out above in paragraph 10.22, sales of wild salmon account for a very small proportion of total salmon sales. As with carcase tagging of farmed salmon it is highly doubtful that the potential benefits of dealer licensing would outweigh the additional costs to the fish farming industry and, in this case, the wholesale and retail sector. We concluded that dealer licensing was no longer a practicable option.

11 Allocation of the salmon resource

- 11.1** Wild salmon are a scarce resource: inevitably, decisions have to be taken on how this resource is allocated between different interest groups. In England and Wales the key question we have been faced with is how any exploitable surplus should be shared between rods and nets.
- 11.2** Provided that conservation limits are met, it makes no difference in conservation terms whether salmon are caught by rods or nets. For this reason, the decision on how exploitable surpluses should be shared is primarily a management one and will be influenced by social and economic factors and historical precedent as well as by the differing characteristics of rod and net fisheries. Box 9 below provides estimates of the economic value of salmon net fisheries in England, Wales and Scotland.

Box 9 Salmon net fisheries

The Environment Agency lists some 60 separate salmon and sea trout net fisheries; in 1998 there were 547 licensed netmen. Average catches per licence in individual net fisheries vary from less than 5 fish a year to over 150.

In 1991 the Centre for Marine Resource Economics (CEMARE) at Portsmouth Polytechnic (now Portsmouth University) carried out an economic evaluation for MAFF of salmon (including sea trout) fisheries in England and Wales, and Scotland²¹. This was based on data from 1988. The study attempted to assess the economic value of these fisheries. For net fisheries, the approach was to estimate the annual gross income minus purchased inputs (fuel, harbour dues etc.) and overheads (licence duties, repairs and maintenance etc.). On this basis, CEMARE estimated the annual economic value of salmon net fisheries in England and Wales to be around £890,000 in 1988. It should be stressed that this estimate is approximate and is based on a number of assumptions.

To provide the Review Group with a more recent estimate, MAFF economists, in consultation with the Environment Agency, updated the CEMARE estimate using the same methodology. Again, the results are subject to considerable uncertainties. However, this exercise indicated that the annual economic value of salmon net fisheries in 1996 had fallen to around £250,000. This decline in total value was caused by a number of factors: the price fetched and quantities landed of wild fish declined considerably over the period, and variable and fixed costs rose with inflation and higher licence duties.

- 11.3** Netting for salmon can be highly efficient, and all net fisheries in this country are subject to effort controls to restrict exploitation. Without such controls, exploitation rates in some fisheries, such as coastal drift net fisheries, could be very high. However, in many net fisheries effort is limited by the availability of fishing stations; the level of exploitation could not increase indefinitely because a larger number of netmen would simply have to take it in turns to fish. Exploitation rates in some net fisheries may also decrease as the stock declines, because netmen may not be able to operate profitably when catches are very low. Elsewhere, however, netmen may fish more as the stock declines, and thus increase their exploitation rate, in order to maintain a satisfactory income.
- 11.4** On an individual basis, angling is usually much less efficient than netting. But, because there are many more anglers than netmen, the total exploitation rate by rods can sometimes be greater than by nets. In addition, while most salmon are vulnerable to net fisheries for a relatively short time, they may be available to rod fisheries for many months. This is particularly true for early running salmon, which may be vulnerable to angling for the whole season. Thus, it has been estimated that rod fisheries may have taken most of the stock of large multi-sea-winter salmon (over 9.1 kg) on the River Wye since the 1950s. Exploitation rates in rod fisheries have also been known to increase at low stock levels.
- 11.5** A point to bear in mind is that net fisheries operate in estuaries or at sea, and thus exploit salmon before anglers can. It would therefore be theoretically possible for nets to take the whole exploitable surplus. For this reason controls on net fisheries are essential to allow rod

²¹ An Economic Evaluation of Salmon Fisheries in Great Britain: CEMARE 1991

fisheries to operate; the converse, however, is not true, and controls on rod fisheries are required only to ensure the survival of adequate numbers of spawners.

- 11.6** There is a further important point, which was emphasised to us in the evidence we received. Because angling is not usually an efficient method of catching fish, in order to provide good fishing the number of fish available to anglers needs to be substantially larger than the number of fish they are likely to catch. This is a factor that managers need to bear in mind in any allocation between rods and nets.
- 11.7** A number of those giving evidence to us proposed that all commercial netting for salmon should be ended. While it was usually claimed that there were conservation reasons for such a measure, the supporting arguments put to us were almost invariably social and economic. We considered these various arguments, but concluded that there was no justification for a blanket ban on all commercial net fisheries. We reached this view for the following reasons.
- 11.8** In the first place, as pointed out above, provided that conservation limits are met there is no reason in conservation terms for discriminating against any particular method of exploitation. Banning netting would increase the number of salmon entering rivers and, because exploitation rates by rods are usually low (and tend to fall as stock levels increase), there would also be an increase in the number of salmon that survived to spawn. This would simply give a larger buffer over the conservation limit.

Box 10 Value of salmon rod fisheries

The 1991 CEMARE study (see Box 10) also estimated the economic value of salmon rod fisheries, based on the estimated capital value of fishing rights. In 1988 the capital value of rod fisheries in England and Wales was estimated on this basis at £72 million. Again, MAFF, in liaison with the Environment Agency, updated this estimate by adjusting the 1988 capital value to take account of inflation: on this basis the capital value of salmon rod fisheries in 1996 was estimated at broadly £108 million.

To enable comparison of the above values of net and rod fisheries the estimates are presented below as both capitalised and annual values. The values shown are highly dependent on the discount rate and appraisal period used. The following figures are consistent with an 8 per cent discount rate and a 25 year appraisal period.

1996	Annual Value	Capital Value
Rod Fishery	£10m	£108m
Net Fishery	£0.25m	£2.5m

While all these estimates have large margins of uncertainty, they are thought to provide a reasonable indication of the relative total values of salmon rod and net fisheries.

- 11.9** Increasing the number of salmon in rivers would, of course, increase the number caught by anglers and the value of the fishery. It was put to us that, because there are many more anglers than netsmen and because rod fisheries have a much higher economic value per salmon caught than net fisheries (Box 10 above provides estimates of the value of salmon rod fisheries), the economic and social benefits of better angling and higher value rod fisheries would outweigh the losses to netsmen. We concluded, however, that in reality the

position is more complicated. The CEMARE report (see Boxes 9 and 10) explicitly warns that while its estimates for the value of salmon rod and net fisheries are of interest as a description of the economic value of salmon fisheries in England and Wales, they cannot be used for predicting the likely economic consequences of policy decisions that might affect salmon catches in rod and net fisheries. To calculate these, marginal values are needed. Reliable values are not available, and will vary, perhaps substantially, between rivers and between fisheries. It is, nevertheless, evident that the marginal value of additional fish to a rod fishery will tend to fall as stock numbers increase, and that this tendency will be accelerated by the fact that rates of exploitation also fall as numbers increase. In simple terms, if the number of salmon increases, anglers will catch a diminishing proportion of the total and the additional value to the rod fishery of the extra fish available will progressively fall. There must then become a point when the value of additional fish to rods falls below their value to nets.

- 11.10** A further point that needs to be taken into account is that the difference in value between net and rod fisheries may be less marked in some parts of the country than in others. While the economic return from net fisheries may not be significant nationally, it may well make a substantial contribution to small fishing communities dependent on a range of different fishing activities. Similarly, some rod fisheries may make a disproportionate contribution to the economy of remote rural areas.
- 11.11** While we did not feel that a general ban on commercial netting could be justified, we did conclude that there was a case for taking greater account of the economic and social values of different fisheries in sharing salmon between them. Currently, there are large variations in rates of exploitation (and hence in the share of the resource) in different net fisheries. For example, whereas in those rivers in England and Wales without net fisheries the total legal catch is taken by rods, there are nine in which estuary nets have taken more than twice the catch by rods in the past five years. These allocations have no objective justification.
- 11.12** To some extent, economic and social factors can already be taken into account under existing salmon fisheries legislation. At present, if restrictions on exploitation are introduced for conservation reasons, Section 7 of the Environment Agency Act 1995 requires Government and the Environment Agency to take into account the social and economic interests of rural areas. However, it is currently not possible to restrict exploitation solely for social and economic reasons. Restrictions cannot, therefore, be imposed on net fisheries with the sole purpose of increasing the number of fish available to anglers.
- 11.13** If economic, social and recreational benefits derived from salmon fisheries are to be maximised, there is a need for additional powers to regulate exploitation in order to allocate the catch between interest groups. Such a power should, however, be used only on a local basis, and in our view no netsmen solely or mainly dependent on fishing for his livelihood should be deprived of a licence for such purposes without his consent. The Environment Agency should make use of this power only if there are reasonable grounds for concluding that a reallocation of the catch between the net and rod fisheries concerned will increase the economic and social benefits derived from these fisheries, and netsmen giving up licences under such a reallocation should be entitled to compensation.
- 11.14** In most cases we would expect compensation to be privately funded by those who would benefit from a reallocation, although if publicly funded bodies, including the Environment Agency, conclude that a reallocation of the catch would promote their objectives they should not be precluded from contributing towards the costs of compensation. If a netsman who is not solely or mainly dependent on fishing is deprived of his licence without his

consent, and agreement cannot be reached on the appropriate level of compensation, this should be determined by an independent arbitrator appointed by the Minister or the National Assembly for Wales, as appropriate.

A power should be introduced to restrict salmon net licence numbers by byelaw for economic and social reasons. No netsman solely or mainly dependent on fishing for his livelihood should be deprived of his licence without his consent under this provision. Any netsmen deprived of their licences under this provision should be entitled to compensation. If agreement cannot be reached on the level of compensation, this should be determined by an independent arbitrator. (Recommendation 114)

- 11.15** We have recommended in paragraph 10.4 above that no byelaw limiting licence numbers in a net fishery should remain in force for more than 10 years. This will provide an opportunity for the Environment Agency to review the allocation of the catch on a regular basis. If, for example, there was a substantial increase in salmon stocks in a river, it might be possible to increase the number of licences in a net fishery without detriment to the rod fishery. Where a net fishery is closed for economic and social reasons this closure should also be reviewed regularly.
- 11.16** It was suggested to us that, in reaching decisions on allocation of the resource, a distinction should be made between commercial and recreational net fisheries. The safeguards that we are recommending be afforded to net licence holders who are solely or mainly dependent on fishing for their livelihood will in practice tend to distinguish between those for whom netting for salmon is a commercial activity and those for whom it is a recreation.
- 11.17** Once the carcase tagging scheme that we are recommending is introduced, it would be possible to issue separate recreational netting licences with a substantially lower catch limit than in normal or commercial net fisheries. It would be for the licence holder to decide which type of licence he or she applied for: the lower cost of a recreational net licence would be balanced by a smaller catch limit. Such a system would not be appropriate in all net fisheries – the haaf net fishery in the Solway, for example, is already essentially a recreational fishery. There are, however, some in which we believe that recreational netting licences would introduce a welcome element of flexibility. If it became necessary to reduce exploitation in a net fishery with both recreational and commercial netting licences, we believe that priority should be given to the latter in order to preserve the livelihood of the netsmen involved.

Once carcase tagging is in place consideration should be given to introducing recreational salmon netting licences, with lower licence duties and catch limits than ordinary netting licences. (Recommendation 115)

- 11.18** It was also suggested to us that special consideration should be given to those net fisheries which could be regarded as forming part of the country's heritage. On this point, we noted that the Secretary of State for Wales decided, exceptionally, to allow Welsh coracle fisheries to remain open to fish for sea trout early in the season (despite the fishing methods used, which make it difficult to release any salmon caught unharmed) because of their unique cultural and historical significance in Wales. We concluded, however, that it would be difficult to define a separate category of 'heritage' net fisheries. Many net fisheries are traditional in the sense that they have operated on the same site for hundreds of years, and over those years they have evolved distinctive methods, influenced by custom and the fishing conditions they face. In recent years these traditional methods have often been modified by the introduction of modern materials, but there is room for debate about the extent to which these alter the traditional nature of the fisheries concerned. In some cases

they clearly have: the introduction of monofilament nets and the use of powered boats with net haulers have fundamentally altered the nature of the North East coast drift net fishery; before the introduction of synthetic yarns, this fishery operated largely at night because drift nets made of natural fibres were clearly visible to fish during the day. On the other hand, as was pointed out to us by a netsman from the River Dee, the introduction of synthetic fibres does not necessarily alter fishing methods; in the case of the Dee draft nets, the nylon used is tarred and monofilament nets are banned. It was suggested to us that the use of fibre glass coracles had altered the nature of coracle net fisheries; the coracle netsmen themselves, on the other hand, claimed that the design of the nets and the methods that they used remained largely unchanged, as did the traditional skills involved.

- 11.19** In these circumstances we concluded that, rather than attempt to define ‘heritage’ net fisheries, it would make more sense to suggest that the traditional nature of a fishery should be regarded as one of the social factors that must be taken into account in reaching decisions on resource allocation.

The traditional nature of a salmon net fishery, both in terms of the time it has existed and the methods it employs, should be taken into account by the Environment Agency and Government in reaching decisions on the allocation of catches between rod and net fisheries. However, the wish to retain the economic viability of a traditional net fishery should not be used as a pretext for over-riding conservation considerations. (Recommendation 116)

12 Sea trout (sewin)

Sea trout fisheries

- 12.1** Sea trout fisheries are highly valued in many parts of England and Wales. Many of the anglers who buy salmon and sea trout rod licences do so principally in order to fish for sea trout: in 1997 some 30,000 sea trout were declared caught on rod and line in England and Wales (nearly half of them in Wales), against some 13,000 salmon. Sea trout, or sewin, are particularly prized in Wales, where they form the mainstay of rod fisheries on such well-known rivers as the Tywi, the Teifi and the Dyfi. Sea trout net fisheries are also of importance in a number of estuaries, and in North East England.
- 12.2** It was put to us that the economic and social value of sea trout fisheries is often underestimated. We agree. Sea trout should not be regarded as a poor man’s salmon, and fisheries regulators and managers should ensure that equal attention is paid to their conservation and to the management of sea trout fisheries. Care should be taken not to favour salmon at the expense of sea trout by, for example, carrying out habitat improvements which increase salmon numbers but have an adverse impact on sea trout. Some rivers appear, for reasons that are not clear, to be better suited to sea trout than to salmon, and on such rivers it would be appropriate to give priority to the conservation and management of sea trout.

Regulation of sea trout fisheries

- 12.3** The principles we recommend be applied to the regulation and management of salmon fisheries can be applied with a few modifications to sea trout. Sea trout are generally caught in the same river and estuary fisheries as salmon, although slightly different methods may be used when one or other species predominates. Salmon, net and rod licences also cover sea trout, and the methods currently used to regulate exploitation of the two species are identical.

- 12.4** There are, however, differences between salmon and sea trout which need to be taken into account in managing sea trout fisheries. In principle conservation limits could be set for sea trout stocks, and the Environment Agency has indicated that this is their ultimate aim. In practice this would be much more difficult than for salmon because of the more complex life history of sea trout: it is a multiple spawner and in many rivers migratory and non-migratory trout form a single stock. Despite these difficulties, we believe that the Environment Agency should set conservation limits for sea trout in order to provide a benchmark against which to regulate exploitation, particularly in net fisheries.

The Environment Agency should set conservation limits for sea trout. (Recommendation 44)

- 12.5** The exploitation of immature and small sea trout in net fisheries is best controlled by method restrictions. The current statutory minimum mesh size (2 inches knot-to-knot) results in whitling and one-sea-winter sea trout rarely being caught by nets. However, byelaws permit smaller mesh sizes to be used in some fisheries in South West England which enables one-sea-winter sea trout to be caught. It is important that any changes to minimum mesh sizes introduced in the future take into account the effect of the change on sea trout.
- 12.6** All sizes of sea trout are caught in rod fisheries. The methods used by specialist trout and salmon anglers are quite different and include fishing at different times of the day and night; nevertheless, sea trout will often be caught by salmon anglers and vice versa. In many rivers the whitling are the staple catch of the rod fishery for migratory salmonids, particularly for less skilled anglers although increasing numbers of sea trout anglers are releasing all or part of their catch.
- 12.7** As we point out in Section 8, the presence of sea trout complicates the calculation of salmon conservation limits. This fact emphasises the need to manage salmon and sea trout stocks on individual rivers in an integrated way. This does not only apply to the setting of conservation limits and to the management of exploitation; it is equally necessary to be aware of the different habitat requirements of the two species when undertaking habitat improvements. We would like to see Salmon Action Plans extended as soon as possible to include sea trout, and where appropriate brown trout, pending the development of the comprehensive Fisheries Action Plans which we recommend in Chapter 14.

Salmon Action Plans should be extended as soon as possible to include sea trout, and where appropriate brown trout, pending development of comprehensive Fisheries Action Plans. (Recommendation 45)

- 12.8** In other respects, the principles we recommend should be applied to the regulation of salmon fisheries, including those concerning net fisheries and the allocation of the resource, should be applied also to sea trout fisheries.
- 12.9** Given the current healthy state of most sea trout stocks in England and Wales, we conclude that there is no need for additional general restrictions on angling for sea trout. We conclude, therefore, that there is no need for measures such as carcass tagging, a general bag limit or a ban on the sale of rod caught fish to be introduced for sea trout – although the power to introduce such measures should cover sea trout and so make it possible to introduce them in the future if circumstances change.

Salmon stock dynamics

In order to obtain an objective measure of the numbers of spawning fish required to adequately stock a river, we need to understand the relationship between the number of adult salmon that spawn and the number that survive to the next generation. Such relationships have been established for a number of salmon populations by monitoring the **stock** size (the numbers of spawners) and the **recruitment** (the numbers of smolts or adults produced) usually for at least 15 years. Figure 1 shows an example of such data, each diamond showing the spawning escapement in a single year and the number of offspring that survived. Unfortunately stocks are affected by a wide range of factors, and the relationship in the raw data is not always easy to see. Mathematical methods are therefore used to define the **stock-recruitment curve** that best fits the data; in Figure 1, a dome-shaped curve gives the best fit.

The **stock-recruitment curve** in Figure 1 shows that the number of smolts produced does not change in proportion to the number of parent spawners, but increases steeply at first before levelling out, and, at high stock levels, declining again. This means that stocks tend to be most productive (i.e. a high proportion of the offspring of each adult pair survive) when numbers are low, but that a smaller proportion of the offspring survive as numbers increase. This occurs because the juvenile fish compete for space and food in the river, and this tends to limit the population size in freshwater to a level known as the carrying capacity for the stream. There does not appear to be a **carrying-capacity** for salmon in the sea (at normal stock densities), and so the *proportion* of salmon smolts that survive to return as adults is not affected by the numbers of emigrating, although it will vary between rivers and with marine conditions. In Figure 1, the straight line at 45° from the origin is known as the **replacement line**. At any point on this line, the number of surviving adults equals the number of spawners in the previous generation. The stock-recruitment curve lies above the replacement line at low stock levels, and the distance between the replacement line and the stock-recruitment curve is the number of fish that may be caught without reducing the population; this is sometimes referred to as the **exploitable surplus** (Figure 2). Because the stock-recruitment curve levels out, it must also cross the replacement line, and this occurs at the **replacement point** (Figure 3). This is the stock size at which the population will tend to stabilise if it is not exploited. If the population is exploited, it will still tend to come to an equilibrium state, but this will be at a smaller size. The higher the level of exploitation, the smaller will be the equilibrium stock size (the stock will stabilise at the point where the exploitable surplus divided by the total (adult) recruitment equals the exploitation rate). However, if the exploitation rate exceeds a critical level, the stock will be unable to replace itself and will be forced to extinction.

Looking at the stock-recruitment curve, it might appear the 'optimum' status of the stock is at the point of **maximum recruitment**, where the number of smolts or adults produced is at its greatest (Figure 3).

However, this is not the point where **exploitable surplus** is at its maximum; this always occurs at the lower stock size. If the management objective was to maximise the catch in a sustainable way, then this might be a preferable equilibrium position. In the case of salmon, the choice may not be so simple because there may be a desire to allocate more fish for the rod fisheries than they will be able to catch, in order to improve the quality of the fishing. The equilibrium state of the stock would therefore depend upon what management objectives were selected and the resulting level of exploitation.

The three points marked on the stock-recruitment curve in Figure 3 can all be defined mathematically (although the maximum recruitment point cannot be defined for all types of curve). They can therefore be objectively set for any stock for which a stock-recruitment curve can be established or approximated, and provide a sensible basis for setting reference levels for management. ICES has selected the lowest of these as an appropriate level for a **conservation limit**, and the objective should be to ensure that the spawning stock in each river is above this level in the majority of years. One way to achieve this is to set a **management target**, a point at which managers might aim, at a higher stock level. The difference between the conservation limit and the management target would depend upon the degree of uncertainty in both the stock assessments and the ability to manage the fisheries (Figure 4).

Salmon Stock Dynamics

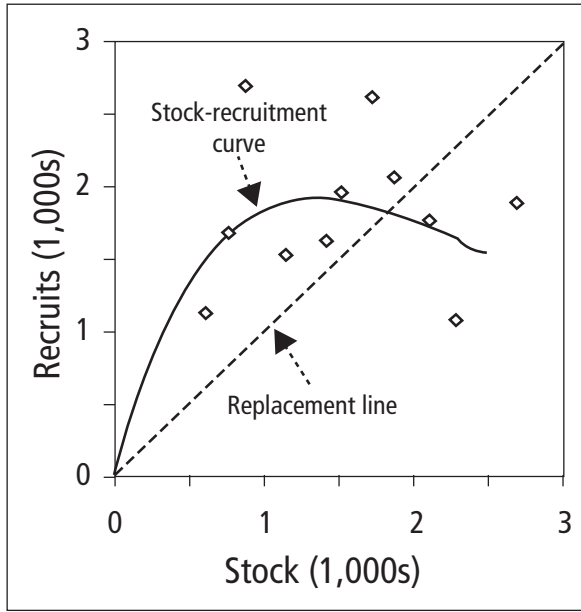


Figure 1. Relationship between numbers of adult spawners (stock) and production of adults in the next generation (recruitment).

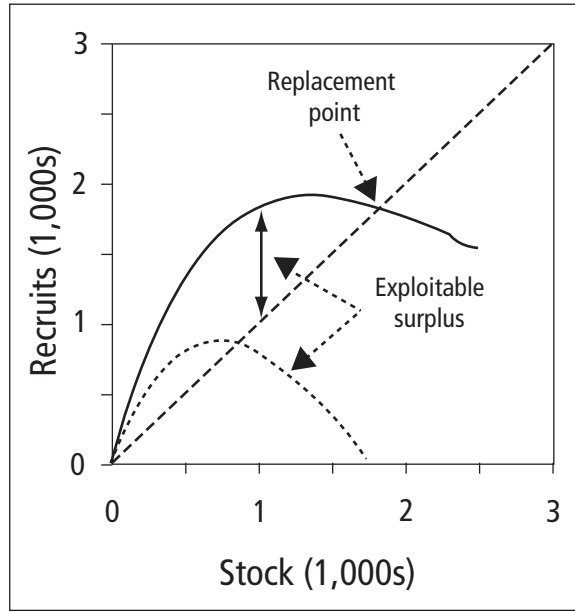


Figure 2. Exploitable surplus calculated from stock-recruitment curve.

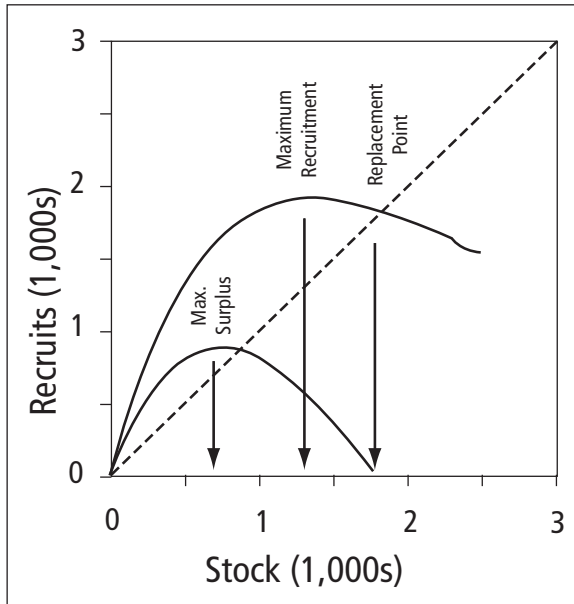


Figure 3. Stock-recruitment curve showing biological reference points.

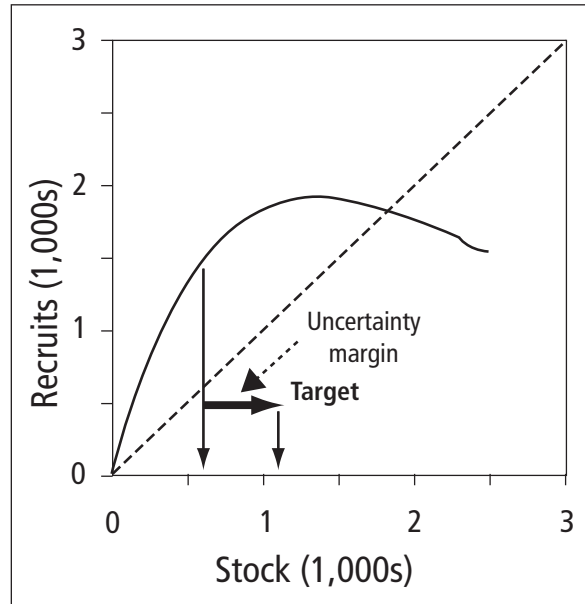


Figure 4. Stock-recruitment curve showing conservation limit and management target.

Chapter 11

Introductions and transfers

1 The need for control

- 1.1 There was unanimity among those giving evidence that it was necessary to retain control over movements of fish. It was pointed out to us that moving fish from one water body to another can adversely affect the receiving fish population through increased predation and competition for food, by weakening its genetic integrity, by introducing diseases and parasites and by disrupting the local ecosystem. Introducing fish can also cause welfare problems if fish numbers rise above the carrying capacity of the water body concerned. The consequences of inappropriate fish movements are likely to be most direct, and most serious, when fish are introduced into the wild, but it is not possible to insulate fish in fish farms from all contact with wild fish, so movements between fish farms can also affect wild stocks.
- 1.2 We agree that control over fish movements is fully justified. The form of control needs to take into account the following categories of fish movement:
- movements for the purpose of stocking, which we define as the introduction of a fish into a water body with the primary intention of keeping it there; and
 - movements of fish for aquaculture purposes, including movements to and from fish farms and a dealer's premises.

2 The Present legislation

- 2.1 Control over stocking is provided by Section 30 of the Salmon and Freshwater Fisheries Act 1975, which requires anyone who stocks fish or fish spawn into any inland water to have the prior written consent of the Environment Agency. Section 30 does not, however, apply to the great majority of fish farms as these are specifically excluded (under an amendment made by the Salmon Act 1986)²².
- 2.2 In theory, Section 30 should allow the Environment Agency to exercise comprehensive control over stocking in England and Wales. However, evidence we received convinced us that, as currently drafted, Section 30 has several weaknesses and is, moreover, difficult to enforce. We return to this latter point in paragraph 7.1.
- 2.3 There are no controls over movements to and from most fish farms, other than those imposed to control fish diseases (Section 6 below) and controls on the movements of non-native fish (Section 5 below).

²² Text of S.30 of 1975 Act, as amended

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

3 Stocking

- 3.1 English Nature and the Countryside Council for Wales emphasised to us that stocking can be particularly inappropriate where there are indigenous fish populations that have been largely unaffected by previous stocking. Although there is only limited evidence of a correlation between genetic makeup and environmental factors, it is likely that selection pressures will have led to adaptive differences between races. As a basic principle, it would be unwise to assume that fisheries managers can do better than Nature and, given the overall lack of conclusive scientific evidence, it would be appropriate to adopt a precautionary approach to stocking and to assume that genetic differences between populations have an adaptive significance and should be protected.
- 3.2 At the same time, it was pointed out to us that few coarse fish and trout populations exist that have not been affected by stocking at some time in the past, and that stocking is an important management tool that has been practised in many waters for many years. Without stocking, many trout fisheries and stillwater coarse fisheries would be severely disadvantaged. Nevertheless, the potential benefits of stocking need to be balanced against the possible disadvantages, including the risk of spreading disease and parasites, and its use should be restricted to those situations where the benefits outweigh the disadvantages.

*Introductions of fish for stocking purposes should continue to be regulated and stocking should be permitted only where it can be justified taking account of the benefits and disadvantages.
(Recommendation 46)*

- 3.3 To assist both those administering the regulations and those who wish to stock, clear guidelines should be established on when stocking should or should not be allowed.

Guidelines on stocking, embodying the following principles, should be established:

- *stocking should be allowed only where there is no significant risk of ecological detriment to donor waters or receiving waters and where there is a demonstrable environmental, economic or recreational advantage;*
- *stocking should not normally be permitted in waters with established fish populations where it is not currently practised and has not been practised in recent years. However, stocking may be justified in such fisheries if it is needed in order to restore depleted populations or mitigate the effects of, for example, loss of spawning habitat;*
- *where recreational pressures justify stocking to sustain exploitation rates by anglers or losses due to predation higher than could be sustained naturally, decisions on consent applications should take account of the carrying capacity of the water involved and the management regime proposed for that water body;*
- *fish should not normally be introduced into waters outside the existing natural range of the species concerned or into new catchments within their existing ranges;*
- *reintroduction of fish species which are no longer present in a catchment should be permitted only after an assessment of the likely environmental effect of the reintroduction.*
(Recommendations 47)

- 3.4 The principle that fish should not be stocked outside their natural range should not apply to rainbow trout stocked in enclosed waters. These have been stocked in such waters for over 100 years, and that practice has been shown not to pose significant risk.

- 3.5 It was proposed to us that wild brown trout fisheries have particular ecological and economic value and should be protected. We agree that protection of these fisheries is important because they tend to be associated with particularly good quality habitat that supports high biodiversity. Various studies (see Box 11 below) have shown that brown trout can develop genetically distinct populations that have particular adaptations to their environment. It is likely that, despite much past stocking, locally adapted brown trout populations exist in many waters in England and Wales. In order to conserve wild brown trout populations there should be a presumption against stocking such waters with hatchery reared fish. Where stocking is proposed it should be evaluated against the principles listed above, bearing in mind the ecological importance of the wild populations.
- 3.6 We also received submissions from various angling groups, including the Barbel Society, the Catfish Conservation Group, the Grayling Society and the Specialist Anglers Conservation Group, raising particular concerns about current policies on the movements of fish, and in some cases proposing distinct policies for stocking certain species. We believe that all these concerns are addressed by our general recommendation on the stocking of fish and do not believe that policies for individual species are necessary or appropriate.
- 3.7 It has been suggested to us that one way to reduce the impact of stocking on wild fish populations is to release sterile triploid fish. However, triploidy cannot always be induced with one hundred per cent certainty. Thus this technique may not be appropriate in situations where it is necessary to guarantee that the introduced fish will not breed with the wild stock (for example with the release of landlocked salmon into rivers). In addition triploid fish may still have other ecological impacts, for example through predation and competition or the introduction of diseases and parasites. We therefore believe that stocking with supposedly sterile fish should also be employed with great care and should adhere to our general recommendations on introductions and transfers.
- 3.8 Extreme care must be taken to assess the impacts before stocking is carried out. Where stocking is permitted, it should be appropriate to the ecological characteristics of the receiving waters and their management requirements. It is essential that the effects of stocking are monitored. One way of achieving this would be to make it a condition of consent that the person undertaking stocking monitors its effects and reports their findings. In our view it is also essential that the Environment Agency assesses the impact of its stocking consent policy both for the individual water body concerned and as a general fisheries management measure.

Where stocking is consented:

- *the size, age, number and provenance of the stocked fish should be appropriate to the ecological characteristics of the receiving water;*
 - *the effectiveness and environmental impact of the stocking should be monitored.*
 - *the Environment Agency should itself undertake periodic reviews of its policy on stocking consents, based on its assessment of the effectiveness of stocking and the environmental impact.*
- (Recommendation 48)*

- 3.9 There is a widespread perception, particularly among anglers and riparian owners, that many of the problems of declining salmon stocks can be addressed by restocking with hatchery-reared fish. There are also those who wish to employ stocking to enhance catches rather than simply as part of stock restoration programmes. There has therefore been continuing pressure for the Environment Agency to undertake such programmes and for other groups to be permitted to do this themselves. However, the Environment Agency's

policy is that stocking should proceed only where this has been identified as the most sustainable and cost effective solution; and stocking will be undertaken only following an assessment of the ecological and genetic risks, and carried out where the risks are considered acceptable. The Environment Agency has also determined that it will not undertake stocking of salmon or migratory trout to supplement an existing stock where production is less than the water body could sustain (enhancement stocking). We have received a number of submissions asking for the Environment Agency's current controls on stocking to be relaxed, but we have also heard from those warning of the dangers of stocking.

- 3.10** It has been suggested to us that extensive stocking was responsible for the success of some fisheries and the development of runs of large multi-sea-winter salmon in the South West of England at some times in the past. However, we believe that the evidence for the success of most historic stocking programmes is questionable and where programmes have been properly evaluated they frequently show low return rates. For example, the increase in multi-sea-winter salmon runs early this century which has been attributed by some to stocking was also seen in many other rivers where no stocking was undertaken. We consider that other stock restoration measures, such as habitat improvement, are generally more effective, particularly since they confer longer lasting benefits.
- 3.11** More importantly, however, we are aware of the growing weight of scientific evidence that some at least of the genetic differences between river and tributary populations of salmon reflect adaptation to the conditions that the fish are likely to experience. For example, differences in run-timing between stocks and the resistance of some stocks to certain diseases or parasites have been shown to be partly under genetic control. Salmon from a "foreign" stock may therefore be less well adapted to the river environment into which they are released than the indigenous stock, and so if surviving fish breed with indigenous individuals they may also confer reduced adaptiveness upon some or all of their offspring. An example of local adaptation of races of brown trout within Lough Melvin is given in Box 11 below. While the use of indigenous broodstock will reduce these risks, many studies have shown that husbandry practices in hatcheries will modify the genetic make-up and reduce the genetic variability of the fish, thus reducing their fitness in the wild. This may be caused by a variety of factors, including the artificial pairing of broodstock and unnatural selective pressures in the hatchery environment. Such a stock may be able to survive quite well under stable conditions but will have limited resilience when the environment changes.

Box 11 Lough Melvin brown trout

Studies by Queen's University Belfast of brown trout (*Salmo trutta*) from Lough Melvin in north-west Ireland have demonstrated that the three varieties of trout in this water, known locally as 'ferox', gillaroo' and 'sonaghen', are genetically distinct and do not reproduce with each other despite there being no physical barrier to prevent them doing so. Individuals from these three populations have different colouration and physical characteristics; tend to live in different parts of the lough; and exhibit different behaviour, diet and growth patterns. One example of the possible risks of introducing crosses or new genotypes is apparent from the differing spawning areas used by the three populations. Gillaroo spawn in the lake and the outflowing river, sonaghen in the smaller inflowing rivers, and ferox in the deep downstream section of the largest inflowing river. Juvenile gillaroo must therefore be adapted to swim upstream to reach the lough while juvenile sonaghen and ferox trout must swim downstream. Juveniles adopting the wrong migratory behaviour would fail to reach the lough.

- 3.12 The results on the Delphi fishery in Ireland, where stocking has been employed, have also been cited in support of more widespread use of this technique particularly in the south-west of England. The success of this programme has been exceptional in providing increased catches, but it is a ranching programme and is not designed to enhance the naturally reproducing stock. The fish have therefore been selected to perform well under artificial smolt-rearing conditions rather than for the juvenile fish to survive well in the wild. On the Delphi fishery, every effort is made to net all the returning stocked fish that are not taken by anglers rather than permit the fish to spawn in the wild.
- 3.13 It is sometimes suggested that salmon stocking may have beneficial effects through the phenomenon of “hybrid vigour”. Hybrid vigour generally applies to the highly artificial situation where two inbred lines are crossed (as for example in plant breeding programmes to produce F1 hybrids). Breeding between races of the same species usually produces intermediate characteristics, and thus intermediate fitness, in the first generation and there is some evidence that it can have adverse effects in subsequent generations. We, therefore, conclude that introducing fish from another river is more likely to decrease the fitness of the stock than to increase it.
- 3.14 In view of these concerns we believe that there is a case for taking a particularly cautious approach to salmon stocking programmes. This does not mean that salmon stocking should not be permitted where appropriate, such as when spawning areas have been lost or in severely depleted populations, but the case for stocking should be carefully evaluated against alternative management options.

Stocking with salmon should be employed only to address a decline in stocks where:

- *alternative methods to solve the problem have been fully evaluated and the need for stocking has been clearly identified and justified;*
- *the programme is appropriate and conforms to agreed guidelines/criteria (including the use of appropriate stock and the adoption of best hatchery practices). (Recommendation 49)*

4 Fish farms

- 4.1 Fish farms are a source of involuntary introductions. Inevitably some fish escape from fish farms; even if a fish farm is fully enclosed, spawn can be transferred to other waters. We recognise that it is impossible to prevent such escapes entirely (although every effort should be made to minimise them) and conclude that the management and regulation of fish farms must take account of the fact that escapes will occur. Fish transfers related to fish farming have been implicated on a number of occasions in the spread of fish diseases; this is another reason why transfers between fish farms, as well as from fish farms to the wild, need to be regulated. In making our recommendations, we have defined a fish farm as being any site where fish are kept with a primary purpose of selling them and/or transferring them to another water. This definition includes fish dealers’ premises.
- 4.2 As is pointed out above, Section 30 of the 1975 Act, which enables the Environment Agency to regulate introductions into most waters, does not apply to the majority of fish farms. We do not consider that this automatic exemption is in keeping with the underlying purpose of this provision, given that fish can, and do, escape from fish farms into the wild. We do not believe, for example, that it would be appropriate to introduce a species into a fish farm in a catchment where it was not naturally present if there was a risk that it would escape and establish a breeding population in the wild. We wish, therefore, to see this exemption removed. At the same time, we recognise the need to minimise the additional bureaucratic

burden that ending the exemption could impose on the fish farming industry. Where there are movements of fish on a regular basis as, for example, onto trout farms producing trout for the table, and there is no significant risk of environmental harm, there would be little benefit to be gained from seeking approval to introduce each new consignment. In these circumstances, the Environment Agency should be able either to exempt particular categories of fish farms from the need to seek consent for introductions or to issue approvals covering all introductions of a particular type for a given period.

The current exemption of fish farms from the requirement to seek approval for introductions of fish should be ended, but the Environment Agency should have the power to exempt particular categories of fish farms from this approval process and to issue consents covering introductions of a particular type within a given period. (Recommendation 117)

- 4.3** Currently, there is no mechanism for regulating fish farming activities or the location of fish farms other than the planning process. All fish farms must be registered under fish disease legislation but this is not a licensing procedure. Registration does not confer rights to farm fish but is a record of farming activity for the purposes of disease control. Section 29 of the Salmon and Freshwater Fisheries Act 1975 provides for salmon and trout farms to be licensed, but there is no provision for the imposition of conditions of approval or any penalties for non-compliance; in any event, it has never been implemented. In the evidence put to us there was considerable support for tighter regulation of fish farms. We conclude that this is desirable, and we would like to see a proper licensing scheme for fish farms (as defined in 4.1 above) introduced. The licensing authority should have the power to refuse applications for fish farms on unsuitable sites – for example where there is a serious risk of flooding – and should also be able to impose conditions of approval; these could, for example, cover species that could be farmed and measures that would need to be taken to prevent escapes or interference with wild fish stocks.

Legislation should be introduced requiring all fish farms, including dealers' premises, to be licensed and the licensing authority should have the power to refuse licences for inappropriate sites and to impose conditions of approval. (Recommendation 118)

- 4.4** We believe that details of all licences, including conditions of approval, should be in the public domain. Currently, there are statutory restrictions on disclosing details of fish farm registrations, although we understand that these are likely to be removed in the forthcoming Freedom of Information legislation.

Licences for fish farms should be listed on a public register containing licensing conditions and other relevant information, such as details of outbreaks of notifiable diseases and any prosecutions for breaching licensing conditions. (Recommendation 119)

- 4.5** Marine cage salmon and trout farms can pose particular problems. Large numbers of fish have escaped from salmon farms in Norway and Scotland, and there are fears that these can destroy the genetic integrity of indigenous stocks. Salmon farms may be implicated in the decline of sea trout stocks in the west of Ireland and western Scotland through the spread of parasites. We are aware of only one marine salmon farm in England and Wales (on the River Fowey), but in view of the potential risks we believe that a cautious approach to any expansion is required.

Marine cage salmon and trout farms should not be permitted in estuaries of rivers containing migratory salmonids or in adjacent coastal waters. (Recommendation 50)

- 4.6 The Moran Committee drew our attention to the particular threat posed to wild fish by the possible use for farming of transgenic fish (that is to say fish modified genetically with genes from another species). While our Review was in progress this issue was considered by the House of Lords Sub-Committee on Genetic Modification in Agriculture, which emphasised that any trials undertaken on such fish, and any subsequent farming of them, must ensure that they are not released into the natural environment. Their Lordships' concern is echoed by the guidelines NASCO has adopted on transgenic salmon: all members of NASCO have agreed to take all possible measures to ensure the use of transgenic salmon is confined to secure, self-contained, land-based facilities. In our view the strict observance of the NASCO guidelines for all fish, not just for salmon, should ensure that transgenic fish are not released, and do not escape, into the natural environment. The licensing system that we are recommending be introduced for fish farms would make it possible to ensure the necessary controls are in place.

Any transgenic fish kept in England and Wales should be confined to self-contained land-based and escape-proof facilities, with all necessary measures taken to ensure they cannot deliberately (by, for example, vandals) or accidentally be released into the natural environment. (Recommendation 51)

- 4.7 However effective the containment measures on a fish farm, they are unlikely to prevent escapes of fish if the site is flooded. As fish farms are often sited on flood plains, this is not a trivial issue. It should, however, be possible to minimise the risks by careful site planning at the development stage. Pending the introduction of a licensing scheme, this should be done through the planning process.
- 4.8 The EC Environmental Assessment Directive applies to both marine and freshwater fish farms. In all cases where there is a likelihood of an adverse environmental impact, proposals for aquaculture projects must undergo an environmental assessment before permission to proceed is given. The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999, which implement the Directive with respect to freshwater fish farms, state that any such farm designed to produce more than 10 tonnes dead weight of fish per year must have an assessment. The assessment is made by the local planning authority as part of the normal development control procedures under planning law. There are separate provisions for marine fish farms because these are not covered by planning law. Instead, the Crown Estate Commissioners, as owners of the seabed, must carry out an assessment before deciding whether to grant a seabed lease for a marine fish farm. The Environmental Impact Assessment (Fish Farming in Marine Waters) Regulations 1999 require the Crown Estate Commissioners to consult the Secretary of State, the local authority and English Nature or the Countryside Council for Wales as part of the assessment process. Given the potential for environmental harm, including damage to fish stocks from inappropriately sited fish farms, we conclude that no proposals for fish farms or extensions to existing fish farms should be permitted unless a full environmental impact assessment, carried out in accordance with the terms of the EC Directive, has indicated that the proposed project will not have a significant environmental impact.

Environmental impact assessments should be made for all proposals for new fish farms or extensions to existing fish farms. In addition, detailed planning guidance should be issued to assist local planning authorities in assessing the suitability of a proposed location. (Recommendation 52)

- 4.9 The Environment Act 1995 amended Section 14 of the Salmon and Freshwater Fisheries Act 1975 to require screens to be installed on all fish farms drawing water from rivers frequented by salmon or migratory trout. We consider this to be a useful change and one that we would like to see extended to all rivers in recognition of the fact that screens on fish farm inlets and outlets are needed to prevent escapes from and ingress to farms as well as

to protect migratory fish. This change would, of course, become unnecessary if our recommendation on licensing of fish farms were implemented, since adequate measures to prevent ingress and egress of fish would be part of a licence's conditions of approval.

Screens should be required on inlets and outlets of all fish farms and the Environment Agency should be given powers to impose conditions on the design and maintenance of the screens to be used on any fish farm. (Recommendation 120)

5 Non-native fish

5.1 Introducing non-native fish into waters in England and Wales presents most of the problems, in more acute form, associated with the stocking and introduction of native species. For this reason introductions of non-native fish are subject to strict controls. Under the Wildlife and Countryside Act 1981 it is an offence to introduce non-native fish into the wild without a licence. This provision, however, has a number of weaknesses. In the first place, it is difficult to prove that non-native fish have been introduced unless someone sees this happening. Second, it applies only to the wild, so that most fish farms are not covered. Third, there is no definition in the Act of the term the wild and so there is uncertainty as to whether, for example, artificially created fishing lakes are included. To remedy these weaknesses an Order²³ was made in 1998 under the Import of Live Fish Act 1980 making it an offence to introduce into or keep in any water a species listed in the schedule to the Order without a licence. (See Box 12 below). This provision applies regardless of where the fish are kept, and thus covers fish kept not just in fish farms and fisheries but also in ponds and aquariums. For some commonly kept species (grass carp, sterlet/sturgeon and ictalurid catfish) general licences have been issued allowing anyone to keep them in garden ponds or aquariums; however, dealers and retailers who sell such fish still require licences. The list does not include some widely distributed species such as rainbow trout and koi carp.

²³ The Prohibition of the Keeping or Release of Live Fish (Specified Species) Order 1998

Box 12 Species of fish whose keeping or release in any part of England and Wales is prohibited except under authority of a licence granted by the Minister of Agriculture, Fisheries and Food and the National Assembly for Wales

Common Name	Scientific Name
American brook trout	<i>Salvelinus fontinalis</i>
Asp	<i>Aspius aspius</i>
Big-head carp	<i>Aristichthys nobilis</i>
Bitterling	<i>Rhodeus sericeus</i>
Blageon	<i>Leuciscus souffia</i>
Blue bream	<i>Abramis ballerus</i>
Burbot	<i>Lota lota</i>
Catfish	species of the genera <i>Ictalurus</i> and <i>Silurus</i>
Chinese black or snail-eating carp	<i>Mylopharyngodon piceus</i>
Danubian bleak	<i>Chalcalburnus chalcoides</i>
Grass carp	<i>Ctenopharyngodon idella</i>
Landlocked salmon	Non-anadromous varieties of the species <i>Salmo salar</i>
Large-mouthed black bass	<i>Micropterus salmoides</i>
Mediterranean barbel	<i>Barbus meridionalis</i>
Nase	<i>Chondrostoma nasus</i>
Pacific salmon and trout (excluding rainbow trout but including steelheads)	species of the genus <i>Oncorhynchus</i>
Paddlefish	species of the genera <i>Polyodon</i> and <i>Psephurus</i>
Pike-perch (including zander)	species of the genus <i>Stizostedion</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Rock bass	<i>Ambloplites rupestris</i>
Schneider	<i>Alburnoides bipunctatus</i>
Silver carp	<i>Hypophthalmichthys molitrix</i>
Sturgeon or sterlet	species of the genera <i>Acipenser</i> , <i>Huso</i> , <i>Pseudoscaphirhynchus</i> and <i>Scaphirhynchus</i>
Topmouth gudgeon	<i>Pseudorasbora parva</i>
Toxostome (or French nase)	<i>Chondrostoma toxostoma</i>
Vimba	<i>Vimba vimba</i>

- 5.2 It is too early to judge how effective these new provisions will be. Nevertheless, we welcome this attempt to tighten up rules applying to the introduction of non-native fish. It is unfortunate, however, that the new rules apply only to species listed in the Order; this is required by the parent legislation, and we understand that if it were found that a species not on the list was being introduced or kept it could readily be added to the list. Nevertheless, we believe that it would be preferable for the rules to cover all non-native cold water fish species.

Legislation should be amended to extend the licensing provisions for non-native fish to all non-native cold-water species. These might be defined as non-native species that are known to survive and breed outside England and Wales in conditions that are comparable to those appertaining to freshwater in England and Wales. (Recommendation 121)

- 5.3 Some introduced species such as goldfish and koi carp are widely distributed. As is pointed out above, these are not currently covered by the licensing provisions for non-native species, and we think it reasonable to continue to exempt them in future. The Environment Agency should, however, ensure that any application under Section 30 to stock them is considered according to the same criteria as an application to stock a non-native fish. The same principle should apply to any colour variant or hybrid of an otherwise native species, such as golden tench.

When applications for the introduction of non-wild varieties of native species are considered, the Section 30 consent determination should follow the criteria laid down for non-native species covered by licensing provisions. (Recommendation 53)

- 5.4 It is necessary to limit the licensing provisions to cold water species because, if all non-native species were included tropical fish hobbyists would also be caught by the provisions. We appreciate, however, that the distinction between warm-water fish and cold-water fish and their potential for survival in the wild is not always clear cut. There may be some uncertainty over whether some species of non-native fish and plants normally found in warmer conditions might sometimes survive and breed in this country. This could become a particular problem if average water temperatures increase as a result of global climate change.

The amended legislation for non-native species should contain powers for adding warm-water species to the fish covered by the licensing provisions. This could be done by listing banned species but would require regular review to enable a precautionary approach to be applied. (Recommendation 122)

- 5.5 A similar Order²⁴ also made under the Import of Live Fish Act 1980, was introduced in May 1996 to protect the threatened native or white-clawed crayfish in England and Wales by means of the introduction of licensing arrangements for the keeping of non-native species. The Order aims to prevent the spread of signal crayfish (see Box 13 below) by designating ‘no-go’ areas in which the unlicensed keeping of this species is banned. The unlicensed keeping of all other non-native species of crayfish is prohibited throughout England and Wales. Similar legislation applies in Scotland, which is a ‘no-go’ area for signal crayfish.

²⁴ The Prohibition of the Keeping of Live Fish (Crayfish) Order 1996

Box 13 The Impact of the spread of Signal Crayfish

- Signal crayfish are significantly larger, faster growing, more aggressive and more voracious feeders than the native white clawed crayfish and will rapidly replace native crayfish in waterbodies where both species are present.
- Signal crayfish spread readily and will cross land to reach new waterbodies.
- Signal crayfish are relatively tolerant of adverse and marginal conditions thus population numbers can increase rapidly.
- Signal crayfish compete with native crayfish, fish and other invertebrates for food and refuges and are vectors for crayfish plague and fish parasites.
- Signal crayfish are predators of fish eggs, larvae and juveniles.
- Signal crayfish have a burrowing habit which can result in bank instability and collapse.
- At present there are no effective methods for eradicating signal crayfish although control of numbers may be possible in small enclosed waterbodies.

5.6 During the course of this review we noted there was some debate about enforcement of the new licensing arrangements and, in particular, the requirement to remove fish from certain waters and their subsequent disposal. We consider that the Import of Live Fish Act controls should not be compromised simply to ensure the survival of individual fish. Where it is necessary to remove fish introduced without authorisation and they cannot be transferred to a licensed site or it is not possible to provide adequate quarantine facilities, we agree the fish concerned should be destroyed. We recognise that this course of action may not be popular and can understand a reluctance to kill fish unnecessarily. Nevertheless, it is important to realise that fish that have been introduced without proper authorisation pose an unacceptable risk to our native flora and fauna.

The Environment Agency should have explicit powers to remove and, where necessary, destroy unlicensed non-native fish and crayfish and to recover full costs from the owner or occupier of the fishery. (Recommendation 123)

6 Fish health

- 6.1 The movement of fish from one body of water to another may spread disease and parasites. The risk of this happening is highest if fish have been transferred outside their natural geographical range or into a catchment where indigenous stocks have not previously been exposed to fish from elsewhere. The rules on fish health, including those on movements of fish, that apply in England and Wales are largely determined by the European Union's fish health regime. This is primarily concerned, however, with movements of fish for fish farming purposes and is intended to prevent artificial barriers to the movement of such fish within the European single market. Although the rules apply in some circumstances to movements of wild fish, they do not address the disease problems that can arise from stocking fish into the wild.
- 6.2 Under the EU regime the whole of Great Britain is an approved zone with regard to the serious salmonid diseases Viral Haemorrhagic Septicaemia (VHS) and Infectious Haematopoietic Necrosis (IHN). To retain this status all farms containing salmonid species have to be inspected annually, with samples taken and tested every two years, to ensure that these diseases are not present. Imports of fish susceptible to these diseases, which

include all salmonids, are permitted only from other approved zones; non-susceptible fish from non-approved zones have to come from waters which are not linked to any other watercourses and do not contain susceptible species. In addition, provisions designed to guard against the introduction of the parasite *Gyrodactylus salaris*, which has had a devastating effect on salmon stocks in Norway, prohibit the import into Great Britain and Ireland of all live salmonids. All fish susceptible to the coarse fish disease Spring Viraemia of Carp imported into the United Kingdom have to be certified as coming from waters listed as free from the disease.

- 6.3 In theory, we believe that these rules, if properly implemented, should provide a high degree of protection against the introduction into Great Britain of diseases and parasites from elsewhere. On the whole, the rules have worked well for salmonids, although we are concerned about the recent outbreak of the salmon disease Infectious Salmon Anaemia (ISA) in salmon farms in Scotland. For coarse fish the situation is less satisfactory; we were told that coarse fish are frequently smuggled into England, evading all health controls, and that these pose a major threat to the health status of native fish stocks. However, this seems primarily to be a problem of enforcement, which we deal with in the next section.
- 6.4 The EU regime does not specifically provide for health standards to be set for fish that are to be stocked into the wild. Before it grants consents under Section 30 of the 1975 Act, the Environment Agency imposes a compulsory health check on all fish stocked into open watercourses or associated still waters. Most such checks are carried out at the Environment Agency's own laboratory but it accepts checks performed by suitably qualified third parties. For introductions of salmonids from fish farms, the statutory testing by MAFF's Fish Health Inspectorate is fulfilling these requirements.
- 6.5 The Environment Agency no longer requires health checks before it issues Section 30 consents for introductions into enclosed waters. For these, it operates a 'buyer beware' policy. Under this, it is up to those wishing to stock fish into such waters to ensure that the fish are disease free, although the Environment Agency warns all those who apply for Section 30 consents of the risks involved.
- 6.6 A number of those giving evidence to us were unhappy about what they saw as a relaxation of the Environment Agency's health controls on introductions; they wanted to see compulsory health checks reimposed on all introductions. The Environment Agency, on the other hand, was concerned about the potential cost of such a change. It does not have the resources to carry out proper health checks on introductions into all waters, and said that imposing a charge on such checks would reduce still further the already inadequate level of compliance with Section 30 requirements.
- 6.7 We are concerned about two aspects of the Environment Agency's current policy. First, as noted above, the EU regime does not specifically provide for standards to be set for the stocking of fish into the wild, and there is, therefore, some uncertainty about the exact legal status of the Environment Agency's rules. It would be helpful if this uncertainty could be ended and such measures fully integrated into the EU's fish health regime.

The Government should seek a revision of the basic fish health directive (91/67/EEC) to permit specifically the imposition of restrictions on stocking fish into the wild. (Recommendation 54)

- 6.8 We are also concerned that health checks in their current form may be of limited use given the difficulty of detecting viruses and bacteria in carrier fish. Ideally, it would be better if health checks were carried out on a regular basis on donor waters and stocking only took place from waters shown over a period of time to be disease free.

- 6.9 In reality, we do not believe that such a system would prove practicable, given the range of waters from which fish for stocking are taken. However, it would be helpful both to those authorising and to those undertaking stocking to have a source of fish that had been tested as disease free, and the Agency, in co-operation with the Fish Health Inspectorate, should consider testing selected waters on a regular basis to establish a list of disease free stocks.
- 6.10 Nevertheless, in our view consent to stocking under Section 30 on health grounds should not be based solely on a sample check. We would like the Environment Agency to undertake an assessment of the potential fish health risks of all proposed stockings, taking into account such factors as the health status of the donor water and the vulnerability of the receiving water. The Environment Agency could then impose fish health conditions matched to the level of risk involved. Such conditions could involve checks on the fish to be stocked or, where the receiving water was particularly vulnerable, the state of the donor water.
- 6.11 Under such a system there would not be automatic exemption for any type of water. We agree, however, that for enclosed waters where the risk of transferring disease to another water is slight, the onus should normally be on the owner to ensure that any fish stocked do not introduce disease. On the other hand, if stocking in enclosed water poses a particular risk, for example, because the water is located in a catchment with no previous history of stocking, we would wish to see fish health conditions imposed. We also suggest that the guidelines we are recommending be drawn up on stocking incorporate guidance on fish health; they should explain how fish and the waters being stocked can best be managed to minimise the risks of introducing and spreading disease and parasites.

Health checks on fish that are to be stocked should be conducted under the following circumstances:

- *the Environment Agency should continue to impose fish health conditions on stocking waters where stocking would involve a significant risk of spreading disease; these conditions should not be confined to satisfying a laboratory check of a sample of the fish to be stocked;*
- *the Environment Agency should carry out a risk assessment of all proposed stockings and that the fish health conditions it imposes should be commensurate with the level of disease risk. For those stockings that do not involve a significant risk, the onus should be on the owners to ensure that the fish stocked are disease free;*
- *the Environment Agency should consider testing selected waters on a regular basis to establish a list of disease free sources of fish for stocking. (Recommendations 55)*

7 Enforcement

- 7.1 There was general agreement from those giving evidence that the existing Section 30 provisions are difficult, if not impossible, to enforce. Unless someone is caught in the act, it is extremely difficult to prove that they have introduced fish into a water body or that they intend to do so – it is not an offence to possess fish (provided that they are not non-native ones) in a tank on a lorry, even if it is apparent that the intention is to use them for stocking. We were told that only a proportion of those who stocked fish bothered to apply for a Section 30 consent. A further problem is that under Section 127 of the Magistrates Act 1980, a prosecution must be brought within six months of the commission of an offence (the “six month” rule). At present, therefore, the Environment Agency is unable to proceed with a prosecution outside this time limit even if new evidence becomes available. We consider this limitation to be too restrictive. There are also major difficulties in preventing the illegal introduction of fish from abroad. There are no longer routine customs controls at channel

ports and, without advance warning, it is likely that anyone smuggling in coarse fish would be undetected. Once a consignment is in the country, even if it is suspected that it has been brought in without the necessary health certification, there is little that the authorities can do, since it is difficult to prove that the fish have been imported. We also heard that the potential rewards for smuggling coarse fish could be very high, since a carp of over 14 kg could be bought relatively cheaply on the Continent and sold for thousands of pounds in this country.

- 7.2 With regard to removal of predatory fish and subsequent transfer, we noted that in some, but not all, regions of the Environment Agency, consents are required from the Environment Agency to remove numbers of freshwater fish beyond specified limits. We consider that there should be a consistent approach.

Express consent from the Environment Agency should be required for the removal of predatory fish in excess of specified maximum numbers from all unenclosed waters. (Recommendation 33)

- 7.3 Some of those who submitted evidence suggested that there should be greater self-regulation by those wishing to move or introduce fish. We noted (paragraph 6.5 above) that the Environment Agency had, to some extent, already introduced some flexibility and delegated responsibility by exempting certain waters from Section 30 health checks but we concluded that the risks posed by unauthorised introductions were too great to recommend further self-regulation at this stage. We would, however, encourage all sectors of the industry to treat seriously the risks posed by unauthorised introductions and to take all possible steps to highlight the need for full compliance with these controls.
- 7.4 In these circumstances, we concluded that a fundamental overhaul of the existing rules was needed. We consider that the key change should be the introduction of a system enabling fish movements to be traced, linked to a requirement that all movements of fish be accompanied by the appropriate documentation. With such a system, it would be possible to trace any consignment of fish back to its origin, and if any consignment was not accompanied by the right documents an offence would be committed, without the need to establish that there was an intention to stock fish without consent or that the fish had been imported illegally. A record of fish movements would also be useful if there was a major disease outbreak in order to trace transfers of fish which might have spread the disease.
- 7.5 For this system to work, anyone intending to sell or transfer fish would need to register as a dealer (this should be a simple registration exercise, distinct from the licensing system for fish farms and commercial dealers that we recommend above). There should, however, be a power to refuse registration with just cause, for example for anyone who had been convicted of a fisheries related offence.
- 7.6 We considered proposing that every fish movement should require prior authorisation, but concluded that this would involve an excessive bureaucratic burden on all involved. Stocking would, of course, continue to need prior authorisation, and it should be a legal requirement that fish being transported for stocking be accompanied by a copy of the Section 30 consent. Applications for stocking consents and details of consents granted should be on the public record and available for inspection in a publicly-available register. For other movements, such as transfers between fish farms, we suggest that the onus should be on the seller, who would need to be registered, to fill in the necessary form and ensure that the fish were accompanied by the correct document. Failure to produce the correct document should be an absolute offence. In addition, we would like to see an offence created of possessing fish, or equipment for catching, holding or transporting fish, in suspicious circumstances, with the burden of proof for the offence reversed so that those

found with fish or equipment in suspicious circumstances would have to prove that the fish were being handled legally; this would be an extension of the existing offence of handling salmon in suspicious circumstances contained in Section 32 of the Salmon Act 1986.

Conviction for this new offence would lead to forfeiture of the fish in question together with that of any equipment used, including nets and other fishing gear, and vehicles. The level of fine imposed should reflect the potential gains to those benefiting from the offence.

The following procedures should be introduced to control the movements of fish:

- *a system should be set up to enable all movements of live fish to be recorded and traced;*
 - *under this system it should be a legal requirement that all movements of fish be accompanied by the correct documents;*
 - *anyone selling fish for stocking or any other purpose should be required to register, and the onus should be on the registered seller to fill in the correct documents;*
 - *moving fish without the correct accompanying documentation should be an absolute offence;*
 - *no stocking, or movements for stocking, should be permitted unless the stocking was authorised beforehand, and a register of all stocking consents should be publicly available;*
 - *an offence of possessing fish or equipment for the holding or transporting of fish in suspicious circumstances should be created, with the burden of proof reversed so that the onus would be on those found with fish or equipment in such circumstances or without correct documentation to prove that the fish were being handled legally. Conviction for the offence should lead to forfeiture of the fish and equipment involved and the penalty for the offence should reflect potential gains from the offence;*
 - *there should be a power of disqualification and/or refusal of registration;*
 - *the six month rule should be relaxed so that the time limit for making prosecutions becomes six months from the time that sufficient evidence comes to the attention of the prosecutor.*
- (Recommendations 124)*

7.7 We believe that a system on these lines would make a major contribution to reducing the level of illegal fish introductions and imports. However, it is possible that these problems may remain difficult to control and further restrictions may prove necessary.

Ministers should be given wide ranging powers to introduce further restrictions on fish transfers including, if necessary, prior authorisation of all movements of fish. (Recommendation 125)

8 Livebaiting with fish

8.1 We received conflicting evidence on this topic. Many people, including anglers, were opposed to livebaiting because they considered it to be cruel. Some anglers, on the other hand, did not accept that excessive cruelty was involved and regarded livebaiting as a traditional, and acceptable, practice. As a Group, we did not feel that we had the expertise to reach a judgement on the ethical issues involved in this debate. We have, however, considered the potential impact of livebaiting on fish populations in the aquatic environment.

8.2 It is clear from the evidence we have received that livebaiting can lead to transfers of fish used as bait from one water to another, and that these unauthorised introductions can have a significant impact on resident fish populations in the receiving water. We were told, for

example, that ruffe, roach and dace introduced into Bassenthwaite as unwanted livebait have had a serious impact on one of Britain's rarest freshwater fish, the vendace; the Bassenthwaite population of this fish is one of only two in Great Britain. To deal with problems of this sort the Environment Agency submitted for confirmation, during the course of our Review, a byelaw making it an offence to take fish for use as livebait unless the fish are retained at and used only in the water from which they are taken. If this byelaw is confirmed and is subsequently observed by anglers, it will largely address the problems specified above. However, in our view more far-reaching measures are required in particularly sensitive locations where the impact of any introductions on either rare fish populations or the freshwater ecosystem may be severe.

Where the release or escape of fish used as livebait could have an adverse impact on a valuable freshwater ecosystem or a rare fish population, the Environment Agency should ban the use of livebait in the water in question. (Recommendation 56)

- 8.3** We remain concerned that the byelaw stipulating that livebait may be used only in the water from which they are taken will be impossible to enforce and could be widely disregarded. If this proves to be the case, we would wish the Environment Agency to go further and ban the use of livebait on all rivers, canals, streams and lakes. On totally enclosed waters it should be for the owner or fisheries manager to decide whether to accept the risk of introducing disease by permitting the use of livebait.

If there is evidence that the byelaw stipulating that livebait may be used only in the water from which they are taken is being widely disregarded, the Environment Agency should ban the use of fish as livebait in all unenclosed waters. (Recommendation 57)

Chapter 12

Obstructions to the passage of fish

1 Introduction

- 1.1 In England and Wales the law has long been concerned to prevent obstructions to the free passage of salmon and sea trout. A provision in Magna Carta required the removal of weirs on the Thames and Medway, and there have been other provisions to prevent partial or entire blockages, for example for flood defence reasons, but these on their own are not sufficient to protect fish or to allow free passage to salmon and sea trout migrating up and down stream. This concern has been carried through into current legislation: Part II of the Salmon and Freshwater Fisheries Act 1975 is dedicated to this issue. However, while a number of the existing provisions cover all types of fish, the main focus of the current rules is on migratory salmonids. Other diadromous species – for example eels, shad and lamprey – are largely ignored (except insofar as eel nets may pose a threat to migrating salmonids), as is the fact that many exclusively freshwater species migrate considerable distances within rivers.

2 Dams

- 2.1 Water has long been of importance as a source of power, and in the early years of the industrial revolution most of the new machinery was water powered. To provide the necessary head of water, dams were constructed across many rivers in England and Wales, leading, in some cases, to the complete demise of salmon and sea trout stocks.
- 2.2 Existing legislation deals with this problem in two ways. First, under Section 9 of the 1975 Act, anyone who, in waters frequented by salmon or sea trout:

- constructs a new dam;
- raises or alters an existing dam so as to increase obstruction to the passage of salmon or sea trout; or
- creates, increases or causes any other obstruction to their passage

can be required by the Environment Agency to install a fish pass to the Environment Agency's specifications. In addition, anyone rebuilding or reinstating an existing dam, provided that at least half its length has been destroyed or taken down, can also be required to install a fish pass. Similar provisions have applied since 1873, so most dams and obstructions constructed since then in rivers with salmon and sea trout stocks should contain fish passes although many are not wholly effective. The 1975 Act requires anyone who builds a fish pass in accordance with Section 9 to maintain it in 'an efficient state' although the term 'efficient' is not defined in the Act. Nor is it clear what onus is placed upon the owner to keeping it free from debris. It was also pointed out to us that it was possible to circumvent the requirement to install a fish pass when rebuilding or reinstating a dam by doing so in a piecemeal fashion. This loophole should be closed.

- 2.3 An owner or occupier who is required to construct a fish pass must obtain approval for the design of the pass from the Environment Agency. The Agency, who must grant provisional approval before work commences, will grant final approval only if it considers that the pass

is “efficient in all respects” and is “functioning to its satisfaction”, and the Environment Agency can also withdraw provisional approval if it is not satisfied with the pass. If an owner does not have approval for a pass or does not maintain it, he can be prosecuted and the Agency may undertake necessary maintenance work itself and recover the costs.

- 2.4** Second, under Section 10 of the 1975 Act, the Environment Agency can, at its own expense, install a fish pass in any dam, provided that this does not damage the efficiency of the dam. This provision enables the Agency, provided that it has the necessary resources, to deal with dams and obstructions constructed before 1873. The Environment Agency informed us that it is currently able to construct up to 40 fish passes a year from its own resources, as well as taking some 200 other actions, such as lowering obstructions, to improve the passage of migratory fish. However, it estimates that there are from 7,000 to 10,000 barriers across rivers in England and Wales and that, at present rates of progress, it will take many decades before meaningful improvements can be made to all of them.
- 2.5** A number of improvements to the current legislation were suggested to us. There was general agreement among those who addressed the issue that the requirement to install a fish pass in a new or modified dam or other obstruction should apply in all rivers, not just those frequented by salmon and sea trout. We agree and conclude that fish passes should as far as practicable provide passage for all fish attempting to migrate past the obstruction. We note, however, that in some situations there will be technical difficulties in designing a fish pass that will permit all species of coarse fish to pass through, given their slower swimming speeds and, in some cases, aversion to fast water flows. We suggest, therefore, that it should be for the Agency, in consultation with the local fisheries committee, in approving the design of the fish pass, to decide on the species and sizes of fish that should be able to use it and to ensure it is suitable for its purpose. Cost of installation is obviously an important factor but the Agency’s decision on whether to proceed should not be made on cost grounds alone.
- 2.6** We also consider that it should become an absolute requirement for anyone constructing or altering in any way a dam or other obstruction to install a fish pass, to a design approved by the Environment Agency again in consultation with the local fisheries committee: at present, it is for the Environment Agency to take the initiative in requiring the installation of a pass. However, the Environment Agency should have powers to relax this requirement in certain circumstances, for example to safeguard certain fish populations (see also paragraph 2.11). With this in mind we would ask the Agency to have due regard for the concept of BATNEEC (best available technique not entailing excessive cost).

Anyone creating a new obstruction to the passage of any fish, or increasing or rebuilding an existing one, either in whole or in part, on any river should be required by law to install a fish pass to a design approved by the Environment Agency unless excused from doing so by the Environment Agency. In approving the design, the Environment Agency should determine the purpose of the fish pass, in terms of the species and sizes of fish which should be able to use it, and should require it to be suitable for this purpose. (Recommendation 126)

- 2.7** It was pointed out to us that elver passes were simple and inexpensive to construct and could greatly facilitate the passage of elvers over obstructions.

It should be a requirement to install elver passes (if the fish pass is not suitable for this purpose) on all new or altered dams and other obstructions, and their installation should be encouraged on existing ones. (Recommendation 127)

- 2.8 It was also suggested to us that the Environment Agency should be required to approve new fish passes installed voluntarily by fisheries' owners or other interested parties. It was argued that an ineffective fish pass represented a wasted opportunity and that it was important that all fish passes were properly designed. We considered, however, that such a requirement could well discourage the installation of fish passes; the Environment Agency might, with the best of intentions, seek more elaborate designs than were strictly necessary and be reluctant to agree to simple, but generally effective, passes. We do not, therefore, propose that Environment Agency approval should be required when fishery owners or other interested parties install new fish passes voluntarily at existing obstructions. Nevertheless, we would strongly encourage anyone considering installing a fish pass to seek the best technical advice and to consult the Agency.
- 2.9 The Environment Agency informed us that its powers to install a fish pass are difficult to use when the ownership of an obstruction is uncertain. The Environment Agency has powers under Sections 154 and 156 of the Water Resources Act 1991 to purchase or take on lease, compulsorily if necessary, dams or weirs for this purpose. However, this power is not easy to make use of if the ownership of the structure is not known and there can be problems if there are ancient rights associated with it.

If it is not feasible to establish who owns an obstruction, the Environment Agency should have the power to enter on the land and to take action to reduce or remove barriers to the passage of fish. (Recommendation 128)

- 2.10 The Environment Agency should not, however, assume that all man-made obstructions should be by-passed and removed. Where barriers to fish migration are long-standing, fish populations may have been conserved above them in the same way as they have above natural barriers. In such circumstances, caution should be exercised in assessing any proposal to remove the obstruction. If, for example, the existence of an obstruction has protected a natural wild brown trout population upstream, with no history of stocking, there would be a strong case for retaining the obstruction. In such a case the Environment Agency should not take action without consulting the relevant local fisheries committee and, where appropriate, the nature conservation agency.

3 Barrages

- 3.1 Estuary barriers, such as the Tees and Tawe barrages, present particular problems for migrating salmon and sea trout. They can have dramatic effects on the quality and characteristics of the impounded water, and problems are partly because the impoundment modifies the current. This makes it difficult to ensure that fish passes in barrages are effective: even if they appear to operate satisfactorily for returning adults, they may not do so for emigrating smolts.
- 3.2 Given the problems they create, we want to see no further estuary barrages built.

There should be a presumption against the construction of barrages affecting any rivers containing anadromous fish. Barrages on such rivers should be constructed only if there are over-riding social and economic benefits, and adequate mitigation measures should be introduced. The latter should include fish passes which have been demonstrated to operate over a suitably wide range of flows, and compensatory restocking where this is necessary; there should also be monitoring programmes to assess the effectiveness of these measures, and adequate budgetary provision for them. (Recommendation 193)

4 Screens

- 4.1 Under the current legislation, any outlet constructed after 1923 that takes water from a river or stream frequented by salmon or sea trout must be screened to prevent salmon or sea trout being drawn in. This provision was extended by Schedule 15 of the Environment Act 1995 to outlets drawing water for fish farms; the amendment also introduced detailed specifications for the placing and operation of screens.
- 4.2 We consider these revised provisions, and in particular their extension to fish farms, to be a useful step forward. We agree, however, with those who argued in their evidence to us that these provisions should not be confined to rivers containing salmon and sea trout.

The legislation should be revised so as to require all outlets drawing water from rivers to be screened with a view to preventing the ingress of fish. (Recommendation 129)

- 4.3 In making this recommendation we recognise that it would not be possible to prevent ingress of fish at all stages of life (for example coarse fish fry). It should be for the Environment Agency to determine how screening can be implemented in a practicable and cost effective way.
- 4.4 For fish farms it is also important that the screens should prevent the escape of farmed fish. Our recommendations on this issue are found in Chapter 11.

5 Fixed engines, fishing weirs and fishing mill dams

- 5.1 The 1975 Act makes it an offence to place a fixed engine or use an unauthorised fixed engine in any inland or tidal waters. This is a long-standing provision, carried forward from previous legislation. The term 'fixed engine' is defined in the Act and includes any stake net, bag net, putt or putcher as well as any other fixed device for taking fish, or any stationary net or any net set and left unattended. An authorised fixed engine is one that:
- is certified under the Salmon Fishery Act 1865 as a privileged fixed engine; or
 - was lawfully used in 1861 to take salmon or migratory trout by virtue of any grant or charter or immemorial usage; or
 - is authorised by byelaw.
- 5.2 The Act also contains provisions on fishing weirs, which are defined as any structure fixed temporarily or permanently across or partly across a river for the exclusive purpose of taking fish, and on fishing mill dams, which are dams used partly for the purpose of supplying water for milling or other purposes and partly for taking fish. Fishing weirs and fishing mill dams are legal only if they were lawfully in use before 1861.
- 5.3 As far as we can establish, no fishing mill dams are currently in use. There are a small number of fishing weirs and privileged fixed engines that are still used, such as the putcher ranks in the River Severn. A number of nets currently meet the definition of fixed engine and are authorised by byelaw: these include T and J nets in Yorkshire and Northumbria, as well as eel fyke nets.
- 5.4 We are not convinced that separate legal provisions for fixed engines, fishing weirs and fishing mill dams are still necessary. Most fixed engines currently being fished are, in fact, nets and there seems to be no reason why they should not be regulated in the same way as net fisheries and subject to similar provisions; they already have to be licensed. In the case of other fixed engines, fishing weirs and fishing mill dams that are no longer in use, we

would like to see the right to fish these extinguished if they have fallen into disrepair. This would leave the few remaining privileged fixed engines and fishing weirs. We do not suggest that their right to fish should be ended without compensation and we note that under Section 156 of the Water Resources Act 1991 the Environment Agency already has the power to purchase any fishing weir or fixed engine and by implication close it down.

Future salmon fisheries legislation should treat all nets (whether fixed or not), putchers and other devices currently defined as fixed engines or fishing weirs in the same way, and existing provisions on fixed engines, fishing weirs and fishing mill dams should be repealed. Where privileged fixed engines, fishing weirs and fishing mill dams are still in use, or the devices concerned have been kept in good repair and are capable of use, the right to use them should be preserved; in other cases the rights to use privileged fixed engines, fishing weirs and fishing mill dams should be extinguished. (Recommendation 130)

- 5.5 There is one important feature of the existing provisions on fixed engines that we do not want to see lost. Since 1975 it has been illegal to place or use any unauthorised fixed engine in any inland or tidal waters. This provision prohibits the use of a fixed net within the six mile limit without the authority of the Environment Agency or the relevant Sea Fisheries Committee and so prevents the use of such nets ostensibly to catch sea fish. This is an important provision.

Future fisheries legislation should continue to prohibit the setting of any unauthorised fixed net or net left unattended in inland or tidal waters. (Recommendation 131)

Chapter 13

Enforcement of freshwater fisheries legislation

1 Introduction

- 1.1 If freshwater fisheries legislation is to be effective, it must be properly enforced. There must be a strong likelihood that those who commit offences will be caught, and that their punishment will match the seriousness of their offence. The evidence that we have received on this topic suggests that this is not currently the case. It is often difficult to prove, to the satisfaction of a Court, that an offence has been committed; and when a conviction is obtained the punishment often fails to reflect the serious effect that fisheries offences can have on fisheries and on the environment. For example, where poachers use cyanide to catch salmon the devastating effects on the ecosystem do not appear to be taken into account in determining the sentence.
- 1.2 In this chapter we recommend a number of changes to existing legislation which we believe will make it easier to enforce. We conclude that maximum penalties are in most cases already adequate: the problem appears to be that the Courts and in particular Magistrates Courts, do not take fisheries offences seriously or appreciate the wider environmental damage they can cause. We address this issue in Section 5.

2 Fish theft and illegal fishing

- 2.1 We have been told that the theft of fish – in particular specimen coarse fish – is an increasing problem in parts of England. In England and Wales the Environment Agency is limited in its ability to deal with fish theft because this is not covered by fisheries legislation. Instead, it is up to police and to owners to take action, making use of Schedule I of the Theft Act, which makes it an offence to fish, whether or not any fish are actually caught, without the permission of the fishery owner. To overcome this problem statutory water bailiffs should be given powers of arrest and prosecution under the Theft Act.

Statutory water bailiffs should be given powers of arrest and prosecution under the Theft Act. (Recommendation 132)

- 2.2 In Chapter 11 we recommend wide-ranging measures to improve enforcement of controls on the movement of live fish. These would also, we believe, be effective against fish thefts. In particular, the offence we recommend be created of possessing fish or equipment for the holding or transporting of fish in suspicious circumstances, with the burden of proof reversed so that the onus would be on those found with fish or equipment to prove that they were being handled legally, should make it easier to secure convictions against those found with stolen fish.
- 2.3 We were told that illegal fishing for salmon and sea trout remains a problem, and we discuss this issue in Chapter 10. As we indicate there, the measures contained in the Salmon Act 1986, and in particular the offence of handling salmon in suspicious circumstances, have proved helpful in dealing with illegal fishing of salmon. This provision should be retained in any future legislation, but to simplify the law it would be sensible to incorporate

it in the wider offence we are recommending be created of being found in possession of fish in suspicious circumstances: the new offence should, therefore, apply to both those found in possession of live fish without lawful authority and those found with dead fish which they have obtained, or are suspected of having obtained, unlawfully. There would also appear to be some advantages, in particular in terms of ease of enforcement, in drawing upon the provisions of Section 22 of the Salmon Act 1986, which applies to Scotland which makes it an offence to possess salmon which have been illegally taken, killed or landed.

- 2.4 We noted problems with confiscation of equipment used for poaching and concluded that the Environment Agency should have powers similar to those provided under the Police (Property) Act 1897 and the Police (Disposal of Property) Regulations 1975. This would allow an Order to be sought within the six month summary period and disposal of equipment that has been used for poaching six months from the date of the Order being granted.

The Environment Agency should have powers to dispose of equipment that has been used for poaching. (Recommendation 133)

3 Powers of water bailiffs

- 3.1 Under the Salmon and Freshwater Fisheries Act 1975 the Environment Agency may appoint its fisheries officers as water bailiffs. Water bailiffs, and any person appointed by Ministers, have extensive powers under the Act to enforce fisheries legislation. The Environment Agency told us, however, that there are a number of weaknesses in water bailiffs' enforcement powers under the Act. We have looked into the matter and conclude that there are a number of defects in the current legislation:

- water bailiffs can examine fishing instruments, baits and containers only if they suspect that an offence has been committed, and they have no specific authority to examine fish. Wider powers would assist the Environment Agency's fisheries officers to deal with a wide range of fisheries offences;
- water bailiffs' powers of search do not extend to commercial premises used for handling, selling or otherwise dealing in fish. Wider powers of search would enable fisheries officers to check that fish on such premises had been taken lawfully;
- water bailiffs are empowered to enter land adjoining or near to water in order to prevent a fisheries offence being committed, with the exception of houses and their gardens and land used exclusively for the preservation of wildfowl. We agree that it is reasonable that fishery officers should not enter houses or gardens without a warrant, but we can see no reason to retain the special status of wildfowl reserves;
- warrants for water bailiffs to enter premises suspected of being used to commit fisheries offences are valid for only one week; this contrasts with the general provisions of the Police and Criminal Evidence Act 1984, under which warrants are valid for one month;
- water bailiffs' powers of seizure, under warrant, are limited to 'illegal' nets and other instruments. This provision has proved difficult to make use of as, if it can be argued that a net has a legal use, the net cannot be deemed to be illegal;
- water bailiffs' powers of arrest are limited to the period between one hour after sunset to one hour before sunrise;

- water bailiffs can demand to see someone's rod licence only if they suspect that the person in question has been fishing within the previous half hour.

3.2 In order to assist Environment Agency fisheries officers we would like to see these defects remedied and strengthened powers made available to statutory water bailiffs.

Statutory water bailiffs should be given powers to:

- *examine all fishing instruments, baits containers and fish;*
- *search all premises used for handling, selling or otherwise dealing in fish;*
- *enter all land adjoining water;*
- *seize, under warrant, any net or instrument suspected of being used to take fish illegally;*
- *arrest suspected offenders at any time of the day or night;*
- *demand production of a rod licence if there are grounds for suspicion that someone has been fishing recently.*

Warrants to enter premises suspected of being used to commit fisheries offences should be valid for one month. (Recommendation 134)

3.3 In the past the NRA, and before that the water authorities, made considerable use of honorary water bailiffs. Members of fishing clubs would serve as honorary bailiffs and provided an inexpensive way of increasing the number of bailiffs on the ground. We were told that concerns over health and safety legislation and over the training of some bailiffs have led to significant reductions in the numbers of honorary bailiffs in some Environment Agency regions. This is a disappointing development. While we agree that honorary bailiffs need to be properly trained and equipped, we do not believe that this is sufficient reason for failing to make use of a considerable resource that is available to help the Environment Agency to enforce fisheries legislation. Given the pressures on the Environment Agency's full-time staff, we would like to see the Agency make greater use of honorary bailiffs and greater consistency between regions on this issue.

The Environment Agency should make greater use of properly trained and equipped honorary water bailiffs and there should be greater consistency over the use of honorary bailiffs between regions. (Recommendation 58)

4 Licences

4.1 A considerable proportion of the Environment Agency's enforcement effort is spent checking rod licences. Licence checking would be made easier if, as in some states in the USA, anglers were required by law to display their licences prominently on their clothing. We believe that mandatory licence display would substantially reduce licence evasion not only by making licences easier to check but also by creating peer pressure among anglers to purchase and display rod licences.

Anglers should be required by law to display their rod licences prominently on their person. (Recommendation 59)

4.2 Rod licence evasion would be further reduced if all fisheries owners and managers insisted that everyone fishing their waters possessed a rod licence. The Environment Agency suggested to us that this should be made a legal requirement. While we consider that a legal requirement would place too great a burden on fisheries owners (it would make it

impossible, for example, to sell fishing permits through a machine) we strongly encourage this practice.

We strongly encourage all fisheries' owners and managers to ensure that anyone permitted to fish their waters possesses a valid rod licence. (Recommendation 60)

- 4.3 The Environment Agency informed us that it faces a problem in dealing with the use of falsified rod licences. Falsifying a rod licence is not an offence under fisheries legislation and can be prosecuted only in a Crown Court as an attempt to pervert the course of justice or as a forgery under the Forgery and Counterfeiting Act 1981. It would simplify prosecutions, and make them less expensive, if a summary offence were created which could be dealt with in magistrates courts, although serious offences should continue to be prosecuted in the Crown Court.

A summary offence of falsifying a rod licence or using a false rod licence should be created under fisheries legislation. (Recommendation 135)

5 Penalties and fines

- 5.1 Prosecuting offenders takes up a great deal of fisheries officers time and imposes considerable costs on the Environment Agency, not all of which are recovered in 'costs'. The introduction of fixed penalties for minor fisheries offences, such as not possessing a rod licence, would help reduce these costs. Powers to introduce a fixed penalty scheme already exist; they are contained in an amendment to the Salmon and Freshwater Fisheries Act 1975 made in the Environment Act 1995, Section 104.

- 5.2 We understand that one reason the Environment Agency has been reluctant to make use of these powers is that it would incur the costs of administering the scheme but would be unable to recover these as income from fixed penalties would go to the Exchequer: at present the Courts normally award it the costs of a successful prosecution. However, MAFF informed us that they were in the process of seeking Treasury agreement for the Environment Agency to retain income from fixed penalties. We note that this approach has now been proposed by the Government for speeding offences and car parking fines and we strongly support its application to a fixed penalty scheme for fisheries offences.

The Environment Agency should introduce a fixed penalty scheme for minor fisheries offences. For such a scheme to be viable, it is essential that the income from fixed penalties is retained by the Agency to defray its costs. (Recommendation 61)

- 5.3 We do not believe that people convicted of serious fisheries offences should be eligible to hold an Environment Agency licence to fish with either rod or net. This would send a strong message to potential offenders that fisheries offences would not be tolerated.

Anyone convicted of a serious fisheries offence should be ineligible to hold a rod or net licence for a fixed period. (Recommendation 136)

- 5.4 We have already commented in paragraphs 1.1 and 1.2 above, on the need for courts to recognise the seriousness of fisheries-related offences and the wider environmental damage that is often caused. We were told that the Environment Agency has taken steps to make magistrates aware of the impact that fisheries offences can have on fish stocks and the environment and on the value of fisheries. Magistrates should also be aware of the need to ensure that where promises of reparation are made these promises are kept. We urge the Environment Agency to continue its efforts and recommend that Government reinforce the message.

Government and the Environment Agency should continue their efforts to make judges and magistrates aware of the potential seriousness of fisheries offences and to ensure that punishments imposed by courts reflect the seriousness of the offence. (Recommendation 62)

- 5.5 An alternative approach in the longer term would be to set up a specialist tribunal or court, such as the Environment Court proposed by some senior lawyers, to try environmental cases including those committed under fisheries legislation. A court of this type, with specially trained officers, would bring greater consistency to the enforcement of fisheries law and would ensure that offences were treated seriously.

Government should consider setting up a specialist environment court to try environmental offences including those committed under fisheries legislation. (Recommendation 194)

- 5.6 Wherever a case is tried, it is imperative that the agency responsible for bringing the prosecution recovers its full costs, including costs of staff time, if the prosecution is successful. Failure to obtain full recovery of costs is a disincentive to bringing prosecutions. We also consider there is a strong case for hypothecation of environmental fines. This would make a significant contribution to the general costs of mitigating environmental damage resulting from illegal activities and would avoid the difficulties of assessing remediation costs in particular cases.

Fines imposed by the courts for environmental offences should be paid to the agency responsible for bringing the prosecution to help meet the costs of mitigating environmental damage (Recommendation 195).

Part V – Institutional and financial arrangements

Chapter 14

Institutional and administrative arrangements

1 Integrated fisheries management

- 1.1 In this chapter we discuss the institutional arrangements for regulating salmon and freshwater fisheries and how these fisheries can best be managed. We wish, however, to emphasise at the outset one key point: the regulation and management of salmon and freshwater fisheries should be integrated at the different levels at which action is undertaken, and integrated with other categories of environmental management. Where the responsibility for implementing legislation falls to separate government departments or agencies it is essential that they co-ordinate their activities.
- 1.2 Integration at different levels requires a common understanding between all fisheries regulators and managers of the goals and objectives of fisheries management and how these can best be achieved. It also requires managers of individual fisheries, those responsible for fisheries management at the catchment level, and regional and national regulators all to understand each other's positions and to work together to achieve shared goals. The key to achieving this is good communications, clearly defined objectives and goals.
- 1.3 Equally, fisheries and fish habitats cannot be managed in isolation from the rest of the environment. Many other bodies – both government agencies and private organisations – are involved in the management of wildlife, their habitats and the wider environment; it is essential that they work towards common goals. As we point out in Chapter 6, fish habitats are affected by a range of other activities, and consideration of fish and fisheries needs must be integrated into the process of policy formulation in relation to these activities. The interests of fish and fisheries also need to be taken into account in the management of these activities. The reverse is also true, and fisheries managers and regulators must be aware of the impact that their activities can have on other forms of wildlife.

2 Policy responsibility

- 2.1 Overall policy responsibility for salmon and freshwater fisheries in England rests with the Minister of Agriculture, Fisheries and Food; in Wales this responsibility has been devolved

to the National Assembly. In their evidence to us the Moran Committee and others proposed that in England this responsibility should be transferred to the Secretary of State for the Environment, Transport and the Regions, on the grounds that the main problems facing freshwater fish and fisheries were environmental and that the need to protect freshwater fish was primarily driven by conservation considerations. It was argued that protection of the environment and conservation were activities that were central to the Department of the Environment, Transport and the Regions (DETR), while the Ministry of Agriculture, Fisheries and Food (MAFF) was primarily concerned with the production of food.

- 2.2 Throughout this report we have tried to emphasise the importance of considering fisheries in their environmental context. While we agree with the Moran Committee that there would be advantages in placing freshwater fisheries alongside other environmental sectors within DETR there would also be disadvantages. In favour of this arrangement is the fact that it could go some way towards ensuring that fisheries matters are considered as environmental matters, which is essential if fisheries are to be managed on a sustainable basis. Just as importantly, it would make it more likely that fish and fisheries were taken into full account when other environmental issues are under consideration.
- 2.3 However, it would be wrong to overlook the specialist nature of fisheries and fisheries legislation. We can see clear advantages in maintaining a discrete area of fisheries responsibilities within MAFF. This arrangement ensures that freshwater fisheries issues are dealt with in the general fisheries context. Furthermore, MAFF has policy responsibility for other activities of relevance to freshwater fisheries such as agricultural policy and policy on flood defence.
- 2.4 We conclude that there are advantages and disadvantages in locating freshwater fisheries in either DETR or MAFF. In reality, under the present departmental structures, no single government department in England can have policy responsibility for all issues of relevance to freshwater fisheries. Wherever freshwater fisheries is located, however, we have no doubt that there is a need for better co-ordination within and between departments in order to ensure that an integrated, holistic approach is brought to bear on fisheries. We were encouraged to hear from the Parliamentary Secretary in MAFF that the Government is concerned less with departmental organisation than with ensuring that different departments work together effectively to deal with common problems. A commitment to such a philosophy is contained in 'Modernising Government' (published in March 1999), which details a programme of reform for the future. It pledges the Government to "joined up government in action" and puts the focus on achieving results (outcomes) rather than to maximising departmental funding (inputs).
- 2.5 On balance, we conclude that responsibility for freshwater fisheries should remain with MAFF because the perceived advantages to be gained by transferring it to DETR do not outweigh the disadvantages of disruption that would result from the transfer. The present arrangements are not so seriously flawed as to merit such a drastic solution at the present time. However, during the course of our Review there was a good deal of speculation that the Government would create a new Department of Rural or Countryside Affairs by merging parts of MAFF and DETR. If such a Department were created it would be the natural home for salmon and freshwater fisheries responsibilities – although, as we note elsewhere, freshwater fisheries have significance in urban as well as rural areas.
- 2.6 The situation is more straightforward in Wales, where the National Assembly is responsible for all the policies that affect salmon and freshwater fisheries. It will, nevertheless, be

important for the Assembly to ensure that its various committees and secretaries give due priority to this sector.

- 2.7 We attach considerable importance to the need for a common approach to the regulation and management of salmon and freshwater fisheries throughout England and Wales. Fish do not respect national boundaries and past experience has shown that a catchment based management regime best delivers an integrated approach to fisheries management. A number of our recommendations would require new or amended primary legislation through the Westminster Parliament, whilst others could be implemented by Order. We recognise that the National Assembly for Wales has devolved powers for fisheries matters in Wales but urge that wherever possible subordinate legislation, in particular on cross-border rivers, be the same in England and Wales.

3 The fisheries regulator

- 3.1 In England and Wales day-to-day regulatory responsibility for salmon and freshwater fisheries rests with the Environment Agency. In a written submission to us, and at our meeting in Exeter, the South West Rivers Association (SWRA), with support from a number of other organisations, argued for fundamental change. The SWRA was highly critical of the current system of fisheries management in England and Wales and expressed complete dissatisfaction with the way in which rivers were run. In particular, the SWRA considered that the Environment Agency, and before it the National Rivers Authority, had failed to carry out its statutory duty to maintain, improve and develop salmon and freshwater fisheries. It advocated a return to a system of local management whereby the fisheries function is removed from the Environment Agency and transferred to new district fishery boards or Boards of Conservators. These bodies would operate and be constituted in much the same way as the Scottish District Salmon Fisheries Boards. Membership would be on a voluntary basis and by election, with members drawn from local riparian and fishery owners, fishing clubs, anglers and non-fishing users although fishery interests would form the majority. Under the SWRA proposal, these boards would have executive powers at local level and funding would be provided via government Grant-in-Aid and income from rod licence duties.
- 3.2 We were not persuaded by these arguments. As we emphasise throughout this report, freshwater fish are only one element in the aquatic environment and many of the problems they face are caused by the impact on the aquatic environment of factors such as water abstraction, pollution and agriculture. For this reason the aquatic environment needs to be managed as an integrated whole and the Environment Agency, with its wide ranging responsibilities, is the most appropriate body to do this.
- 3.3 We also noted that while the Scottish system does have advantages – in particular, the involvement of local fisheries owners – it also has weaknesses. On some rivers it has not been possible to constitute a District Salmon Fisheries Board; there is no control in Scotland over water abstraction; the Scottish Environmental Protection Agency, which deals with water pollution, operates independently of Fisheries Boards. Moreover, the Scottish system virtually ignores coarse fish and provides little protection for non-migratory trout. While this may be logical in Scotland, given the predominance of salmon fisheries there, the situation in England and Wales is very different. We received little support from coarse fishery interests for the idea of transferring the Environment Agency's fisheries responsibilities to river boards, and it is difficult to see how the system would work satisfactory in those parts of the country which are dominated by coarse fisheries.

The Environment Agency should continue to be the body responsible for the regulation and management of salmon and freshwater fisheries in England and Wales. (Recommendation 2)

- 3.4 It is clear to us, however, from the evidence we have received that there is considerable dissatisfaction with the way the Environment Agency exercises its responsibilities and is accountable for them. We deal with these below.

4 Roles of the Minister/National Assembly for Wales and the Environment Agency

- 4.1 Currently, the Minister of Agriculture, Fisheries and Food and the National Assembly for Wales are responsible for confirming all Environment Agency Net Limitation Orders and byelaws, for approving increases in licence duties and for the payment of grant-in-aid to the Environment Agency in respect of its fisheries functions. The Environment Agency is responsible for proposing all Net Limitation Orders, byelaws and licence duty changes; for enforcing and implementing freshwater fisheries legislation and, more generally, for fulfilling its statutory duty to maintain, improve and develop salmon and freshwater fisheries.
- 4.2 In general terms we believe that the division of responsibilities between the Ministers in England and the National Assembly for Wales on the one hand and the Environment Agency on the other is appropriate. While we have recommended that the Environment Agency should remain responsible for the regulation and management of salmon and freshwater fisheries, we are conscious that the Environment Agency is a non-departmental public body (or quango) and that the members of its Board are appointed, not elected. In evidence to us concern was expressed over the Environment Agency's alleged lack of accountability. In these circumstances we think it essential that the Environment Agency should remain under the supervision of and accountable to government, which should have the last word on whether new legislation is introduced via byelaws.
- 4.3 It was put to us that the procedures for making Net Limitation Orders and byelaws were unduly complicated and time consuming. We considered the question of Net Limitation Orders separately in Chapter 10. So far as byelaws are concerned, the Environment Agency has a statutory duty to consult its advisory committees in the execution of its fisheries duties; it will normally consult these committees, and other interested parties, before making a byelaw. Once a byelaw has been made it must be advertised for a minimum of four weeks; anyone who objects to the byelaw may make a formal objection to the Minister or to the National Assembly. The Environment Agency then decides, in the light of the objections, whether to seek confirmation of the byelaw; if it does, the Minister and/or the National Assembly must take all objections they receive into account in deciding whether or not to confirm the byelaw. They may decide to confirm the byelaw with amendments, provided that the Environment Agency agrees the amendments, and they have the option of referring a byelaw to a public inquiry.
- 4.4 The Environment Agency suggested to us a more streamlined procedure, proposing that byelaws should be made in a manner similar to that now used for determining discharge and abstraction licences. Under such a procedure the Environment Agency would, as now, prepare a proposal for a byelaw and publicly advertise it. It would then, however, be for the Environment Agency's Board to decide whether or not to confirm the byelaw, although objectors would have the right of appeal to the Minister/the National Assembly, who would be able to overturn or amend the byelaw. A new byelaw would therefore come into

force as soon as it was confirmed by the Environment Agency, and would remain in force unless overturned.

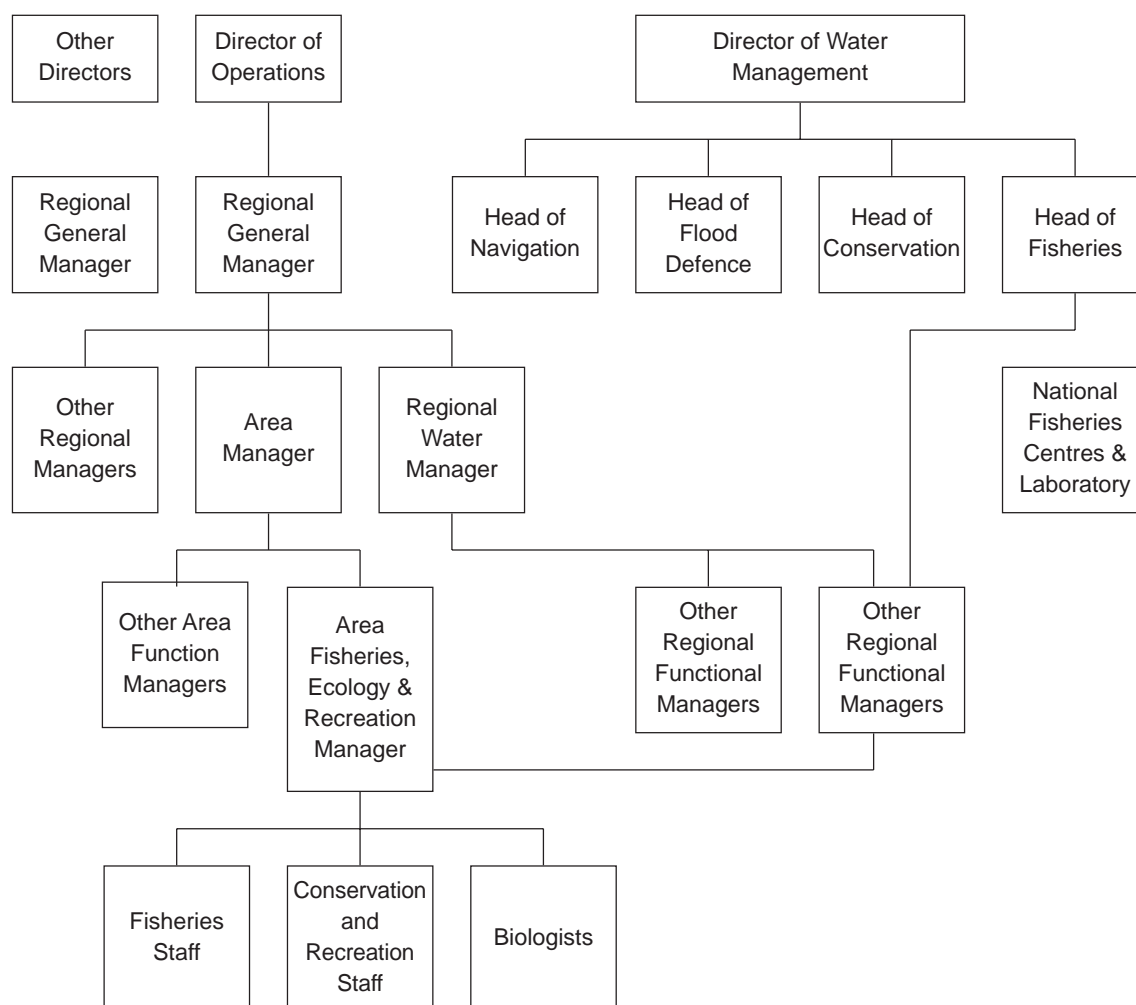
- 4.5 While we can see some advantages in this proposal there is a fundamental difference between licensing schemes and byelaws in that the latter create new criminal offences. As we point out above, the Board of the Environment Agency is an appointed, not an elected, body. In normal circumstances, therefore, we consider that byelaws should not come into force until they have been confirmed by a Minister answerable to Parliament or, in the case of Wales, by the National Assembly.
- 4.6 There may be occasions when it is desirable to introduce new restrictions on a fishery more rapidly than can be done under existing byelaw making procedures. For salmon, for instance, there may on occasion be a need to reduce exploitation during the course of a season if there is a serious drought, for example, or a collapse in numbers of returning fish. One possibility would be to use an accelerated procedure of the kind used to make drought orders. Under this, objectors have seven days in which to make objections after an order has been advertised; if there are objections the Secretary of State can either hold a public inquiry or provide an opportunity for objectors to make their case in person to an independent adjudicator; in cases of urgency this last requirement can be dispensed with and the Secretary of State himself can reach a decision on the application, taking all objections into account. Alternatively, an accelerated version of the procedure proposed by the Environment Agency for byelaws generally could be introduced, with an emergency byelaw coming into effect immediately, but being subject to review by the Minister/the National Assembly if there were objections. Emergency byelaws should be for a strictly limited period only and intended to deal with a specific problem; in these circumstances we believe that it would be acceptable for such byelaws to come into effect without ministerial confirmation, provided that there was a right of appeal.

In normal circumstances byelaws should not come into force until confirmed by a Minister or the National Assembly for Wales. There should be a power for the Environment Agency to use an accelerated byelaw making procedure in emergencies. Byelaws made under such a procedure should be of very limited duration and made only in response to unforeseeable, specific problems. (Recommendation 91)

- 4.7 It was suggested to us that responsibility for implementing all fish disease controls, and any other controls on fish farms, should be transferred from MAFF/NAW to the Environment Agency. We noted, however, that fish disease controls are implemented throughout England and Wales by the Fish Health Inspectorate, which is part of a separate Government Agency, CEFAS. The Inspectorate works closely with other parts of CEFAS, in particular those conducting R&D on fish diseases in support of Government's policy responsibility for fish health. We concluded that there was a significant difference in focus between MAFF/CEFAS and the Environment Agency and a transfer would not be appropriate at this time. For this reason we are not recommending any change so far as fish disease work is concerned although, the feasibility of any such transfer should not be discounted in future should circumstances change. If and when licensing for fish farms is introduced, as we recommended in Chapter 11, a decision will need to be taken on which organisation should run the licensing scheme. The Environment Agency may well be the most appropriate body for this task.
- 4.8 In our view it is essential that Government Departments and the Environment Agency operate in a fully integrated way and are aware, and take account, of the need to work closely together to achieve common aims. We conclude, however, that close co-operation between those carrying out the work is more important than organisational change.

5 The Environment Agency

- 5.1 Salmon and freshwater fisheries represents only a small part of the Environment Agency's responsibilities – although anglers form the largest single category of people who pay the Environment Agency for licences or consents. The Environment Agency's other responsibilities include the overall management of water resources, flood defence, prevention of water and air pollution, and waste disposal. Responsibility for the Environment Agency's actions rests with its Board, who are accountable, through Ministers, to Parliament. The Board comprises 15 members of whom 11 are appointed by the Secretary of State for the Environment, Transport and Regions, one by the National Assembly for Wales and three by the Minister of Agriculture, Fisheries and Food. One of the latter is appointed to represent the interests of salmon and freshwater fisheries.
- 5.2 At the Environment Agency's headquarters at Bristol there is a small Fisheries 'policy' head office, which is complemented by national centres for salmonids (at Cardiff), coarse fish (at Kidderminster) and fish diseases (at Brampton). Operationally, the Environment Agency is structured into seven regions in England, while Environment Agency Wales has responsibilities similar to those of an English region. An Environment Agency region comprises three or four areas, each with considerable autonomy, responsible for the Environment Agency's day-to-day operations. The managers responsible for fisheries, ecology and recreation report to Area Managers (General) who report, via their Regional General Manager, to the Director of Operations at headquarters. Policy development and standards within each of the Environment Agency's functions (Fisheries, Flood Defence etc.) are the responsibility of regional and national Heads of Functions; the latter reporting to the relevant Board directors. The Head of Fisheries reports to the Director of Water Management. Because the Environment Agency does not operate a Functional line management system, Heads of Functions have no direct line management responsibility for operations at regional and area levels. We note that the Environment Agency's matrix management structure has the potential for cross functional teams providing rapid response in the kinds of emergencies frequently met by the Flood Defence and Pollution Control functions of the Environment Agency. The factors critical to success in Fisheries, however, are more often the quality and cost-effectiveness of policy decisions and the co-ordination of their implementation across all regions. The Environment Agency's matrix management structure as it applies to fisheries is set out in the diagram below:



- 5.3 We do not believe that best practice is always followed in all Areas. The Environment Agency's work in monitoring freshwater fisheries is an example: in Chapter 8 we concluded that monitoring has not been well co-ordinated between regions. The present Head of Fisheries outlined to us an ongoing review of monitoring policy aimed at rationalising the monitoring programme and ensuring that best practice is applied throughout England and Wales. While welcoming this, we remain concerned that accountability for implementing policies and standards at Area level and hence for achieving planned environmental and socio-economic outcomes does not seem to be well defined. We would wish to see the Environment Agency's operations directed more closely towards achieving its environmental and socio-economic goals. This will require a culture change within the Environment Agency and more sustained efforts to improve integration.

The Environment Agency should intensify its efforts to improve integration of its policies and activities, particularly those which affect fish, fisheries and the aquatic environment.
(Recommendation 8)

- 5.4 In our view, what is needed is a shift from a technological culture to one of sustained and integrated management which is embraced by operatives at all levels within the organisation. For example, we received a lot of evidence that land drainage works were often carried out without any apparent regard for other functions. However, this is not confined to flood defence – not all fisheries or conservation activities are carried out in an integrated manner or with a view to sustained management; for example, jetting salmon spawning gravels at the wrong time of year can destroy lamprey eggs.

The Environment Agency should establish clearer accountability at Area level for implementing national policies and standards and for achieving planned environmental and socio-economic outcomes. (Recommendation 13)

6 Advisory committees

- 6.1 The Water Act 1973, which established Regional Water Authorities, required each water authority to establish regional and local advisory committees and to consult these committees on the way they discharged their duties to maintain, improve and develop salmon and freshwater fisheries. This requirement was inherited by the NRA and, in its turn, by the Environment Agency. Under the Environment Act 1995 the role of Regional Fisheries Advisory Committees has been widened, so that the Environment Agency is now required to consult them on issues relating to recreation and navigation, as well as on fisheries matters and on the conservation aspects of these functions. In recognition of these changes, the committees are now known as Regional Fisheries, Ecology and Recreation Advisory Committees (RFERACs).
- 6.2 There are seven RFERACs in England, one in each Environment Agency region, together with the FERAC for Wales. Each committee meets at least quarterly and considers both national issues (such as proposed national policy initiatives and byelaws) and regional issues. The meetings are open to the public.
- 6.3 The Environment Agency appoints members of its advisory committees. However, RFERAC chairmen are appointed by Ministers. By law no RFERAC may have more than 21 members; these are drawn from persons who are not members of the Environment Agency but appear to it to be interested in salmon fisheries, trout fisheries, freshwater fisheries or eel fisheries or in aquatic recreation, navigation and associated conservation matters.
- 6.4 Throughout our Review many of those who gave evidence to us were highly critical of the role and composition of RFERACs and of the way the Environment Agency consults local fisheries interests. Widening the remit of RFERACs has meant that more issues have to be dealt with in a limited time. Moreover, RFERACs have to deal with both national and regional issues, and there are concerns that they are failing to do either effectively. The Environment Agency has made efforts to limit the number of national issues that are discussed at RFERAC meetings, in order to allow adequate time for discussion of regional matters, but this is often impossible if RFERACs are to be properly consulted on important national issues.
- 6.5 Concerns about the changes to RFERACs have been compounded by changes to the Environment Agency's local committee system. Under the Environment Act the Environment Agency is required to establish only 'such local advisory committees as it considers necessary to represent fisheries interests' and it has moved away from the formal local committee structure that existed in many regions under the NRA. While there is no standard format, in a number of regions formal local committees have been replaced by informal fisheries forums and consultative groups; in some regions local fisheries advisory committees have been subsumed by the Area Environmental Groups (AEGs); which represent all those in an Area with an interest in the Environment Agency's activities. The combination of the widening of the role of RFERACs and changes to local committee arrangements has left fisheries' interests in some parts of the country with an impression that their views are less valued than previously. We were told that particular problems had arisen in the South West. Under the NRA, two RFACs were retained when two previous regions were merged, but these have now been replaced by a single RFERAC. The creation

of a single RFERAC with an expanded remit resulted in a substantial reduction in the number of members representing fisheries interests, from a maximum of 42 to considerably less than 21; moreover, there had also been major changes to local consultation arrangements.

- 6.6** Some of the evidence we received expressed concern about the way the Environment Agency appoints members of advisory committees; it was claimed that those who were known to disagree with Environment Agency policies were unlikely to be appointed. Concern was also expressed about the independence of RFERAC chairmen, on the grounds that they were paid by the Environment Agency.
- 6.7** We conclude that the current advisory committee system is not working well. There is a strong feeling that the views of those interested in fisheries are not given the same weight as they were by the Environment Agency's predecessor, the NRA. To overcome this, we believe that a number of changes need to be made.
- 6.8** In making our recommendations we are conscious that the existing advisory system imposes considerable costs on the Environment Agency and the improvements we are recommending could add to these. However, from the evidence we have received the current system is not cost-effective, in that the costs incurred do not produce a satisfactory outcome. We believe that slightly higher spending on an improved process would be money well spent.

Regional committees

- 6.9** Taking the regional level first, we are concerned that some RFERACs cover too wide an area. The Environment Agency's regional structure was not devised with fisheries in mind, and there are regions where the size of the region and the diversity of its fisheries make more than one RFERAC appropriate. This is particularly the case in South West England, where we believe that the Environment Agency should revert to the situation that existed under the NRA.

Environment Agency regions which are large and diverse should, if necessary, have more than one Regional Fisheries, Ecology and Recreation Advisory Committee. (Recommendation 14)

- 6.10** We would also like to see improvements in the way RFERACs operate. It is essential that all those involved feel that their views are being taken into account and that they are working in partnership with the Environment Agency towards shared goals. To achieve this:
- the Environment Agency needs to consult RFERACs at an early stage in the planning process. Too often in the past, committees have had the impression that they are being consulted only after policy has been decided by the Environment Agency;
 - committees should be kept informed on how policies develop after they have tendered their advice. If the Environment Agency decides to follow a course other than that recommended by a committee, it needs to explain the reasons for its decision;
 - committees need to be involved as fully as possible in fishery decisions. While we agree that the role of committees should continue to be an advisory one, committees should be given every opportunity to have an input into regional decisions and, wherever possible, their advice should be acted on. Where committees wish to tender advice on other issues, the Environment Agency should take this into account.

- 6.11 We were told that the Environment Agency is making efforts to improve the way its consultation arrangements work and has made considerable progress in, for example, providing feedback to committees. We believe, however, that more needs to be done if the Environment Agency is to convince all those involved that its culture and practices have undergone a fundamental change.

The Environment Agency should consult RFERACs at an early stage in the process of developing policy; in particular it should:

- *keep committees informed of the development of policies on which they are consulted;*
 - *involve committees as fully as possible in its decisions, particularly at the regional level;*
 - *take account of committees' views on any issue on which they wish to provide advice.*
- (Recommendations 15)*

- 6.12 We noted the concerns expressed about the independence of RFERAC chairmen and members. We do not, however, consider that these fears are well founded. Chairmen are appointed by Ministers according to the procedures recommended by the Nolan Committee and are not beholden to the Environment Agency for their appointment. We also believe that RFERAC chairmen should receive a salary. The fact that they are paid by the Environment Agency to undertake their duties is irrelevant, since the Environment Agency has no power to cease paying them or to vary their salaries.

- 6.13 The Environment Agency's procedure for appointing RFERAC members is, first, to advertise the vacancies; candidates are then interviewed, normally by the appropriate regional general manager and RFERAC chairman. For practical reasons we do not think that there is any workable alternative to retaining the Environment Agency's role in the appointments process. The presence of the RFERAC chairmen should help ensure that the procedure is not dominated by Environment Agency staff, and there would be advantages in having another independent member on the appointment panel. Whatever the composition of the appointment panel, it is important that the procedure is open and transparent, with full records of the panel's decisions and feedback to unsuccessful candidates, if they request it, on why they were not appointed. RFERAC vacancies should be more widely advertised, in order to broaden the range of applicants.

RFERAC chairman should continue to be appointed by Ministers and RFERAC members by the Environment Agency. Candidates for RFERAC membership should be interviewed by a panel with a majority of independent members and the appointment procedure should be open and transparent.

(Recommendation 16)

Local committees

- 6.14 At the local level it is clear to us from the evidence we received that many people involved in fisheries are not satisfied with their ability to influence Environment Agency decisions and their outcomes. We conclude that the Environment Agency needs to be more accountable for its actions and for delivery of outcomes at the local level. The main structural change that we recommend is the restoration of a formal local committee system. These local advisory committees should focus on fisheries issues, and should be responsible for ensuring that local interests are taken into account in decisions on fisheries matters and that advice on the fisheries implications of the work of other Agency functions is available to the Environment Agency and to bodies such as Area Environmental Groups. There should be at least one committee in each Environment Agency Area. All local

committees should be represented on the appropriate RFERAC. The Environment Agency should be required by law to consult local committees on local issues, on priorities and targets for the year and on the development of local Fisheries Action Plans (see Section 11 below). The Environment Agency should also report to the committees on progress against targets.

- 6.15** We would not wish to prescribe a single model for local committees; we are aware that currently there are different arrangements in different regions. There would be advantages in local committees meeting quarterly, before the quarterly RFERAC meeting, and we doubt that a local committee would be effective if it met less than twice a year. However, the number and timing of meetings of, and the catchments covered by, a local committee are matters that are best decided locally; the essential point is that those involved locally must be satisfied with arrangements in their Area.
- 6.16** The points we make in paragraph 6.11 in relation to RFERACs apply equally to local committees. Consultation can be effective only if those consulted have sufficient information upon which to base their advice and if there is a process whereby that advice can influence decision making. Local committees need, therefore, details each year not only of the Environment Agency's proposed targets, but also of the resources that will be available to achieve them and the relative priority the Environment Agency accords each target. Committees must be provided with this information in sufficient time for them to assess it and provide considered advice to the Environment Agency, and for the Environment Agency to take this advice into account in reaching final decisions on targets and priorities for the year ahead. At the end of each year the Environment Agency should report to local committees on its success in achieving the targets for the catchments they represent, and, if targets have not been met, on the reasons for failure and on what steps have been taken to improve future performance. Local committee meetings must be attended by Environment Agency staff capable of providing the necessary information, answering questions and considering the committee's advice.
- 6.17** The principles set out in paragraph 6.11, should apply also to the decision making process at the local level: local committees must be consulted in time to influence the process and their views taken into account. One area where local committees could make a particular contribution is that of selecting projects for grant-aiding. If, as we recommend in Section 13 below, the Environment Agency is given powers to grant aid projects, local committees should advise on which projects to aid.

The Environment Agency should restore a two tier advisory structure, with a formal local committee system. Under this system the Environment Agency should be required by law to:

- *establish and maintain at least one local committee in each Area;*
 - *consult local committees, and take account of their advice, on the development of Fisheries Action Plans, on annual fishery related targets and on priorities for the use of its resources on fisheries;*
 - *consult local committees, and take account of their advice, on other issues of relevance to salmon and freshwater fisheries, such as local flood defence programmes and water quality investments, in particular where the Environment Agency is a statutory consultee;*
 - *arrange regular meetings of all local committees;*
 - *report at one of the meetings each year to local committees on progress against targets and on the state of local fish stocks, and additionally to make regular progress reports.*
- (Recommendations 17)*

Other committees

- 6.18 We note that RFERAC chairmen meet quarterly, under the chairmanship of the Board member appointed to represent fisheries interests, to consider issues likely to be raised at the quarterly RFERAC meetings. The Environment Agency's Head of Fisheries attends the meeting. The meeting provides chairmen with an opportunity to inform the Environment Agency of matters that are sensitive or of interest in their regions, as well as providing the Environment Agency with the chance to brief chairmen on policies on which it wishes to consult RFERACs. The outcome of each chairmen's meeting is reported to the Board. We consider this to be a sensible way of keeping the Environment Agency's headquarters staff and the chairmen informed of each others concerns; it should not, however, be used to bypass the regional and local consultation arrangements we are recommending. The minutes of these meetings should continue to be available to the public.
- 6.19 In addition to the RFERACs, the Environment Agency is required to establish regional committees covering environment and pollution issues and flood defence matters known as REPACs (Regional Environment Protection Advisory Committees) and RFDCs (Regional Flood Defence Committees) respectively. We noted that there is good communication between the chairmen of the various committees within regions; they attend each other's quarterly meetings to ensure they are aware of developments within other functions and that their respective interests are taken into account, and they also meet quarterly with the Environment Agency Regional Board member.

7 Arrangements in coastal waters

- 7.1 The Environment Agency's responsibilities in coastal waters overlap with those of Sea Fisheries Committees (SFCs). The Environment Agency is responsible for regulating fishing for salmon, sea trout and eels in coastal waters out to six miles, while SFCs are responsible for regulating sea fisheries in the same area. Not all coastal waters are, however, covered by SFCs: under the Sea Fisheries Regulation Act 1966 local authorities in coastal areas may, but are not required to, establish SFCs. The local authorities in question are then responsible for funding the SFCs and appointing half the members: the other half are appointed by Ministers. SFCs may make byelaws regulating fishing activity in their areas; as with Environment Agency byelaws, these do not come into force until they have been confirmed by Ministers.
- 7.2 In some coastal waters the Environment Agency acts as the SFC; these include the estuaries of most major salmon and sea trout rivers. When acting as an SFC the Environment Agency operates under SFC rules; byelaws, for example, are made under sea fisheries, not salmon and freshwater fisheries, legislation.
- 7.3 Under Section 37 of the Salmon Act 1986, SFC byelaw making powers were extended to cover measures to protect salmon and sea trout and to prevent interference with their migration. Byelaws under this power (which can be made only with the consent of the Environment Agency) have been used to prevent fishing for salmon in the guise of fishing for sea fish, which had caused heavy exploitation of salmon in a number of estuaries prior to the coming into force of the 1986 Act.
- 7.4 In the evidence we received we heard that a number of problems still exist so far as the interaction between the Environment Agency and SFCs is concerned. The relationship between individual SFCs and the Environment Agency varies. In some regions we were told that it was good, with Environment Agency bailiffs and SFC fisheries officers cross-

warranted (that is holding SFC/Agency warrants as well as those of their own organisation) and there is active co-operation; in others, we heard, little real co-operation took place. Even in Sea Fisheries Districts where byelaws to protect salmon have been introduced, and sea fisheries officers hold Environment Agency warrants, we are concerned that the protection of migratory salmonids is low on the SFCs list of priorities. Catches of salmon and sea trout in sea fisheries remains a very real problem in some places. For instance, we were told that considerable numbers of multi-sea-winter salmon are taken early in the year in cod nets off the North East coast of England.

- 7.5 We conclude that a much closer co-operation is needed between the Environment Agency and SFCs in respect of their functions in coastal waters. It is a waste of resources to have SFC and Environment Agency vessels patrolling the same waters without an agreed and co-ordinated approach to enforcement. SFC and Environment Agency officers should enforce each other's legislation as well as their own. Such an approach would help maximise the benefits to be obtained from limited resources.
- 7.6 In waters where the Environment Agency acts as the SFC, it is, of course, able to ensure that measures to protect migratory salmonids are introduced under both sea and salmon fisheries legislation. In principle, we would like the Environment Agency to take on SFC responsibilities in all estuaries in which there are significant runs of migratory salmonids. We understand, however, that the Environment Agency faces a problem of resources in acting as an SFC, as it receives no funding for this. This is unreasonable, and the increase in Grant-in-Aid that we are recommending should include an element to pay for the Environment Agency's SFC functions.
- 7.7 Adequate funding for the Environment Agency would enable it to perform the full range of SFC functions. We were told by MAFF that the Environment Agency tends to use its sea fisheries powers, where they exist, primarily to protect salmon and sea trout by imposing restrictions on other types of fishing. Protection of commercial marine fish species is largely coincidental. The nature of the controls used are also somewhat crude, tending to focus on restrictions on particular fishing methods known to be detrimental to salmon and sea trout stocks rather than on more subtle controls using measures such as mesh size and minimum landing size intended to protect marine fish as well as migratory salmonids.

The Environment Agency should be properly funded, through Grant-in-Aid, to fulfil its sea fisheries responsibilities in areas where it acts as a Sea Fisheries Committee (SFC). In such waters it should perform the full range of SFC duties necessary to regulate and conserve sea fish as well as salmon, sea trout and eels. (Recommendation 20)

- 7.8 SFCs' regulatory powers extend to diadromous fish other than salmon and sea trout while they are in coastal waters. We believe that more needs to be done to protect such fish as shad and lampreys.
- 7.9 During the course of our Review the House of Commons Select Committee on Agriculture published its report on Sea Fishing. This recommended, among other things, that MAFF should initiate a full review of the powers of SFCs and that the jurisdiction of SFCs and the Environment Agency should be reviewed to ensure consistency of approach within individual fisheries. In its response the Government said that the jurisdiction of SFCs and the Environment Agency would be reviewed in the light of any recommendations that we might make and as a follow up to the Review of SFCs powers and funding that the Association of Seas Fisheries Committees is carrying out.

- 7.10 We support the call for a review of the roles of SFCs and the Environment Agency in coastal waters, as well as of SFCs powers and funding arrangements, and we welcome the Government’s acknowledgement of the contribution that our Review can make to this process.

There should be a full review of the role and powers of SFCs in coastal waters and of the relationship between SFCs and the Environment Agency. This should cover, among other things:

- *the respective roles and jurisdictions of the Environment Agency and SFCs;*
- *how co-operation between the Environment Agency and SFCs can be improved so as to make best use of resources devoted to the enforcement of sea fisheries and salmon and freshwater fisheries legislation in coastal waters;*
- *extending the Environment Agency’s powers to act as an SFC in estuaries of rivers containing migratory salmonids;*
- *how the Environment Agency and SFCs can best co-operate to regulate eel fisheries in coastal waters;*
- *how best to protect diadromous fish, other than salmon, sea trout and eels, in coastal waters.*
(Recommendations 21)

8 Other agencies

- 8.1 There are a number of other Government agencies involved in the management of the aquatic environment and in rural development with functions that complement those of the Environment Agency. There is also some degree of overlap. We are concerned that some aspects of fisheries, in particular the conservation of fish species, is being inadequately addressed by the statutory agencies. Lack of clarity over the respective roles of the different agencies may contribute to this problem.
- 8.2 The nature conservation agencies, English Nature and the Countryside Council for Wales (CCW) are Government’s principal advisors on conservation and have a duty to assess the impact of such activities as fishing on wildlife and natural resources. They have responsibilities in relation to the selection and designation of several types of protected area. In particular, they have a duty to notify Sites of Special Scientific Interest (SSSIs) and to propose possible Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) for designation under the EC Habitats Directive and Birds Directive respectively. They play an important role in the management of these protected areas and are responsible for monitoring the status of the sites. In England and Wales 38 rivers, with a combined total length of 2400 km, have been notified as SSSIs and some of these have been accepted by the Government as candidate SACs. Salmon, trout and other fish populations are conservation features of a number of SSSIs and candidate SACs. CCW also has statutory responsibilities to protect, conserve and enhance natural beauty and amenity and to promote and facilitate countryside enjoyment and open-air recreation. In England these functions are carried out by the Countryside Agency. Both agencies are involved in the development of the Government’s policy of extending access to the countryside.
- 8.3 In their evidence to us the nature conservation agencies made it clear that they wished to be more involved in decision making processes which impinge on the conservation of natural freshwater and wetland resources and their wildlife. The conservation agencies recognised that catchment management planning is the essential framework for the effective management of freshwaters and their fish populations. However, they were concerned that

while they were invited to comment on Local Environment Agency Plans (LEAPs), which carry forward the process of catchment planning, the Environment Agency is not required to take account of their views. The conservation agencies suggested to us that the LEAP process should be made statutory and that it should be necessary for the Environment Agency to obtain their agreement before the publication of a LEAP including a river, standing water or wetland SSSI or candidate SAC. While we agree that it is important for the conservation agencies to play a full part in catchment planning, we would not wish them to be given a veto over the publication of any LEAP. They further suggested that they should have a greater role in the catchment planning process, in recognition of their increased role in freshwater management and fish conservation.

- 8.4** We discuss the role of the conservation agencies further in Section 11 below, in which we consider how the various action plans currently being produced by different agencies should relate to each other.
- 8.5** In England the Countryside Agency and the eight Regional Development Agencies have responsibilities in relation to rural development. The Welsh Development Agency has similar responsibilities in Wales. These bodies need to take into account the contribution that fisheries can make to rural development and to ensure that this is covered in any local development plans. They will need to work closely with the Environment Agency here.

Statutory agencies with functions of relevance to the management of fisheries should work more closely together to ensure that fisheries issues are properly addressed. Where the responsibility for implementing legislation falls to different agencies, it is essential that these agencies co-ordinate their activities. (Recommendation 19)

9 United Kingdom wide issues

- 9.1** The legislation and structures for managing salmon and freshwater fisheries in Scotland and in Northern Ireland differ substantially from those in England and Wales. It is nevertheless important that all parts of the United Kingdom work closely together, both to deal with issues that affect them all and to provide a coherent UK voice internationally.
- 9.2** The Tweed and the Border Esk catchments straddle the English-Scottish border. In order to ensure that fisheries in these catchments are managed on a catchment basis, the whole of the Tweed is, effectively, subject to Scottish salmon and freshwater fisheries law and the whole of the Border Esk to English Law. We are pleased that the Scotland Act 1998 recognises the importance of catchment management and provides for changes in these arrangements to be introduced by Order in Council approved by both the Westminster and Scottish Parliaments. We are also pleased to note that in the concordat on fisheries between the Ministry of Agriculture, Fisheries and Food and the Scottish Executive there is a commitment to continue to manage both catchments on a catchment basis.
- 9.3** We were told that officials from the UK fisheries departments meet from time to time to discuss salmon and freshwater fisheries issues. In our view it is important for such meetings to take place regularly, and we were pleased to see that in the MAFF/Scottish Executive concordat on fisheries there is a commitment for MAFF and Scottish Executive officials to meet at least annually with their counterparts from Northern Ireland and Wales to consider issues relating to the management of salmon and freshwater fisheries. We understand that there are plans to involve officials from Ireland in these meetings. We welcome this, given the close links that exist between Northern Ireland and Ireland on inland fisheries and the impact of Irish salmon fisheries on English and Welsh salmon stocks.

- 9.4 The Moran Committee suggested to us that a UK Migratory Fish Unit should be set up, involving all the fisheries departments, other relevant government agencies and interested non-governmental organisations. The role of the Unit would be to co-ordinate policy, manage legislative changes and assess the effectiveness of the protection of mixed fish stocks. We are not convinced, however, that a separate Policy Unit is needed and we are not sure how this could operate in the context of devolution, now that responsibility for salmon and freshwater fisheries has been devolved to the Scottish Parliament, the National Assembly for Wales and the Northern Ireland Assembly. We agree, however, that more needs to be done to involve non-governmental organisations in the policy process; we discuss this further in Section 12 below.
- 9.5 We were told that under existing English and Welsh legislation it is not possible for the Environment Agency to make a byelaw for the sole purpose of conserving salmon stocks outside its jurisdiction; it cannot therefore make a byelaw solely to conserve Scottish salmon stocks. In our view this conflicts with generally accepted principles for managing migratory fish stocks, and we think the law should be changed.

The Environment Agency should be able to exercise its byelaw making powers to conserve salmon and other diadromous fish originating outside England and Wales while they are within its jurisdiction. (Recommendation 92)

10 The international dimension

- 10.1 The conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries in the United Kingdom cannot be considered in isolation from what is happening elsewhere. This is particularly true for migratory fish such as salmon and eels, but there are also lessons to be learnt from other countries about the conservation and management of resident freshwater fish. We note that the Environment Agency plays an active role in the European Inland Fisheries Advisory Commission (EIFAC). Through a system of voluntary working parties of experts, EIFAC consolidates and disseminates information and recommendations on key, topical issues. We encourage the Environment Agency to maintain its involvement in EIFAC and in work internationally on the conservation of freshwater fish and the management of freshwater fisheries.
- 10.2 The International Council for the Exploration of the Sea (ICES) provides scientific advice on the management of specific fish stocks to the governments of its 19 members (all countries bordering the North Atlantic and Baltic) and to certain fisheries commissions. CEFAS and FRS (Scotland) provide the two UK delegates to ICES and alternate in providing the UK's member of the ICES Advisory Committee on Fisheries Management. ICES provides advice annually to NASCO (see below) on North Atlantic salmon and has advised the EC on eels; it has also set up a group to co-ordinate work on sea trout. CEFAS takes the lead in representing the interests of England and Wales within ICES, but it seeks the involvement of the Environment Agency at working group meetings and workshops as appropriate. We believe the current arrangements work well and do not see any need for change.
- 10.3 International co-operation over the regulation of management of salmon is provided by the North Atlantic Salmon Conservation Organisation (NASCO). NASCO is an inter-governmental organisation set up to promote the conservation, restoration, enhancement and rational management of salmon stocks in the North Atlantic Ocean through international co-operation. Its members comprise Russia, Norway, the European Union, Denmark (in respect of Greenland and the Faroe Islands), Iceland, Canada and the United

States of America. Because the European Union is responsible for international fisheries matters, the European Commission represents EU Member States' interests in NASCO; the UK attends NASCO meetings as part of the EU delegation.

- 10.4** We understand that the UK team to NASCO meetings comprises officials from the different fisheries departments as well as representatives of the Environment Agency. The arrangements we discuss in the previous section are used to ensure a co-ordinated UK position. It is clearly essential for the UK to be able to put forward coherent, well-considered arguments at these meetings and, as we indicate above, it is desirable for officials to involve non-governmental organisations in their development.

11 Action plans

- 11.1** As we explain in Chapter 10 the Environment Agency is in the process of producing Salmon Action Plans for all main salmon rivers; this is now a legal requirement following a Ministerial direction to the Environment Agency. In evidence to us it was suggested that the concept underlying Salmon Action Plans should be extended to cover other species. We agree, and we recommend that the Environment Agency should be required to develop Fisheries Action Plans for all catchments. Where appropriate, Salmon Action Plans should be incorporated into Integrated Fisheries Action Plans. Fisheries Action Plans should cover all relevant fish species, should contain both biological and socio-economic targets, and should set out priorities for the use of resources and how performance against targets should be measured. It is essential that Plans are realistic, capable of being implemented and are reviewed regularly. As we recommend in para 6.14 above, local fisheries committees should be fully involved in the development, monitoring and review of Fisheries Action Plans.
- 11.2** There are other action plans that are of relevance to fisheries and the environment. Each Environment Agency Area has produced one or more Local Environment Agency Plan (LEAP), and key species and habitats are covered by Biodiversity Action Plans. It will be essential to ensure that these different plans are consistent with each other. Fisheries Action Plans will succeed only if other factors that affect the freshwater environment are addressed and they need, therefore, to be seen as integral parts of the LEAP process. In formulating such plans due care should be given to overall fisheries and conservation interests. If integrated fisheries management is to be a reality, Fisheries Action Plans cannot be developed in isolation and need to be seen as one element in a framework of initiatives designed to conserve the freshwater environment. Similarly, Biodiversity Action Plans, and the requirements of SACs and SPAs need to be consistent with LEAPs/Fisheries Action Plans. To ensure this, close working relationships between agencies will be needed. There will also need to be co-ordination with such other plans as local Agenda 21 Plans, River Basin Management Plans produced under the Water Framework Directive, and Internal Drainage Board Water Level Management Plans. It is important to note that the Plans themselves are not the end product; each should include details of how and when they are to be developed and implemented.

The Environment Agency should be required by law to develop Fisheries Action Plans for all catchments. Where appropriate, Salmon Action Plans should be incorporated into Fisheries Action Plans, which should be reviewed annually with targets updated to reflect revised priorities and available resources. The development of Fisheries Action Plans should be an integral part of the LEAP process. (Recommendation 18)

12 Voluntary sector

- 12.1 From the evidence we received it is clear that river trusts make an important contribution to the conservation of rivers and their environment. Some of us visited the Wye Foundation, and we received written and oral evidence from the Westcountry Rivers Trust. We also visited the Tweed Foundation. We conclude that river trusts have done valuable work in bringing together different people interested in the conservation of rivers and in accessing funds from a variety of sources. It was, however, explained to us that for a river trust to benefit from charitable status it must promote the conservation of the river habitat as a whole, not only the development of fisheries. We were told that the Charity Commissioners are taking an increasingly hard line on this point. The involvement of riparian owners in the management of a trust would normally disqualify it from being accorded charitable status. We note that on this point Scottish rules appear to be more relaxed and we would wish to see improvement of habitats in England for public good purposes treated by Charity Commissioners as eligible for charitable status. Nevertheless, we accept that in England and Wales river trusts can not be regarded as a vehicle for undertaking improvements to fisheries. But they can help improve river habitats in ways that will benefit wildlife, including fish and thus be of indirect benefit to fisheries. As we emphasise throughout our report, conservation of fish and their habitats is at the heart of fisheries management; we therefore strongly encourage the creation of river trusts where this is feasible.
- 12.2 We were surprised at how little evidence we received on fish conservation and the conservation of the freshwater environment from environmental non-governmental organisations, other than those solely representing fisheries, despite the fact that we invited a number of such organisations to submit evidence. We concluded that, as with the statutory nature conservation bodies, these organisations do not attach high priority to fish and their environment. We think that this is a mistake and hope that the recommendations we have made for the encouragement of greater co-operation between bodies with responsibilities with respect to fisheries will be extended to include more active participation from the voluntary sector.
- 12.3 We also attach importance to the role of fisheries non-government organisations. We mention above the need to involve these more closely in policy formulation and in preparations for NASCO meetings. We also discuss this in Chapter 9, where we recommend that these organisations should set up an angling consultative forum.

13 Fisheries' owners and clubs

- 13.1 Owners and tenants of fisheries play a key role in the maintenance of fish habitat and the management of fisheries. Angling clubs manage fisheries on many waters in all parts of England and Wales, and club members make a major contribution to the maintenance of these fisheries. Individual fisheries owners also contribute substantial amounts in time and resources to the maintenance of their fisheries: a survey carried out by the South West Rivers Association in 1996 estimated the value of such work in Devon and Cornwall at around £1m a year. Fishing clubs and private fisheries owners both have an essential role to play in the integrated management of fisheries, and fisheries management at the catchment level must, if it is to be effective, work with them and harness their enthusiasm and resources.
- 13.2 To encourage local involvement we suggest that fisheries' owners and clubs consider establishing informal river or catchment forums to discuss the management of fisheries.

These forums could seek to obtain agreement among fisheries owners on management issues, including programmes of habitat improvement. They could also be involved in the development of Fisheries Action Plans and provide opportunities for local owners and interest groups to put their views to the Environment Agency.

- 13.3** Catchment forums would differ from local advisory committees in that they would be independent of the Environment Agency. It will be for local owners and interest groups to decide whether to set up a forum and, if so, what form it should take. While we believe that there would be advantages in making a forum open to all local people who wished to attend, we would not wish to prescribe any particular format. We would hope, however, that where forums exist they will be represented on local advisory committees.
- 13.4** We would also like the Environment Agency to have powers to grant-aid fisheries improvement work by owners (including angling clubs) or groups of owners. Such a power could be used to encourage habitat improvement programmes developed by catchment forums. It could also be used to encourage individual owners and clubs to undertake habitat work, and would both stimulate the use of private resources in such work and help ensure that they were well directed.

The Environment Agency should have the power to pay grants towards the cost of fisheries and habitat improvement work. (Recommendation 93)

14 Professional accreditation

- 14.1** It was suggested to us that a national scheme of accreditation for fisheries managers should be established and that all those employed in fisheries management should be required to hold a professional qualification at a relevant level and to abide by the code of conduct governing that qualification.
- 14.2** We strongly support the development of training schemes and linked professional qualifications for fisheries managers, and we would encourage all those involved in fisheries management to obtain a relevant qualification, such as those awarded by the Institute of Fisheries Management. Continuing education and training should be seen as an integral part of such qualifications. However, we do not consider that it would be right to require all those involved in fisheries management to obtain a professional qualification. We do not think that the benefits of such a requirement would justify the additional costs to the industry.
- 14.3** It was also put to us that enclosed fisheries run by professional managers should be allowed a degree of self-regulation in relation to rules on such matters as the use of nets. For example, professional fishery managers should be authorised to use nets to remove fish from enclosed fisheries. We agree that detailed supervision of competent fisheries managers by the Environment Agency wastes resources and runs counter to the Environment Agency's approach, which we support, of placing the onus on the owner to ensure that fisheries in enclosed waters are well managed. We believe, however that it must be for the Environment Agency to decide how much self-regulation to permit. It will, in any case, be important to ensure that fisheries managers are competent; professional accreditation would provide one measure of competence.

The Environment Agency should explore areas where the management of enclosed waters can be deregulated from fisheries legislation where this encourages owners and managers to maintain, improve and develop their fisheries without detriment to fish stocks elsewhere. (Recommendation 27)

Chapter 15

Public expenditure

1 Introduction

1. We were asked by Ministers to answer two specific questions on public expenditure on salmon and freshwater fisheries:
 - what is the rationale for, and the objective of, public expenditure on salmon and freshwater fisheries?
 - are existing levels of public expenditure adequate and is it possible to secure a greater contribution towards the costs of public sector involvement from those directly involved with salmon and freshwater fisheries?

2 Rationale for public spending

- 2.1 There is a convincing rationale for Government intervention to achieve the objectives we recommend in Chapter 3 for policies on the conservation of salmon and freshwater fish and the management of salmon and freshwater fisheries and for that intervention to be publicly funded.
- 2.2 Many of the threats to freshwater fish are caused not by fishing but by external factors such as farming, water abstraction and land drainage, and these activities are in turn influenced by a variety of factors, including Government policy. Government is the appropriate body to fund work to reverse adverse impacts of actions on fisheries where these have been in accordance with then Government policy or occurred in the past and cannot be attributed to existing individuals or organisations. In many cases remedial action is being pursued as part of the Government's wider policies on, for example, water quality, water abstraction and CAP reform, but specific measures to address particular impacts on salmon and freshwater fish and fisheries will be necessary.
- 2.3 Action to protect salmon and freshwater fish and their environment from such human activities as illegal fishing, inappropriate stocking and obstructing the passage of fish cannot be left to individuals or to the market: because successful action depends on the activities of large numbers of individuals with differing economic interests, Government intervention is needed. In the case of migratory fish, such as salmon, action by individuals can, by denying fish passage, endanger the entire population in a river – which is why salmon fisheries have been regulated since the thirteenth century. Unregulated fishing endangers fish stocks, and unregulated stocking of fish can lead to the irreversible spread of fish diseases and of alien fish species: these pose a threat to biodiversity and economic sustainability of fisheries.
- 2.4 As pointed out above, conserving freshwater fish is consistent with the UK's international commitments. It is thus a public good, and research undertaken by NOP on behalf of the Environment Agency has shown that the presence of fish is valued not only by anglers and others interested in fisheries but also by the general public. Encouraging the development of salmon and freshwater fisheries in remote areas and promoting angling as a recreational activity are consistent with Government policies intended to benefit the general public by

encouraging rural development and farm diversification and helping to create a fair and healthy society.

- 2.5 If they are to be effective, measures to protect freshwater fish need to be enforced. Enforcement of legislation, together with the protection of private and public rights, are activities of a kind normally carried out by the State. In the case of fisheries legislation there are particular reasons for not leaving enforcement to private individuals or relying solely on the police. Illegal fishing, fish theft and illegal stocking of fish are not only economic crimes: they are crimes against the environment that can threaten the sustainability of fish stocks and biodiversity.

3 Level of public spending

- 3.1 The second question we were asked was whether public spending on salmon and freshwater fisheries was adequate. On this, we noted that it was difficult to establish the total amount spent by the Government that benefits freshwater fisheries; fisheries benefit from spending in a number of sectors, but it is not possible to quantify the total. We have, therefore, concentrated on spending by the Environment Agency on its fisheries function, which covers most public expenditure in relation to salmon and freshwater fisheries legislation.
- 3.2 In real terms there has been a considerable reduction in the Environment Agency's (and before it NRA's) spending on fisheries since the early 1990s, although in nominal terms it has remained broadly stable at around £21m. In particular, there has been a very substantial reduction in Government Grant-in-Aid, from £13.5m in 1992 for England and Wales to £7.4m (£4.7m in England and £2.7m in Wales) in 1999, which has been partly offset by increased receipts from rod licence duties. A further reduction of £1.5m in Grant-in-Aid (to £3.2m) in England was announced during 1999 to take effect from 2001/2002. Comparisons of actual to inflation-adjusted Grant-in-Aid; and Grant-in-Aid and licence duty income are provided in Figures 5 and 6.
- 3.3 The Environment Agency explained to us that reductions in Grant-in-Aid have had an uneven impact. This is because the Environment Agency's two main sources of income for its fisheries expenditure – licence duties and Grant-in-Aid – are allocated unevenly between coarse and trout fisheries on the one hand and salmon and sea trout fisheries on the other. Nett income from rod licence duties from coarse and trout fisheries is around £12m and currently funds all the Environment Agency's expenditure on these fisheries, which is at broadly the same level. Expenditure on salmon and sea trout fisheries is around £9m, whereas income from salmon and sea trout rod licence duties amounts to only £1.0m, with net licence duties contributing a further £150,000. Effectively, therefore, all Grant-in-Aid is now spent on salmon and sea trout fisheries.
- 3.4 As a result the impact of the reductions in Grant-in-Aid on spending levels has been borne mainly by salmon and sea trout fisheries. This has greatly curtailed spending on habitat improvements for these fisheries. It has also meant cuts in numbers of bailiffs, which we were told has led to a significant reduction in the effectiveness of the Environment Agency's law enforcement activities. Although expenditure on coarse and trout fisheries has fallen in real terms, increases in rod licence duties and sales – the latter as a result of better promotion and enforcement – have to some extent offset the reduction in Grant-in-Aid. Salmon and sea trout rod licence duties have also increased substantially, but this has done little to offset reduced Grant-in-Aid, for reasons explored below.

- 3.5 The present situation is not satisfactory. There appears to be no fisheries basis for the reductions in Grant-in-Aid, which have been driven by recent Governments' wish to cut public expenditure, not by any assessment of the justification for, and necessary level of, spending on freshwater fisheries. This illogical approach is particularly apparent in the case of the cut in Grant-in-Aid in England which was announced during the course of our Review: the Minister for Fisheries and the Countryside explained to us that this was made to help respond to demands for additional spending on other non-fisheries areas for which MAFF was responsible.
- 3.6 Nor can we find any logical justification for expecting spending on coarse and trout fisheries to be wholly funded by anglers through rod licence duties. A significant proportion of this spending, as we explain above, benefits the general public, not only anglers, and should in our view be publicly funded.
- 3.7 To give one example, in Chapter 3, we recommend that fisheries legislation be extended to cover fish species listed in the EC Habitats Directive, such as the shad and lamprey. These species are generally not targeted by fishermen and we do not believe that the cost of conservation measures to protect them should be borne by rod licence duties.
- 3.8 Our conclusion, which is strongly supported by the evidence we received, is that current levels of public funding for salmon and freshwater fisheries are not adequate and should be increased. For salmon and sea trout fisheries we believe it to be essential to restore levels of law enforcement and fund work under Salmon Action Plans. For coarse and trout fisheries we have identified a number of areas where more needs to be done: in particular control of fish movements; law enforcement and combating fish theft; research; and remedying historic damage to habitats. Given the disproportionate contribution coarse and trout anglers already make, we believe that this additional work should be publicly funded.
- 3.9 The increase in public funding we are seeking would be most straightforwardly achieved by increasing Grant-in-Aid to the Environment Agency. The Government is about to embark on its second major spending review, to determine levels of public expenditure for the three years from 2001 to 2004, and this will provide an opportunity to reassess the appropriate level of Grant-in-Aid. We believe that it should be restored to at least the level that obtained, in real terms, in 1994, with additional provision to fund habitat restoration work.

In the forthcoming public expenditure round the Government should provide a substantial increase in Grant-in-Aid for the Environment Agency's fisheries function in England and in Wales. (Recommendation 4)

- 3.10 In our view adequate and stable Government funding, via Grant-in-Aid, is the best way of paying for the Environment Agency's fisheries activities such as law enforcement and the maintenance of biodiversity. However, a substantial proportion of the Environment Agency's fisheries costs result from activities such as water abstraction and discharges and in our view there is a good case for seeking to recover these indirect costs through charges related to these activities. The Agency suggested to us that this could be done through a levy on charges for abstraction licences and discharge consents. A levy on Environment Agency charges, passed on to consumers, would internalise these costs and would have the added advantage of informing consumers about the full costs of their actions and thus improve incentives for the efficient use of resources. The Government is currently considering the possibility of amending the arrangements for these charges to permit indirect costs of this kind to be recovered. The 1999 periodic review of the water industry, the so-called AMP 3 exercise, to determine expenditure and price limits was finalised

during the course of our review. We noted that a number of elements were not financed in the price limits set, pending reassessment and reconfirmation of certain schemes; in particular, £110 million relating to the cost of reducing the impact of water abstraction and a further £100 million for making progress towards meeting river quality objectives.

The Government should explore and develop ways of raising money to fund some of the costs of the Environment Agency's fisheries function through a levy on charges for abstraction licences and discharge consents. (Recommendation 94)

- 3.11** In considering a levy on Environment Agency charges, it will be important to recognise that income from these charges already funds some work on fisheries carried out by the Environment Agency. The Environment Agency told us that certain activities, such as monitoring the status of fish populations, could legitimately be charged against other parts of its budget where the information was required to carry out non-fisheries duties; it estimated that such charges presently amounted to around £5m a year. These activities are likely to grow with the need for increased monitoring of fish populations under the EC Water Framework Directive. Their cost should not be borne by the fisheries budget, as they are a legitimate charge on the water quality and quantity budgets.

The Environment Agency should ensure that all work carried out by its fisheries function to benefit its other functions is properly identified and costs recovered accordingly. (Recommendation 7)

4 Contributions from those involved in salmon and freshwater fisheries

- 4.1** The final question on public expenditure put to us by Ministers asked whether it was possible to secure a greater contribution towards the costs of public sector involvement from those directly involved with salmon and freshwater fisheries. The Environment Agency currently collects money from those directly involved in these fisheries via duties on licences for rods and nets.

Rod licence duties

- 4.2** So far as rod licences are concerned, it was argued, in some of the evidence we received, that rod licences should be abolished and income from licence duties replaced by charges on abstraction licences and discharge consents, on the grounds that most of the costs incurred by the Environment Agency from salmon and freshwater fisheries were caused by these abstractions and discharges. It was also argued, in particular by the Commercial Coarse Fisheries Association, that many anglers, especially those who fished still waters, gained little benefit from the Environment Agency's fisheries expenditure and that abolishing rod licences would lead to a substantial increase in the number of anglers.
- 4.3** We have already recommended that money should be raised for fisheries from abstraction licences and discharge consents. However, we concluded that any income raised this way should supplement, not replace, income from licence duties. While not all individual anglers benefit to the same extent from the Environment Agency's expenditure on fisheries, anglers in general benefit collectively and we think it reasonable that they should contribute to a proportion of the cost via the rod licence. Moreover, the rod licence gives individual anglers a stake in the funding and management of freshwater fisheries, which we believe to be of considerable value. Most anglers and angling associations supported its retention.

Rod licences should be retained and rod licence duties should continue to contribute to the funding of the Environment Agency's fisheries activities. (Recommendation 5)

- 4.4 As we have indicated above, we consider that coarse and trout anglers currently pay too high a percentage of the Environment Agency's fisheries costs: we have already recommended that the increase we wish to see in expenditure on these fisheries should be publicly funded. For salmon and sea trout fisheries the position is different: currently, licence duties account for only around 20 per cent of the Environment Agency's expenditure on these fisheries, so there appears to be scope for an increase. However, in our view it is unlikely that it will be possible to increase substantially income from salmon and sea trout rod licences. Such a licence currently costs £57, and the Environment Agency has proposed that this should be increased by £1. In a consultation paper in 1995 the NRA suggested that the cost of a licence should be raised to £75; this idea was endorsed by a number of its advisory committees. However, the £10 increase that was actually introduced in 1996 coincided with a substantial reduction in sales of full licences, with an increase in short term licence sales, and income fell by 5 per cent. The Environment Agency's estimate of the price elasticity of rod licences suggests that a further substantial price rise would reduce income still further. Moreover, we have been told that since 1994 licence sales have fallen by some 40 per cent. In these circumstances, and given the current state of salmon stocks, we consider that a large increase in the cost of licences would be unwise.
- 4.5 The existing requirement to apply for an annual rod licence is administratively expensive with commissions paid on each purchase, and some anglers may genuinely forget to renew their licence. Other more reliable systems are commonly used to eliminate these problems, for example television licences can be obtained on direct debit thereby securing payment. A similar system for fishing licences should help reduce administrative costs.

The Environment Agency should provide a wider range of payment options for fishing licences including direct debit. (Recommendation 6)

Net licence duties

- 4.6 There are currently more than 60 different types of salmon net licences, with duties ranging from £42 to £920 per annum, and some 550 licensees in England and Wales. In 1999/2000 the Environment Agency expects receipts from net licence duties to total around £150,000. It was put to us that since net fisheries account for some 70% of the total salmon catch in England and Wales, net licence holders should be expected to pay a much higher proportion of the costs of regulating and managing salmon fisheries. We were also informed that when the NRA put forward proposals in 1995 for major changes to the structure and rates of net licence duties, it stated that its long term objective was to achieve consistency between rods and nets: it defined this as recovering from netsmen the same proportion of NRA expenditure on behalf of nets that it recovered via rod licence duties of NRA expenditure on behalf of rods. This objective has since been endorsed by the Environment Agency.
- 4.7 We have reservations about the Environment Agency/NRA approach towards consistency between rods and nets and the feasibility and legality of its long term objective. In 1995 the NRA assessed the costs it incurred on behalf of netsmen at £1.31m. This is some five times the estimated nett economic value of all net fisheries in England and Wales²⁶ If net fisheries ceased to exist the sum that would be saved by the Environment Agency would be much

²⁶ See Box 11 in Chapter 10

less than this. In our view it would be more realistic to link licence duties to the actual economic benefit that netmen obtain from salmon and sea trout net fisheries, taking into account the costs incurred by the Environment Agency in regulating these fisheries.

- 4.8** We also note that achieving the Environment Agency's objective would involve increasing net licence duties very substantially: in 1995 the NRA estimated that some nets would eventually incur licence duties of some £3,500, whereas the highest rate of duty currently paid is £920. If such duties were ever introduced, most if not all net fisheries would cease to be viable economically; in practice, therefore, the introduction of such duties would be likely to close the great majority of net fisheries and lead to a large reduction in income from net licence duties. We do not consider that it would be right to use increases in net licence duties to, in effect, close net fisheries. If it is desirable on economic grounds to close net fisheries it should be done openly, not indirectly through net licence increases, and we discuss in Chapter 10 how this might be done. We also note that using licence duties to close net fisheries would seem to be highly vulnerable to legal challenge.
- 4.9** The changes proposed to net licence duties in 1995 placed the various net fisheries in seven bands, based on average catch levels, with the intention of eventually moving to a single rate of licence duty for each band; this change, together with substantial changes to many licence duty rates, was approved by Ministers in 1996. An aspect of the changes that Ministers questioned, however, was the exclusion of salmon of Scottish origin from the catch statistics used to determine the different bands; this was done because the NRA did not consider that it incurred any costs in relation to Scottish fish. We conclude that it would be better to take total catches into account in allocating net fisheries to catch bands, as these determine netmen's economic return from a fishery and so the financial benefits they obtain from fishing.
- 4.10** Overall, we consider it unlikely that it will be possible to increase income from salmon net licence duties by a significant amount. If all net licence duties were harmonised at the highest rate in their current bands, with licence duties for the North East coast net fisheries placed in the top band, receipts would increase to £300,000 if uptake was unchanged. In reality, however, a significant fall in the number of licences might well occur and total income from net licence duties increase by considerably less, if at all.
- 4.11** There is also a wide range of different licence duties for eel net fishing licences. The Environment Agency is currently reviewing these and is likely to propose a degree of harmonisation to achieve greater consistency between licence duties in different parts of the country. The total income from eel licence duties is currently around £70,000 and we believe that there is scope to increase this considerably, particularly in relation to duties for elver nets for which the duty is low, given the value of the catch.

The Environment Agency should propose appropriate increases in licence duties on instruments used in eel and elver fisheries. (Recommendation 12)

Charges on fisheries' owners

- 4.12** We considered the possibility of introducing charges on owners of fisheries as an additional source of income for the Environment Agency. At present, fisheries' owners do not contribute directly to the Environment Agency's income, although they clearly benefit from its activities. The Minister, on application by the Environment Agency, has the power to introduce charges for fisheries' owners under Section 142 of the Water Resources Act 1991. In 1992 the NRA proposed a national charging scheme, covering all fisheries' owners, but in the face of widespread opposition and practical difficulties it was decided not to proceed.

- 4.13 The NRA's proposed scheme would have covered all types of fisheries. From the conclusions we have reached on the funding of coarse and trout fisheries, however, we do not believe there is any justification for seeking extra revenue from coarse and trout fisheries; we therefore confined ourselves to examining the case for a scheme covering salmon and sea trout fisheries only.
- 4.14 Any estimate of the income that a scheme charging salmon and sea trout fisheries' owners might raise is bound to be speculative. In Scotland charges on fisheries' proprietors provide the funding for District Salmon Fisheries Boards; charges are based on the number of salmon caught in each fishery, and the charge for rod fisheries varies from around £20 to £40 per fish. A charge on the same basis in England and Wales would, at current catch levels, raise around £500,000 a year from a charge of around £20 a salmon (with four sea trout counting as one salmon) and around £1m from a charge of around £40 a salmon. However, we noted that anglers in Scotland do not need a rod licence. Instead, a high proportion of the charge on proprietors is passed on to anglers in the price of their fishing. We would expect at least part of any fisheries charge in England and Wales to be passed on to anglers in the same way, although these anglers are already paying a substantial licence duty: the total income raised from salmon and sea trout rod licences is equivalent to a charge of nearly £50 a salmon. If a charge on fisheries' owners of £20 per fish was added to this, the total charge on angling interests would be nearly £70 a fish – well above the amount recovered in Scotland or in Ireland. This led us to conclude that the maximum income that could be expected from a fisheries charge would be £500,000 gross and that even this would represent a considerable extra burden on anglers.
- 4.15 In nett terms, income from the charging scheme for fisheries' owners would probably be substantially lower, as the administrative costs would be high: in 1992 it was estimated that they would amount to some 25 per cent of the gross receipts. We noted that the structure of fisheries' ownership in England and Wales is very different from that in Scotland. In many parts of the country farmers retain ownership of fishing rights after they have sold or leased out the land, and as a result ownership is fragmented among a large number of small owners. Owners will often not be aware of catches from their fisheries, and establishing who is responsible for the charge, and then collecting it, would impose substantial costs on the Environment Agency. In parts of England and Wales salmon and sea trout fisheries are often owned by clubs, which would have to pass the cost of any charge on to their members. The administrative burdens involved could cause problems for smaller clubs, and the extra costs could deter local people from remaining as members. A charging scheme would be a particular problem for clubs which predominantly own coarse fisheries but have some salmon and sea trout fishing which they make available to their members at no extra charge. It has been estimated that some 20 per cent of riparian fishing rights in England and Wales are owned by angling clubs.
- 4.16 Not all the cost of a charge on fisheries' owners would be passed on to anglers; owners would have to meet a proportion themselves. We are concerned, however, that this could have an adverse impact on the overall amount of work undertaken to manage and improve salmon and sea trout fisheries. At present many owners carry out considerable amounts of work themselves; some also contribute to work carried out by bodies such as fisheries trusts. In 1996 a survey by the South West Rivers Association estimated the value of such work in Devon and Cornwall at around £1 million. In many cases owners will be able to carry out such work as habitat improvement more cost effectively than the Environment Agency can. A charging scheme would also be likely to reduce the ability of fisheries' owners to provide matching funding for projects under EU structural programmes and other partnership schemes. For these reasons we believe that there is a danger that the

introduction of charges on fisheries' owners would be likely to reduce the opportunities for the Environment Agency to work in partnership with owners and could mean a reduction in the amount of work that owners can undertake on their own initiative. This is the opposite of what we would like to achieve. As we recommend in Chapter 14, it is essential for the EA to work more closely with local fisheries interests and for innovative ways to be found to encourage joint projects.

Other possible sources of income

- 4.17** There is no requirement for a rod licence for sea angling. There are about one million sea anglers. It was suggested to us that, if these fishermen had to buy a licence, this would provide a useful additional source of funds for fisheries work. Even allowing for the fact that many sea anglers will possess licences already because they fish for salmon and coarse fish, this would amount to several million pounds. However, we conclude that there are problems with this proposal: it is difficult to see what benefits the sea anglers would receive in return for their licence fee; and, at present, commercial sea fishermen do not pay an annual fee for their fishing licence and it could be seen as inequitable if leisure anglers were charged.
- 4.18** It was also suggested to us that a levy on fishing tackle would provide an additional means of funding expenditure on fisheries. We noted, however, that such a levy would apply only in England and Wales, not in Scotland – unless it was regarded as a tax, in which case the proceeds would go to the Treasury. To avoid evasion it would need to apply to tackle used by sea anglers who, again, would gain no benefit from it. It could not, in any case, apply to tackle purchased in other EU countries, and would therefore encourage anglers to buy tackle abroad, to the detriment of the English and Welsh tackle trade. Finally, all or most of such a levy would be passed on to anglers and, as we make clear above, we consider that coarse anglers already contribute much more than their fair share towards spending on freshwater fisheries. For all these reasons, we do not support this idea.

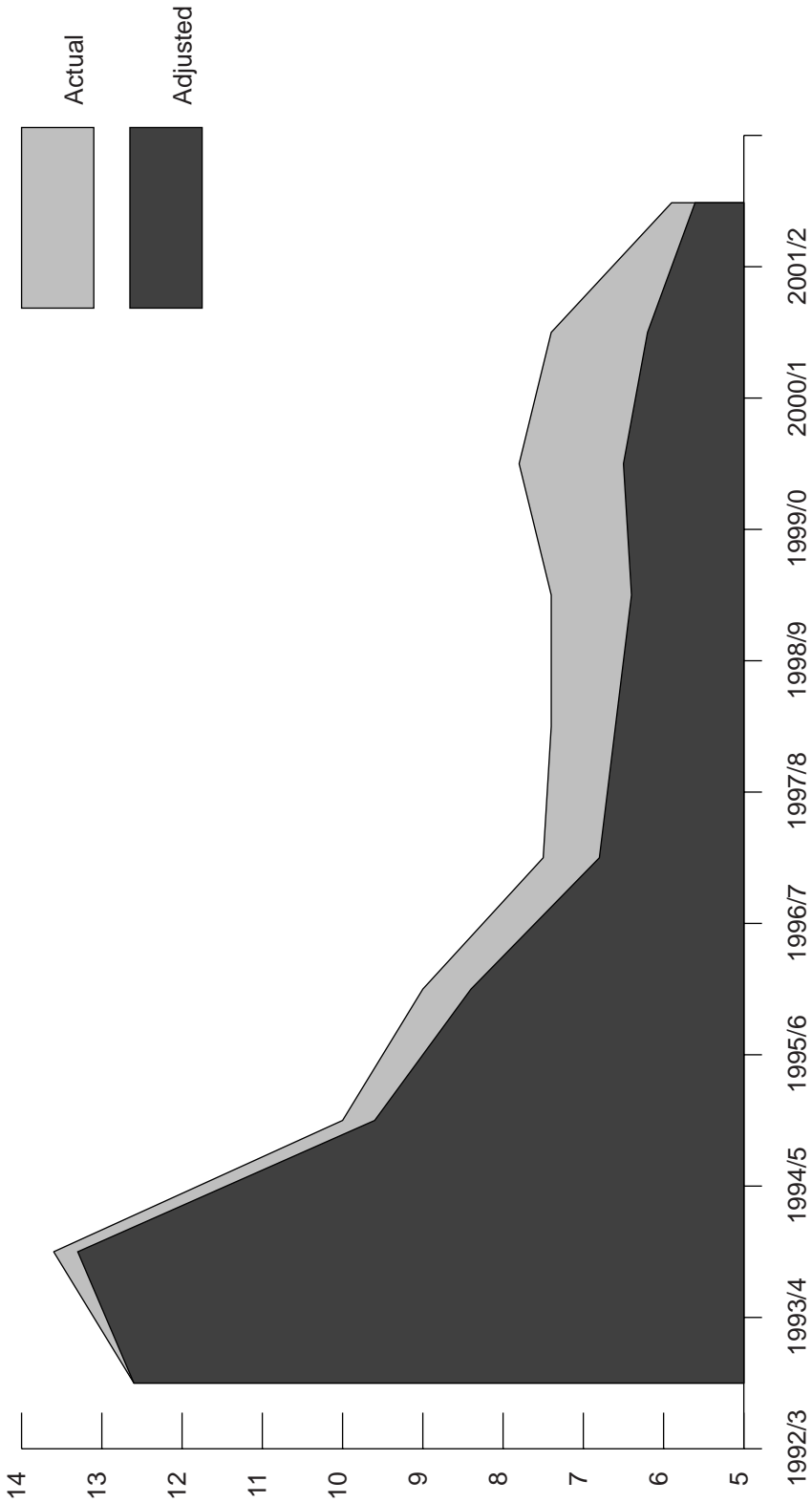
Conclusion

- 4.19** Our response to the question Ministers have asked us is, therefore, that we see little scope for securing a substantially greater financial contribution to the costs of the Environment Agency's fisheries work from those directly involved in salmon and freshwater fisheries. As we have made clear above, we see no justification for increasing the contribution by anglers and others to the cost of work on coarse and trout fisheries; indeed we have recommended that the increase we wish to see in expenditure on these fisheries should be publicly funded. There are a number of areas where we recommend that the Environment Agency do more: habitat restoration, controls on fish movements; including combating fish theft; increased responsibilities for sea fisheries in some areas; research; and the conservation of species not targeted by anglers. In all these areas the benefits would accrue to society as a whole and it is right that the taxpayer should meet the costs.
- 4.20** For salmon and sea trout fisheries we are aware that our conclusion means that the Environment Agency will continue in future to have to look to the Treasury for most of its funding for work on these fisheries, and that, as the cuts in Grant-in-Aid made over the last five years have shown, this is a burden that the Treasury is reluctant to assume. The central problem, as we see it, is that salmon fisheries in England and Wales are not prolific when compared to those in Scotland or Ireland and they face greater problems; this is because many parts of the country are densely populated and there is competition from agriculture, industry and housing for the water resources and habitats on which salmon and sea trout

depend. A higher human population density also exacerbates poaching problems. In these circumstances, if salmon and sea trout are to continue to survive in reasonable numbers the Government will have to meet the lion's share of the cost; given the size of the catch, angling interests will never be able to contribute more than a small proportion of what is required. But salmon and sea trout have been ascending the rivers of England and Wales since the last Ice Age, providing a rich element in our natural heritage and food and recreation for our people. It would be a sad day if pollution, over-exploitation and official neglect led to their disappearance.

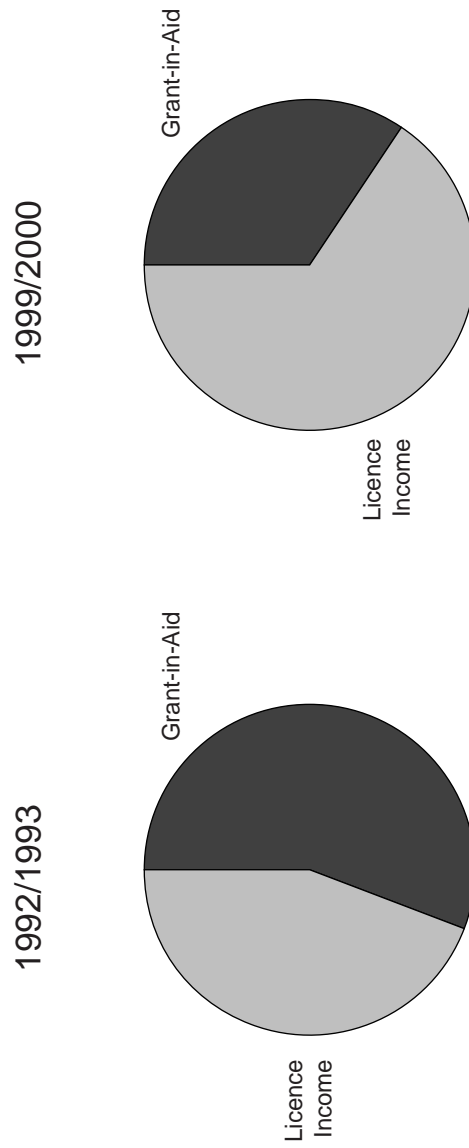
- 4.21** It is important that the amount of money that the Government is being asked to find is put in perspective. In 1998/1999 the Government provided Grant-in-Aid of £19.9m to the English National and Royal Operas, of £6.5m to the Royal Ballet and £5.4m to the Birmingham Royal Ballet. In comparison, it provided £7.4m Grant-in-Aid to the Environment Agency for fisheries work for England and Wales; in 2001 it plans to provide only £3.2m for England. Even with the substantial increase in Grant-in-Aid that we are recommending, the Government will be paying comparatively little to conserve salmon and freshwater fish, and their habitats, on 158,000 km of river and over 350,000 hectares of lakes/stillwaters and to encourage a recreation enjoyed by over two million anglers.

Figure 5: Comparison of actual and inflation-adjusted GIA (England and Wales)



- 1. 1998/99 figures show GIA nett of licence duty receipts
- 2. 1999/2000 figure includes a one-off payment of £0.5m
- 3. Figures for 2001/2 are estimates only

Figure 6: Comparison of GIA and licence duty income between 1992/3 and 1999/2000 (England and Wales)



1. 1998/99 figures show GIA nett of licence duty receipts
2. 1999/2000 figure includes a one-off payment of £0.5m
3. Figures for 2001/2 are estimates only

Annex I

Biographical details of the Review Group Chair and members

Chair

Professor Lynda Warren

Professor of Environmental Law at the University of Wales, Aberystwyth; author of a number of publications on environmental law and a Member of the Countryside Council for Wales and the Environmental Law Commission of IUCN.

Members

Dr Nick Giles

A self-employed consultant specialising in freshwater fisheries and wetland ecology management; life member of the Freshwater Biological Association and Anglers Conservation Association and member of the Institute of Fisheries Management; Chairman, Regional Fisheries, Ecology and Recreation Advisory Committee (RFERAC) – Southern Region; Executive Chairman of the Wildlife Trusts Water Policy Team; Scientific Adviser to the Salmon and Trout Association; member of Scientific Advisory Committees of the Wildfowl and Wetlands Trust and Game Conservatory Trust; and formerly head of Wetlands Research Game Conservatory Trust.

Mr John Golding

Formerly an MP, Junior Minister from 1976-1979 and Chairman of the Select Committee on Employment 1979-1982. Mr Golding died during the review in January 1999.

Dr Keith Hendry

Managing Director and senior fisheries biologist of the consultancy firm APEM Ltd; Member of the Institute of Fisheries Management and Honorary Biologist to the National Federation of Anglers.

Mr Derek Heselton, MBE

A sea fisherman and salmon netsman; Chairman of the National Federation of Fisherman's Organisations (NFFO) Salmon Committee; Minister's Appointee to the North Eastern Sea Fisheries Committee; and Member of the former Salmon Advisory Committee.

Mr David Hodgkiss

A businessman (structural engineer); riparian owner on Rivers Eden and Derwent; Member of the Salmon and Trout Association and the River Eden Owners Association; and Patron of the Tweed Foundation. A keen salmon fisherman.

Mrs Jean Howman

A past chairman of the Salmon and Trout Association; and one of the founders of the Association of Stillwater Game Fishery Managers. She owns and runs a still water trout fishery and is a keen salmon angler.

Mrs Jane James

Director of the Anglers' Conservation Association, which campaigns for cleaner rivers. Enjoys both coarse and fly fishing.

Dr Mike Ladle

A salmonid and coarse fish ecologist at the Institute of Freshwater Ecology, angling instructor; and author of books on coarse and sea fishing.

Mr Frank Lythgoe

A retired police officer; Vice President of the National Federation of Anglers; and Secretary of the Warrington Anglers' Association.

Mr David Moore

A recreation manager with Anglian Water, formerly Fisheries Officer for the Welland and Nene catchments; Committee Member of the Association of Stillwater Game Fishery Managers; Founder Member of the Institute of Fisheries Management; and life Member of the Freshwater Biological Association.

Mr Mervyn Mountjoy

Skipper/owner of a stern trawler and former salmon netsman; South West Member of the NFFO's Salmon Committee; and former Minister's appointee to both the Devon and the Cornwall Sea Fisheries Committees; salmon angler; and Member of the Institute of Fisheries Management.

Mr Pat O'Reilly

A self-employed management consultant; Chairman of the Environment Agency's Welsh RFERAC; author and fly fishing instructor.

Mr Stanley Payne

Fisheries Manager for Castle Fisheries on the River Derwent; Chairman of the Derwent Owners' Association; Founder Member of the Institute of Fisheries Management; and Chairman of the South and West Cumberland Fisheries Association.

Dr Anne Powell

Ecologist; Ministers' Fisheries Appointee to the Environment Agency Board; Trustee of World Wildlife Fund UK; Thames Salmon Trust; and Freshwater Biological Association.

Mr John Williams

General Secretary of the Birmingham Anglers' Association Limited; Vice Chairman of Severn Fisheries Consultative

Technical assessors

The following acted as technical assessors to the Review Group

Dr Phil Hickley	Fisheries' Scientist, Head of the Environment Agency's National Coarse Fish Centre
Dr Ian Hodge	Agricultural and Rural Economist, Gilbey lecturer in Land Economy, University of Cambridge
Mr Ted Potter	Fisheries Scientist, Head of Salmon and Freshwater Fisheries Team at CEFAS

Secretariat

Mr Ivor Llewelyn	(Secretary) MAFF
Mr Rob Bowman	(Assistant Secretary) MAFF
Mr Mike Barbier	(to December 1999) MAFF
Mr Will Hellon	(from January 2000) MAFF
Mr Glyn Perryman	National Assembly for Wales Agriculture Department

Annex II

Programme of open meetings

Oral evidence

<i>Date</i>	<i>Location</i>	<i>Main Issues</i>
28 September 1998	London	Coarse and trout fisheries
19-20 October 1998	Cardiff	Salmon, sea trout and wild brown Trout fisheries
16 November 1998	London	Introductions and transfers of fish
10-11 December 1998	London	Factors affecting habitats
12 January 1999	London	Coarse, trout (excluding wild brown trout) and eel fisheries
8 February 1999	London	Factors affecting fish populations
8 March 1999	London	Fisheries and recreation
21-22 April 1999	London	Institutional arrangements for the management and regulation of fisheries; fisheries funding

Regional meetings

<i>Date</i>	<i>Location</i>
25 January 1999	Nottingham
29 January 1999	Lymm, Cheshire
12 February 1999	Newcastle
16 February 1999	Exeter
19 March 1999	Aberystwyth
23 April 1999	London

Annex III

List of respondents to the Salmon and Freshwater Fisheries Review Group

Name	Organisation
J Read	Atlantic Salmon Trust
M Hatcher	National Association of Fisheries and Angling Consultatives
M Hatcher	Moran Committee
C Bourner	Commercial Coarse Fisheries Association
H Maund	British Trout Association
W Reece	National Federation of Sea Anglers
K Ball	National Federation of Anglers
G Howard Roberts	Welsh Salmon and Trout Angling Association
R Mulholland	Grayling Society
R Mulholland	Piscatorial Society
Mary Gibson	English Nature
C Duigan	Countryside Council for Wales
T Hodge	Country Landowners Association
P Wood	UK Glass Eels Limited
C Quaife	British Canoe Union
N Edwards	Inland Waterways Association
D Daines	Historic Narrow Boat Owners Club
G Asbury	Consumers in Europe Group
Dr B Knights	University of Westminster
P Thompson	
R Millichamp	
G Nicholson	d'Arcy Hildyard Angling Club
B Dove	Scalby Beck Angling Club

Name	Organisation
C Burton	
A Herbert	North York Moors National Park Authority
D Morton	Mossbrook Angling Club
A Britton	River Eden and District Fisheries Association
P MacGillivray	Salmon and Trout Association (Yorkshire Region Committee);
S Targett	Stockton Angling Association
W Arnold	Cumberland Rivers Foundation
J Raynar	Clark-Scott Harden
Sir D Bradbeer	Northumberland Sea Fisheries Committee
A Fell	
A Fell	
B Wilkinson	West Riding Anglers
L Rogers	Goole and District Angling Association
P Skelton	Goathland Fishing Club
S Griffiths	
S Foster	Egton Estate
M Jackson	
D Aldworth	KENT (Westmorland) Angling Association
P Thompson	Upper Derwent Preservation Society
A Sanders	Dee Fishery Association
B Gwynne	Criccieth, Llanystumdwy and District Angling Association
J Gareth James	Neath and Dulais Angling Club
P Bowen	Crickhowell and District Angling Society
A Pepper	Danby and Jervaulx Fly Fishers
H Hughes	Seiont Gwyrfai and Llyfni Anglers Society (Cymdeithas Pysgotwyr Seiont Gwyrfai A Llyfni)
J Hughes	Glaslyn Angling Association (Cymdeithas Bysgota'r)
D Gregory	South West Wales Angling Federation

Name	Organisation
W Rogers	
S Allen	Bute Angling Society
P Nelmes	Glamorgan Anglers Club
J Rogers	
J Wilmot	Birchgrove (Cardiff) Angling Society
G Ayres	Environment Agency Midlands RFERAC
C Tarver	Wiltshire Fishery Association
A Lumby	River Allen Association
C Rothwell	
A Pope	
J Redfearn	Huish Episcopi Parish Council
P Lacey	Somerset Association of Local Councils
C Inniss	River Torridge Fishery Association
J Lewis	
M Charleston;	South West Rivers Association
Lord Clinton	
A Medley	Frome, Piddle and West Dorset Fishery Association
A Kilby	River Exe and Tributaries Association
P Mercer	Lower Tamar Fishing Club
Sir F Kitson	
A Knights	River Otter Association
W Eliot	Liskeard and District Angling Club
J Levell	Wessex Salmon Association
J Levell	Somerley Estate
J Glasspool	Test and Itchen Association Ltd
M Ferguson	
Stephen Payne	
C Bourner	Commercial Coarse Fisheries Association
G Roberts	Carmarthenshire Fishermen's Federation
	Environment Agency

Name	Organisation
V Beale	Anglers' Conservation Association
M Hatcher	Moran Committee
C Poupard	Salmon and Trout Association
C Brain	Salmon and Trout Association
T Hodge	Country Landowners Association
J Read	Atlantic Salmon Trust
J Gregory	Institute of Fisheries Management
O Vigfússon	North Atlantic Salmon Fund
D Clark	Cullercoats Fishermens Association
M Hopper	
H Rowe	
J Weatherstone	
D Brown	
J Armstrong	
I Wakenshaw	
P Clark	
P Stone	
K Bowie	
M Anderson	
W Cook	
J Robinson	
IJ Stocks	
G Baxter	
P Rolph	
D Hyde	
G Clarke	
G Dawson	
R Marsden	
V Henderson	
K Spencer	The Ribble Fisheries Association

Name	Organisation
H Whittam	Ulverston Angling Association
J Carr	
A Jones	Llandysul Angling Association
D Davies	Clwb Godre'r Mynydd Du Saethu A Physgota Angling and Shooting
P Eklund	Aberystwyth Angling Association Ltd
J Williams	Tawe & Tributaries Angling Association
Major General Hopkinson	Wye Salmon Fishery Owners Association
Dr S Marsh-Smith	The Wye Foundation
G Roberts	Carmarthenshire Fishermens Federation
C Rothwell	
Colonel Tarver	Wiltshire Fishery Association
A Pope	
B Burrows	
G Roberts	Welsh Salmon and Trout Angling Association
Dr C Duigan	English Nature/Countryside Council for Wales
N Brabner	The United Usk Fishermen's Association
B Deas	National Federation of Fishermen's Organisations
T Marsh	Ribblesdale Angling Association
R Forrest-Webb	
J Parkman	Countryside Alliance
Ms V Beale	Anglers' Conservation Association
S Clarke	Catfish Conservation Group
K Davenport	Ornamental Aquatic Trade Association Ltd
M Hatcher	Moran Committee
T Marks	Specialist Anglers Conservation Group
K Ball	National Federation of Anglers
M Burdon	Barbel Society
R Knight	Farming and Wildlife Advisory Group
C Durie	UK Biodiversity Action Plan Vendace Steering Group

Name	Organisation
J Gregory	Institute of Fisheries Management
D Harpley	Wildlife Trust (Cumbria)
G Proud	Carlisle Angling Association
R Millichamp	
J Rogers	
A Kilby	River Exe and Tributaries Association
M Charleston	South West Rivers Association
Major A Hill	Hooke Springs Trout Farm
A Randles	Draft Netsmen of the River Dee
M Hatcher	Moran Committee
K Ball	National Federation of Anglers
A Woods	Country Landowners Association
K Allanson	Environment Agency (Wales)
C Duigan	English Nature; Countryside Council for Wales
N Edwards	Inland Waterways Association
J Gregory	Institute of Fisheries Management
T Thompson	Cranfield University
A Jones	Llandysul Angling Association
A Kilby	River Exe and Tributaries Association
M Charleston	South West Rivers Association
A Rickard	Westcountry Rivers Trust
J Carr	
M Payne	National Farmers Union
C Dennison	Eel Study Group/Eel Conservation Society
N Edwards	Inland Waterways Association
J Gregory	Institute of Fisheries Management
Ms M Gibson	English Nature; Countryside Council for Wales
P Wood	UK Glass Eels Ltd
S Sim	British Waterways
	The National Anguilla Club

Name	Organisation
Dr B Knights	University of Westminster
K Ball	National Federation of Anglers
R Mumford	
M Hatcher	
Moran Committee	
H Hughes	Seiont Gwyrfai and Llyfni Anglers Society (Cymdeithas Pysgotwyr Seiont Gwyrfai A Llyfni)
R Mumford	
S Griffiths	
Dr R Broughton	
E Le Cren	
A Crofts	Wildlife Trusts
R Wynde	RSPB
Dr C A Duigan	Countryside Council for Wales; English Nature
Dr J S Welton &	Institute of Freshwater Ecology
Dr M Elliot	
J Gregory	Institute of Fisheries Management
M Gadstone	Campaign for the Abolition of Angling
C Howells	British Waterways
N Edwards	Inland Waterways Association
K W Ball	National Federation of Anglers
K B Spencer	Ribble Fisheries Association
S Griffiths	
A D Kilby	River Exe and Tributaries Association
M Hatcher	Moran Committee
Dr O C Wetherell	Ryedale Anglers
R Mumford	
J H Mitchell	National Federation of Anglers (N E Region)
A G Britton	

Name	Organisation
H P Hughes	Seiont Gwyrfai and Llyfni Anglers Society (Cymdeithas Pysgotwyr Seiont Gwyrfai A Llyfni)
C Howells	British Waterways
C Howells	British Waterways
B & C Maher	
A Crofts	Wildlife Trusts
A Rickard	Westcountry Rivers Trust
E L Maddison	
D Blagrove	Commercial Narrowboat Operators Association
C Quaife	British Canoe Union
C Quaife	British Canoe Union
N Edwards	Inland Waterways Association
C Howells	British Waterways
D Casey	Sport England
D Casey	Sport England
P P Dickin	Residential Boat Owners Association
K W Ball	National Federation of Anglers
M Charleston	South West Rivers Association
A D Kilby	River Exe and Tributaries Association
J Gregory	Institute of Fisheries Management
D Daines	Historic Narrow Boat Owners Club
R Rickards	
N Richardson	
L Meakin	
J S Amsden	Isle of Wight Animal Preservation and Action Group
F Bancroft	Hemsworth Conservative Angling Society
J Burton	
J Roxburgh	
M Collins	
J Kampf	

Name	Organisation
H W Beech	Wirral Borough Council Anglers Club
R Roach	
R C Handy	
J Robbins	
R Mumford	
A D Kilby	River Exe and Tributaries Association
V Beale	Anglers' Conservation Association
M Hatcher	Moran Committee
A Jones	Llandysul Angling Association
M Hatcher	The Moran Committee
R W Earl	
R Hampson	North Petherton Town Council
J H Eggleton	
N J Nokes	
A W Haynes	
A Laprade	
L Roskilly	
Dr C Duigan	Countryside Council for Wales; English Nature
M Gastone	Campaign for the Abolition of Angling
P Lea	National Association of Boat Owners
A N E Cox	River Taw Fisheries Association
A Rees	
W Corns	Wombourne Angling Club
R Stancombe	Paxmans Angling Club
Stephen Payne	
C W Poupard	Salmon & Trout Association
P J Parkinson	Sportfish
D B Hobson	
J Lodatt	
V L Hopper	

Name	Organisation
R Banfield	
D Johnson	
A Mackintosh	
P Burgess	
J Chapman	
D Morris	
C Wilderspin	
B Halsall	
L Hughes	
M B Lamb	
W Hughes	
J P Long	Marlow Angling Club
T M Kerry	
D J Appleby	Dereham and District Angling Club
R Stenhouse	
S O'Connor	
	Anglers' Voice
E S Bray	Environment Agency
A N E Cox	River Taw Fisheries Association
C Wright	
D Treleaven	Launceston Anglers' Association
H Thresher	Crediton Fly Fishing Club
C Inniss	South West Rivers Association
M Charleston	South West Rivers Association
M Charleston	South West Rivers Association
T Jackson	South West Rivers Association
A Knights	South West Rivers Association
H Thresher	Crediton Fly Fishing Club
Major J Macro	
M Wilson	

Name	Organisation
D Pakes	South West Rivers Association
B Hill	Taw Mussel Fishery
C Tarver	Wiltshire Fishery Association
R Adams	
S Foster	The Egton Estate
C Braithwaite	Tyne Fisheries Improvement Association
G Ayres	Environment Agency RFERAC Midlands
C Miller	Garnffrwd Trout and Salmon Fishery
I C Rees	The New Dovey Fishery Association (1929) Ltd
Major General Hopkinson	Wye Salmon Fishery Owners Association
A F Saunders	Dee Fishery Association
R Lee	
G J Rogers	
E Lloyd	
K Williams	
R Allen	Tregaron Angling Association
R Darker	Welsh Federation of Coarse Anglers
I C Rees	New Dovey Fishery Association (1929) Ltd
C Evans	Aberystwyth Angling Association Ltd
E Lloyd	Environment Agency FERAC Wales
A Randles	
H Roberts	Welsh Salmon and Trout Angling Association
A Randles	
G M Hayter	
Dr M Smith	Countryside Council for Wales; English Nature
K W Ball	National Federation of Anglers
N Edwards	Inland Waterways Association
J Gregory	Institute of Fisheries Management
M Hatcher	Moran Committee

Name	Organisation
M L Weaver	Wild Trout Society
T J Turner	Severn Fisheries Consultative Council
A Whitchurch	
K B Spencer	Ribble Fisheries Association
J R Carr	
A D Kilby	River Exe and Tributaries Association
R J Chappell	
Major General Hopkinson	Wye Salmon Fishery Owners Association
C Howells	British Waterways
M Aprahamian	UKBAP Shad Species Action Plan Steering Group
J Read	Atlantic Salmon Trust
R Bradley	Association of Sea Fisheries Committees
G Howard Roberts	Welsh Salmon and Trout Angling Association
R Wynde	Royal Society for the Protection of Birds
P Wagstaffe	British Waterways
A Rio	
C Rogers	
A Moseley	
P Brader	
M Waters	
G Roberts	Welsh Salmon and Trout Angling Association
C Ward	
C Ward	
D Summers	
Mrs Forrester	
R & K Poar	
Dr Wetherell	Ryedale Angling Club

Name	Organisation
Colonel Bewsher and the Earl of Eglinton and Winton	Atlantic Salmon Trust and North Atlantic Salmon Fund
S Marsh-Smith	Wye Foundation
M Hatcher	Moran Committee
J Castle	Lune & Wyre Fishery Association
M Callery	
G Roberts	Carmarthenshire Fishermens Federation
K Elson	
N Drake	
C Poupard	Salmon and Trout Association
M Hatcher	Moran Committee
Ms S Swartz	
Mrs J Duffin	
Ms M Guess	
Mr M Gastone	The Campaign for the Abolition of Angling
Mrs M Harrison	
Mrs Horn	
Mrs A Laprade	

A total of 352 responses, of which 58 originate (at least in part) from Wales.

A number of organisations and individuals commented more than once and this is reflected in this list.

Annex IV

Text of letter to Mr E Morley from Professor L Warren

Mr Elliot Morley
MAFF
Nobel House
17 Smith Square
London SW1P 3JR

8 June 1999

Thank you for your letter of 21 May advising me of the cut in MAFF's spending on salmon and freshwater fisheries. I am writing to you on behalf of the Salmon and Freshwater Fisheries Review Group to let you know our reaction to this news.

In his letter to me of 8 April, Dr Cunningham, explained to me that, in order to avoid the possibility of pre-empting the outcome of the Review, he had agreed that "the MAFF CSR should not consider salmon and freshwater fisheries in any detail and that the questions which would normally be asked as part of the CSR should instead be dealt with by the Research Group". These questions were:

- what is the rationale for, and the objectives of, public expenditure on salmon and freshwater fisheries?;
- are existing levels of public expenditure adequate and is it possible to secure a greater contribution towards the costs of public sector involvement from those directly involved with salmon and freshwater fisheries?;
- what should the respective roles be of Government Departments and the Environment Agency?

Members of the Review Group discussed and applauded your statement at Easter in your interview with Jeremy Paxman that Fisheries GIA to angling would be maintained over the next 3 years of the CSR. Yesterday, they expressed dismay at what they saw as a reversal of this statement.

Our concerns are twofold – concern over the impact of the decision on fisheries and concern over its impact for the workings of the Review Group. Turning to the second point first, we are committed to producing a report by the autumn ie 15 months after our first full meeting. We have held all our scheduled open sessions and have received an enormous amount of useful evidence. We did, of course, seek views on sources of funding but the bulk of the evidence was submitted from the starting point of a level playing field – not an unreasonable assumption given previous indications. The Review Group now doubts the relevance of some of the evidence. The cuts imposed are likely to have a drastic effect on fisheries management across the board and will impact on most areas of our review, not merely our considerations of administrative and financial matters.

For this reason, we have decided that we must give witnesses the opportunity to submit further evidence. In addition we shall actively seek further evidence from the Environment Agency and other key players. In consequence, I feel that I can no longer be held to my commitment to deliver a report in the autumn. We will have to hold extra meetings and revisit our earlier deliberations.

I do not make such a decision lightly. Review Group members are all busy people and have already committed a great deal of time to this review. It is stretching their good will to ask them to extend their commitment. Members do not receive a fee for their services and many can ill afford the extra time. There will, in addition, be implications for the funding of the review and sufficient funds will have to be made available to finance further meetings of the Group.

I will turn next to the impact on the fisheries themselves. The Environment Agency will clearly have to make changes to accommodate such a cut. These might involve fisheries staff and dismantling infrastructure currently dedicated to maintenance of fisheries. Whatever action they take, it is certain that the Agency will not be able to afford to wait and see what the Government's response to our report is. There is, therefore, a significant risk that changes made in reaction to the cuts might be in directions incompatible with the Review Group's findings. The result would be lost opportunities and inefficient use of public funds.

Government recently agreed that the Agency should take on extra work to help conserve salmon stocks (national byelaws and the preparation of Salmon Action Plans). These cuts will inevitably have greatest impact on those regions where most of the extra work is needed. The UK's international credibility is dependent not solely on promoting conservation measures to protect salmon stocks but also on adequately funding their implementation and enforcement. We seriously question whether the Agency will be able to carry out these duties.

We appreciate that Government cannot make an open-ended commitment to maintain a particular level of funding and we are not seeking to make a special case for fisheries funding. We fear, though, that the extent and timing of the cuts undermines the credibility of the Review Group – and thence the value of its report – and sends out negative messages about the Government's policy on salmon and freshwater fisheries. In your letter, you seek to assure me and members of the Group that the cuts do “not indicate any lessening of the Government's commitment to these fisheries” but I think it will be difficult to convince the public of this. Instead, salmon and freshwater fisheries seem to have been treated in a cavalier fashion. Drastic cuts have been made without the benefit of examination in the CSR or the outcome of this review.

The consequence is that morale in the Review Group is very low. Members of the Group feel that this action reduces their confidence that the Government will take the outcome of their deliberations into account. We must, of course, formulate our report to take account of the cuts but I suspect that several of us would have declined the invitation to become a member of the Group in the first place if we had known that the funding basis for salmon and freshwater fisheries might change during the course of the review. We were led to believe that Government would await our report before making any further decisions on GIA. This commitment has not been honoured and we feel let down.

Yours sincerely

Lynda M Warren.

Text of response to Professor Warren's letter from Mr Elliot Morley, Minister for the Countryside and Fisheries

Professor Lynda Warren

22 June 1999

Thank you for your letter of 8 June about the recently announced reduction in MAFF's Grant-In-Aid to the Environment Agency.

I can understand the review group's reaction to this cut. As I said in my letter informing you of our decision, I very much regret the necessity for the reduction, which was one of a number of economies we had to make to keep MAFF's expenditure within the limits imposed on us by the Comprehensive Spending Review. I must also reiterate that the Government remains committed to the review of salmon and freshwater fisheries that the group is carrying out, and we still want the group to address the questions put to you by Jack Cunningham; the answers will be needed for the review of Government spending that will determine spending plans for the three years following the CSR period. I would also welcome the Group's views on the priorities for spending by the Environment Agency on salmon and freshwater fisheries during the remainder of the CSR period, bearing in mind the reductions in the Agency's Grant-In-Aid.

I appreciate that this new development means that the group might have difficulty in completing its report by the end of September. I hope, however, that you will be able to finalise it as soon as possible thereafter, so that it can be taken into account in reaching decisions on issues such as implementation of the new rural development regulation.

Finally, I would welcome the opportunity to hear the group's concerns at first hand. I understand that your next meeting in London will be on 26 July; if the group would like me to attend, please let me know.

Yours

Elliot Morley

Annex V

Glossary of terms used in the Report

Alevin	young salmon or sea trout, from hatching to end of dependence on yolk sac as primary source of nutrition, during which stage they remain within the gravel.
anadromous fish	fish, born in fresh water, that migrates to sea and then returns to fresh water to spawn.
artificial waters	man-made ponds or lakes many of which have been built specifically for the purpose of angling.
brown trout	freshwater resident form of the trout <i>Salmo trutta</i> .
by-catch	capture of non-targeted fish in a net.
carrying capacity	level to which a fish population in a river or stream is limited by natural factors such as space and food.
catadromous	fish, born in sea water, that migrates to fresh water and then returns to sea to spawn.
coarse fish	freshwater fish other than “game” fish.
conservation limits	threshold levels below which the spawning stock should not be permitted to fall.
diadromous	fish that spend part of their life-cycle in freshwater and part in the sea.
drift net	type of gill net released from or attached to a boat and free to drift with the wind or tide.
escapement	salmon or sea trout that survive to spawn.
exploitation	any means by which fish are removed from any stock and killed by man.
fishery	see Chapter 2 of the report.
fishing	the act of catching or taking fish.
fishing mill dam	a dam or weir built partly for the purpose of taking or facilitating the taking of salmon and sea trout and partly for providing water for generating power or other purposes.

fishing weir	a structure across a river channel, either natural or man-made, which obstructs the free passage of salmon and sea trout and is used for the purpose of taking or facilitating the taking of fish.
fixed engine	any fixed net or fixed device for catching fish.
freshwater fish	fish which live all their lives in freshwater. All species of diadromous fish are excluded.
fry	young fish at stage from independence of yolk sac as primary source of nutrition to dispersal.
game fish	a term sometimes used for salmon and all kinds of trout.
gill net	net designed to catch fish by enmeshing them.
gravid fish	female fish carrying eggs and about to spawn (see unclean).
grilse	a small member of the species <i>Salmo salar</i> , normally one that has first matured, or is about to mature, after one winter at sea.
introduction	the intentional or accidental transportation and release by man of species or races into an environment outside their natural range.
invertebrates	those who do not have a spine or backbone.
J-net	a type of fixed engine for taking salmon and sea trout used exclusively on the Yorkshire coast. The net hangs vertically and stationary in the water and is set in the shape of a "J" or "T". Fish can only be caught by becoming enmeshed or entangled in the walls of the net.
kelt	a salmon that has spawned up until the time it re-enters salt water.
lake	any naturally-occurring body of water enclosed by land.
landlocked salmon	variety of salmon of <i>Salmo salar</i> which does not migrate to sea to breed.
multi-sea-winter salmon	salmon which has spent two or more winters at sea.
parr	young salmon, in stage from dispersal from redd to migration as a smolt.
post-smolt	young salmon, at stage from leaving the river until the end of the first winter in the sea.
precautionary approach	see Chapter 2 of the report.

putcher	wickerwork conical baskets which, when erected on stages, form putcher ranks. Fish swimming in the turbid water enter the baskets and become trapped as the tide falls.
ranching	release of reared fish (salmon smolts or elvers) into the wild with the intention of harvesting all the returning adults or to use them as broodstock.
redd	the depression made by a hen salmon, trout or char in the gravel on the river bed in which her eggs are laid.
reintroduction	the deliberate release of fish by man into a geographic area in which it was indigenous in historic times but where it subsequently became extinct.
run-timing	the time of year in which salmon or sea trout first return to fresh water and move up river.
salmon and freshwater fisheries	see Chapter 2 of the report.
salmonid fish	a fish belonging to the <i>Salmonidae</i> , which includes the salmon <i>Salmo salar</i> and the trout <i>Salmo trutta</i> .
sea-age	number of winters a salmon has remained at sea.
sea trout	diadromous form of the trout <i>Salmo trutta</i> after the post smolt stage.
seine net	the most widely used netting method for taking salmon or sea trout in England and Wales. It consists of a wall of netting with weighted foot rope and floated head rope which is shot from a boat to enclose an area of water between two points on the shore. The net is then retrieved and any fish drawn up onto the shore.
stocking	the repeated injection of fish into an ecosystem in which a population of that species already exists from one external to it. A stocked species may be either already native to the recipient water body or exotic to it but previously introduced.
smolt	fully silvered juvenile salmon migrating or about to migrate to the sea.
spring salmon	multi-sea-winter salmon which return early in the year, generally before end of May.
Territorial sea baselines	the line from which the territorial sea is measured. It usually follows the low water mark, running across the mouths of bays or inlets.
transfer	the intentional or accidental transportation and release of individuals of a species or of populations into an environment within their natural range.

transgenic fish	genetically modified fish into which additional genes have been inserted.
T-net	a type of fixed engine operated close to shore and designed to intercept and trap salmon and sea trout moving along the coast close to the shore but which may also take some fish by enmeshing them.
trap	any box, crib, net or other device located in a weir across all or part of the width of any river with the intention of taking fish.
triploid	fish derived from eggs that have been physically treated to prevent sexual maturation.
unclean fish	a term used to refer to a salmon or sea trout that is about to spawn, or one that has recently spawned and has not recovered from spawning.
whitling (aka finnock, school peel)	a sea trout that returns to river in the same year as it migrated to the sea.
winterbourne	stream or watercourse whose flow are dependent upon winter rainfall or run-off and that tend to dry up in summer.

Annex VI

Latin names of native fish species occurring in freshwater in England and Wales

Family	Species	Common name
Acipenseridae	<i>Acipenser sturio</i>	Sturgeon
Anguillidae	<i>Anguilla anguilla</i>	European eel
Clupeidae	<i>Alosa alosa</i>	Allis shad
	<i>Alosa fallax</i>	Twaite shad
Cobitidae	<i>Cobitis taenia</i>	Spined loach
	<i>Noemacheilus barbatulus</i>	Stone loach
Coregonidae	<i>Coregonus albula</i>	Vendace
	<i>Coregonus lavaretus</i>	Powan / Schelly / Gwyniad
	<i>Coregonus oxyrinchus</i>	Houting
Cottidae	<i>Cottus gobio</i>	Bullhead
Cyprinidae	<i>Alburnus alburnus</i>	Bleak
	<i>Abramis brama</i>	Common bream
	<i>Barbus barbus</i>	Barbel
	<i>Blicca bjoerkna</i>	Silver bream
	<i>Carassius carassius</i>	Crucian carp
	<i>Cyprinus carpio</i>	Common carp
	<i>Gobio gobio</i>	Gudgeon
	<i>Leuciscus cephalus</i>	Chub
	<i>Leuciscus leuciscus</i>	Dace
	<i>Phoxinus phoxinus</i>	Minnow
	<i>Rutilus rutilus</i>	Roach
	<i>Scardinius erythrophthalmus</i>	Rudd
	<i>Tinca tinca</i>	Tench
	Esocidae	<i>Esox lucius</i>
Gadidae	<i>Lota lota</i>	Burbot
Gasterosteidae	<i>Gasterosteus aculeatus</i>	Three-spined stickleback
	<i>Pungitius pungitius</i>	Ten-spined stickleback
Osmeridae	<i>Osmerus eperlanus</i>	Smelt
Percidae	<i>Gymnocephalus cernuus</i>	Ruffe
	<i>Perca fluviatilis</i>	Eurasian perch
Petromyzontidae	<i>Petromyzon marinus</i>	Sea lamprey
	<i>Lampetra fluviatilis</i>	River lamprey
	<i>Lampetra planeri</i>	Brook lamprey
Salmonidae	<i>Salmo salar</i>	Atlantic salmon
	<i>Salmo trutta</i>	Sea trout/Brown trout
	<i>Salvelinus alpinus</i>	Arctic char
Thymallidae	<i>Thymallus thymallus</i>	Grayling

Marine species that enter freshwater:

Gobiidae	<i>Pomatoschistus microps</i>	Common goby
Mugilidae	<i>Chelon labrosus</i>	Thick-lipped mullet
	<i>Liza auratus</i>	Golden mullet
	<i>Liza ramada</i>	Thin-lipped mullet
Pleuronectidae	<i>Platichthys flesus</i>	Flounder
Serranidae	<i>Dicentrarchus labrax</i>	Bass

Latin names of introduced fish species occurring in freshwater in England and Wales

Family	Species	Common name
Acipenseridae	<i>Acipenser spp.</i>	Sturgeon/Sterlet
Centrarchidae	<i>Ambloplites rupestris</i>	Rock bass
	<i>Lepomis gibbosus</i>	Pumpkinseed
	<i>Micropterus rupestris</i>	Largemouth bass
Cyprinidae	<i>Carassius auratus</i>	Goldfish
	<i>Ctenopharyngodon idella</i>	Grass carp
	<i>Cyprinus carpio</i>	Koi carp/Ghost carp
	<i>Hypophthalmichthys molitrix</i>	Silver carp
	<i>Leuciscus idus</i>	Ide/Orfe
	<i>Leucaspis delineatus</i>	Sunbleak/Motherless minnow
	<i>Pseudorasbora parva</i>	Topmouth gudgeon
Ictaluridae	<i>Ameiurus spp</i>	Ictalurid catfish spp
	<i>Silurus glanis</i>	Wels (Danubian) catfish
Percidae	<i>Stizostedion lucioperca</i>	Pikeperch/zander
Salmonidae	<i>Oncorhynchus mykiss</i>	Rainbow trout
	<i>Salmo salar sebago</i>	Salmon (landlocked)
	<i>Salvelinus fontinalis</i>	American brook trout/Brook char

Annex VII

Text of Review Group's response to the MAFF consultation document 'A New Direction for Agriculture'

Secretary of the Salmon and Freshwater Fisheries Review Group
C I Llewelyn

Ms Nicola Martin
Room 411
Whitehall Place East

29 September 1999

Dear Ms Martin

I have been asked to let you have the views of the Salmon and Freshwater Fisheries Review Group on some of the questions contained in the consultation document A New Direction for Agriculture.

The Review Group was established by the Minister and by the Secretary of State for Wales in April 1998 to review existing policies and legislation in England and Wales concerning the management and conservation of salmon and freshwater fish. The Review Group's terms of reference require it to consider all the factors that may affect the development and sustainability of these fisheries. The Group has so far met 17 times; in addition, it has held 5 regional meetings. It has received evidence, both written and oral, from a wide range of individuals and organisations. This evidence has, among other things, covered the impact of agricultural practices on fish habitats and the significance of freshwater fisheries to the rural economy. The Group will be making a number of recommendations on these issues in its report, which it expects to submit to Ministers in December. In the meantime, given the deadline in the consultation document, I have been asked to convey to you the conclusions the Group has reached on the issues relevant to salmon and freshwater fisheries covered by the questions on the consultation document.

The Group is, however, concerned that its views should not become generally known until it has agreed all the recommendations in its report and has been able to submit them to Ministers. I would be grateful, therefore, if this letter could be treated in confidence, and not disclosed to third parties, until the Review Group's report has been published.

The Group has concluded that intensive agriculture has caused substantial damage to fish habitats in many parts of the country. It believes that a fundamental reform of the Common Agricultural Policy is needed, with a shift away from support for production towards support for maintaining specific habitats and landscapes and other measures to sustain the rural economy. It has noted that this remains the Government's long term objective, although in the short term the opportunity for making such a shift is constrained by the terms of the Agenda 2000 reforms of the CAP.

The Group has further concluded that support for salmon and freshwater fisheries is wholly consistent with the Government's wider objectives on agriculture and rural development. In some areas, particularly remote rural ones, freshwater fisheries can make a significant contribution to rural development. In the Tweed, for example, fisheries is estimated to be worth some £13 million

to the local economy and to support the equivalent of 520 full time jobs (in practice the benefits will be spread over a larger number of people and will help farmers and fisheries' owners to retain workers who would otherwise be unaffordable). On a much larger scale, the Irish Department of the Marine has assessed the value of angling tourism to Ireland at £80 million a year, with further benefits to rural areas from expenditure by Irish anglers from towns.

Measures taken to reduce the input of agriculture on freshwater fisheries, and so improve the economic value of these fisheries, will also have substantial environmental benefits : for example reducing over-grazing and providing fencing and buffer strips along rivers and streams would benefit a wide variety of flora and fauna, as well as improving fisheries.

I turn now to the specific questions asked in the consultation document.

Rural development regulation

Article 33 projects

The Group has concluded that measures are needed to protect rivers and streams from erosion and encourage the growth and management of bankside vegetation. In livestock farming areas fencing to protect streams from poaching by cattle and sheep is the single most important measure that can be taken to improve habitats for fisheries, and wider conservation, purposes. Fencing allows natural vegetation to regrow, stabilises banks and in many cases is sufficient on its own to narrow streams, improve flows and recreate riffle and pool sequences. Vegetation also encourages invertebrate populations, which provide an essential food supply for juvenile fish as well as for birds. In arable farming areas uncultivated buffer strips along rivers and streams can play a similar role by reducing risks of erosion and run-off of silt. Better protection for streams would, in particular, provide enhanced nursery areas for many species of coarse fish.

Grants for fencing along rivers and streams in order to improve salmon and freshwater fisheries have been included in a number of Objective 5b schemes. The Review Group would like to see similar measures, preferably extended to include the provision of buffer strips in arable areas, made available more generally. As well as providing benefits to fisheries, such measures would yield substantial other conservation benefits. They would improve habitats for a wide range of mammals, birds and invertebrates, encourage a more diverse flora and would also provide wildlife corridors in intensively cultivated lowlands and heavily grazed uplands.

While the Group would like to see such measures as widely available as possible, they would be likely to be most effective if they were targeted to encourage the widest possible take up in specific rivers or river catchments. This would help ensure that all water courses in an area were protected and avoid continuing damage in one part of a river reducing the effectiveness of improvements carried out downstream.

The measures suggested above would seem to meet at least three of the criteria in Article 33, namely diversification to provide multiple activities or alternative incomes; encouragement for tourist activities; and protection of the environment in connection with land, forestry and landscape conservation.

Agri-environment measures

The measures outlined above could also be made available to farmers under Countryside Stewardship and in ESAs. However, the Group has noted that competition for funds under Countryside Stewardship is strong, and that priority tends to be given to proposals that will lead to a wide range of improvements on a farm. The scheme therefore tends to favour complex proposals covering a limited number of farms rather than simple measures covering a large number of farms.

While there are obviously some advantages in environmental terms in seeking to address all the problems on an individual farm, this approach does not encourage simple measures such as fencing rivers and streams which can be a very cost-effective way of obtaining improvements to riparian habitats and to water courses. For this reason the Review Group would not like to see priority given to Countryside Stewardship at the expense of Article 33 schemes.

In the longer term, the Group would like to see the measures that it is recommending to protect rivers and streams available throughout the country, whether as agri-environment measures or under Article 33.

Another measure that the Group would like to see introduced is aid towards the recreation of wetlands. In a number of areas land drainage schemes have greatly reduced wetland habitat. As well as creating a conservation problem in its own right, the reduction in wetlands has had adverse effects on many rivers : the loss of natural “sponges” means that water is drained much more rapidly, leading to more intense floods followed by longer periods of low flows. These create difficult conditions both for salmon and sea trout migration and for fishing : in addition more intense floods tend to lead to greater erosion. These effects could be reversed by recreating wetland areas. Schemes already exist to create new woodlands, and the same approach could be applied to wetlands.

Horizontal measures regulation

Modulation

The Group is in favour of applying modulation to direct payments in order to increase funding for measures under the Rural Development Regulation.

Cross compliance

The Group received a considerable body of evidence indicating that increased sheep numbers in upland areas had led to overgrazing and to serious erosion. This has had a substantial adverse effect on rivers and spawning streams, and it is essential to reduce sheep numbers on vulnerable hillsides. Tougher rules on over-grazing, designed to prevent environmental damage to vulnerable hillsides, should be drawn up as soon as possible, and enforced by cross compliance.

While tougher rules on over-grazing might cause problems initially for farmers, it is unlikely that the problem can be resolved by reducing stocking densities generally, even if this was possible under the CAP. Conditions vary very substantially in upland areas, and stocking densities which may be perfectly satisfactory on some hills will cause major damage on others. It must be for the individual farmer to recognise when sheep are causing damage to the environment and to take the appropriate action. While such an approach could have administrative costs, it could well be more cost effective than measures which are cheaper to enforce but have far less effect on the environment.

The other area where the Group has identified a problem concerns maize growing within flood plains. This can lead to very substantial erosion, and the Group considers that clear enforceable guidelines on maize cultivation should be drawn up to make it clear that maize should not be grown on highly erodible flood plains, and that cross-compliance should be used to ensure that these guidelines are observed.

Yours sincerely

C I Llewelyn

List of abbreviations

CAP	Common Agricultural Policy
CCW	Countryside Council for Wales
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
DETR	Department of the Environment, Transport and the Regions
EC	European Council
EIFAC	European Inland Fisheries Advisory Commission
EN	English Nature
EU	European Union
FRS	Fisheries Research Services
ICES	International Council for Exploration of the Sea
IHN	Infectious Haematopoietic Necrosis
ISA	Infectious Salmon Anaemia
JNCC	Joint Nature Conservation Committee
LEAP	Local Environment Agency Plan
MAFF	Ministry of Agriculture, Fisheries and Food
NASCO	North Atlantic Salmon Conservation Organisation
NAW	National Assembly for Wales
NCFC	National Coarse Fish Centre
NERC	Natural Environment Research Council
NOP	National Opinion Poll
NRA	National Rivers Authority
NSTFC	National Salmon and Trout Fisheries Centre
OP	Organophosphate
R & D	Research and Development
RFERACs	Regional Fisheries, Ecology and Recreation Advisory Committee
RHS	River Habitat Survey
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SFC	Sea Fisheries Committee
SP	Synthetic Pyrethroid
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STANIC	Salmon and Trout Association National Instructor's Certificate
SVC	Spring Viraemia of Carp
SWQO	Statutory Water Quality Objective
VHS	Viral Haemorrhagic Septicaemia
WSTAA	Welsh Salmon and Trout Angling Association