

Synopsis

Introduction and Background

This document entitled 'Land Management Technical Appendix to the Strategy' provides technical information, which provides the basis for the proposed Strategy related to Sustainable Management of the River Itchen candidate Special Area of Conservation. It is a product of the River Itchen Sustainability Study (the Study). The principal aim of the Study is to complete the investigation into the impact of water company operations on the River Itchen Special Area of Conservation required by the Secretary of State. If these show a serious impact, a scheme may subsequently be prepared for implementation.

Assessments of impacts have been carried out through the Study in a holistic manner.

Assessment Methods

The Study's SSSI/cSAC status and condition assessments were based on a combination of field surveys, expert opinion, DNA work (for southern damselfly and otters), laboratory analyses in relation to eco-toxicological assessments/water quality determinands, mathematical modelling and data analysis in a holistic manner. Assessments were carried out for the River Itchen system as a whole and for the key interest features, including those for which the SSSI/cSAC was designated. Assessment methods were based on 'best science' and has involved leading academics and consultants who are acknowledged experts in their fields both in the UK and internationally.

Conclusions

For most of the cSAC interest features the historical status in the period 1970 – 2000 was favourable for the river as a whole. The one exception was the southern damselfly, which was poor due to the fragmented nature of suitable habitats and the population. In all cases the target status is favourable. This does not mean that all reaches are required to reach good status; for several of the interests some reaches represent inherently sub-optimal habitat, and this has been clearly identified as part of the Study. The current status of the interests is variable. Some are favourable (e.g. *Ranunculus* community, bullhead, brook lamprey) while others unfavourable and maintained (e.g. otter and salmon) or part destroyed (e.g. crayfish).

Factors responsible for the deterioration in condition are very variable and include low flows, obstructions to movement and sediment in spawning gravel (salmon), disease (crayfish), lack of safe access throughout the river and road deaths (otter), water quality, and water level issues and habitat discontinuity (southern damselfly). The Strategy has been developed to maintain, or return to, favourable status for all the interest features.

Minor Qualifications

This Technical Appendix contributes to the development of the 'Action Groups' incorporated within the Sustainable Management Plan to provide detailed background information on subjects dealt with by the Plan. This Appendix must be read in conjunction with the Strategy document, and other Appendices to the Strategy noted as follows.

1. Ecology and Fisheries Technical Appendix
2. Water Resources and Flow Technical Appendix
3. Water Quality Technical Appendix

CONTENTS

Synopsis

1	The Problem	3
1.1	<i>Introduction</i>	3
1.2	<i>Contents of the Land Management Technical Appendix</i>	3
2	Possible Solutions	5
2.1	<i>Minor Actions</i>	5
2.2	<i>Major Actions</i>	5
2.3	<i>Other Options</i>	5
3	Discussion of the Probable Way Ahead	6
3.1	<i>Dealing with the Problem</i>	6
3.2	<i>The Study's Land Care Group's Recommendations to the Steering Group</i>	6
3.3	<i>Closure</i>	7
	Appendices	8
	Appendix 1 – Discussion of the Study's Land Use Issues and Questions	

1 The Problem

1.1 **Introduction**

There is no doubt that the within-gravel survival of salmon and trout eggs and fry has generally been very low in the Itchen in recent years. There is also no doubt that the high level of fine sediment within the gravel is implicated, as indicated by greatly improved survival in cleaned gravel and in incubator boxes using the same source of water.

Chalkstreams have always tended to be high in sediment and it is likely that the situation of successful spawning of salmonids may always have been marginal. However, it appears likely that the situation has worsened over the past 15 years, and that the main source of fine material is run-off from the surface of cultivated land. Changing land use is a likely factor. The series of low-flow years between 1989 and 1992 may also be a factor.

Natural sources of sediment include in-stream vegetation, bankside vegetation, and natural erosion. In addition to arable farming, anthropogenically induced sources include damage to banks by livestock, urban and road run-off, farmyards and farm tracks, sewage treatment works and fish farms.

A number of issues remain to be resolved, however. There is a need to identify critical sources of the fine material, both in general (e.g. run-off from recently ploughed land) and specifically (e.g. identify areas, and even individual farms and fields, which are chiefly responsible). There is also a need to resolve the roles of patterns of rainfall precipitation and river flow (both discharge, water velocity and bed shear stresses) in mobilising, depositing and remobilising fine material. These issues can be investigated further through the Test and Itchen Land Care project.

The extent to which abstraction may be exacerbating the problem of siltation is uncertain. Information on estimated bed shear stresses (drag force per unit area) between the naturalised and the with abstractions conditions (ref: H(DD)04) suggests that the impact of abstraction on bed shear stresses is higher under low flow conditions and lower under high flow conditions. It could be doing so by reducing low to medium flows, perhaps increasing siltation, and by reducing high flows, possibly reducing flushing of deposited sediment. This is clearly an important issue to resolve so that appropriate remedies can be considered.

1.2 **Contents of the Land Management Technical Appendix**

The Land Management annex contains only two documents. The first is a report prepared by the Study team on salmonids and sediments, land use and Landcare Reviews (ref:

L(DD)01). This draws together information on the problem of sediments in spawning gravels affecting the survival of eggs and alevins of salmonids. It covers the River Itchen in particular and Chalkstreams in general. It discusses the causes of the problem and potential sources of material, and possible approaches to dealing with the problem.

The second (ref: L(PR)01) is the proceedings of a seminar on “Land Use, Sediment Dynamics and River Morphology” held in July 2002 as part of the investigation. This was attended by more than 40 delegates representing all the major groups with an interest in and researching this issue.

2 Possible Solutions

2.1 *Minor Actions*

There are several ways in which the situation might be managed and improved. Short-term palliatives include gravel-cleaning within gravel survival of Salmonid and Trout eggs and fry and deployment of incubator boxes, and such immediately-available methods may be very important to deploy while longer-term solutions are sought.

2.2 *Major Actions*

More permanent cures will be dependent upon establishing sources and the role of discharge variability in sediment dynamics. If cultivation of land does prove to be a major factor there are several possible modifications to agricultural practices that can be considered, including contour planting, terracing, grassed waterways, spring ploughing, and conservation tillage. It should be noted that there can be other advantages associated with such modified practices. The Wessex Area Landcare Project Officer reported on a conservation tillage initiative on the Wilton Estate near Salisbury. The Estate was so impressed with the resultant economic benefits of the approach that they are planning to use the technique over a much greater area of the estate and have purchased appropriate equipment costing of the order of £100,000.

2.3 *Other Options*

Other options that are likely to prove worthy of examination include buffer zones alongside the river, creation and maintenance of sediment traps, and use of created wetlands as sediment sinks. Equivalent approaches are available to address sediment arising from most of the practices and sources listed in Section 1.1. These issues are incorporated into the concept of “Sustainable Drainage Systems” (SUDS).

The Landcare initiative in the Wessex Area of the EA South west Region is of considerable interest to the Study and the recently inaugurated Test and Itchen Land Care project’s proposal in looking at sediment issues is endorsed by the Study team.

3 Discussion of the Probable Way Ahead

3.1 *Dealing with the Problem*

Identification of sediment build-up in salmonid spawning gravels as one of the important issues on the species listed in the cSAC citation posed something of a quandary for the Steering Group for, in spite of its apparently all-encompassing title (direction and funding of a River Itchen Sustainability Study), its deliberations were limited to the impact of the activities of the water companies. While these activities have some influence on the sediment dynamics of the river, the siltation issue was a much wider one of land use and agricultural practices.

The Steering Group took an enlightened view of the situation and encouraged further exploration of this issue, but asking them to make additional major funding available to investigate matters through the Study on an issue that was at most marginal to their activities, was considered to be inappropriate. There appeared to be two ways ahead on this matter. One was to widen the remit and funding base of the Steering Group to include agricultural and land use interests and thus develop a mechanism for funding the required investigations and remedies; the second was to maintain a limited involvement in the field, commensurate with the level of influence of the water companies activities.

3.2 *The Study's Land Care Group's Recommendations to the Steering Group*

The Land Care Group of the Study considered the alternatives at its meeting in July 2002, with a view to making recommendations for future initiatives to the Steering Group.

Taking account, on the one hand, of:

- The clear identification of issues important to the sustainability of the cSAC interests
- The opportunity for future developments in researching the Salmon redd siltation issue with a broad consensus represented by the July 2002 seminar initiative and its follow-up activities
- The similar issues confronting the other English Chalk streams (in particular the Test and Avon, which like the Itchen are designated SSSIs)
- The relevant initiatives being taken on the Avon and more recently the Test and the Itchen in terms of appointment of Land Care Officers
- The scope for synergy in considering and furthering actions on the Rivers Itchen, Test and Avon

and on the other hand, of:

- The likely cost implications of future research, monitoring and remedial measures
- The limited implication of water company activities in the development of the siltation problem
- The limited remaining time span of the Itchen Steering Group and its activities
- The tight funding constraints for the Study

.....The Study's Land Care Group recommended the following:

- That the Study maintains a limited commitment to further investigation and input to remedial initiatives with the Study's scope of work appropriately limited, to include suspended solids monitoring (See Water Quality Technical Appendix) and investigation of shear stress derived from the Study's ISIS River Hydraulic Model outputs.
- That a separate group (external to the Study) be established to consider all issues associated with the sediment dynamics of the Rivers Itchen, Test and Avon to include the South Wessex Area of the Agency and other interests from Wiltshire and if appropriate Dorset. This group would have a longer lifespan than the commitment of the Study, and would seek coordination and funding of major initiatives relevant to all rivers included in the future research work.
- That, while such a separate group (external to the Study) would be quite independent of and separate from the Study, but taking account of the significant overlap in interests, the Steering Group should use all its influence to progress setting up the new group, to ensure appropriate representation, and to aid in identifying and accessing potential sources of funding, defining its objectives and expected outcomes.

3.3

Closure

The recommendations set out in Section 3.2 were accepted by the August 2002 sitting of the Steering Group but, at the time of writing, no progress has been made regarding setting-up of the proposed sediments dynamics group.

Appendices

Appendices

Appendix 1 Discussion of the Study's Land Use Issues and Questions

Appendix 1

Discussion of the Study's Land Use Issues and Questions

Appendix 1 – Discussion of the Study’s Land Use Issues and Questions

Land Use Issues and Land Drainage	
LU1	Influence of changes in land use or land drainage (for example new development or stewardship schemes).
LU2	Management of land use change and development (polarisation into brown field or green field sites).
LU3	Influence of urbanisation (run-off/drainage) on river quality and quantity.
LU4	Value of Sites of cultural heritage.

Land Use and Land Drainage Questions	
LU1	What is the impact of current and future planned and unplanned land use changes?
LU2	What are the short, medium and long-term development proposals for the Itchen catchment and how can this be accommodated in a sustainable manner?
LU3	What are the existing and planned polarisation of brown field and green field development within the catchment?
LU4	What is the polarisation of brownfield to greenfield sites within the River Itchen catchment, and is there enough brownfield to meet the needs of Major Development Areas?
LU5	How has the land use within the River Itchen catchment changed historically and can change be linked to changes in the River habitats/species?
LU6	What are the existing and projected future numbers, locations and coverage of Countryside Stewardship schemes within the Itchen catchment?
LU7	Are there any measurable benefits to the river, and species using the habitats, developing from existing Countryside Stewardship schemes?
LU8	What can be learnt from the Avon Land Care Project (an encompassing land management scheme on the Hampshire Avon) in terms of the relative effects of land use changes on the river?
LU9	Is a Land Care Project a priority for the River Itchen and how does this relate to the existing Countryside Stewardship scheme?

1

Land Use and Land Care Issues and Questions

1.1

Land Use and Land Care Issues

Issues LU1 to LU3. Land Management – Ecological Interests and Land Care

Following the 3 July 2002 seminar on 'Land Use, Sediment Dynamics and River Morphology', a paper (Appendix 1 – Water Quality and Land Management Technical Appendix) was presented by the Land Care Group of the Study to the August 2002 Steering Group meeting. The Group proposed that an independent group (outside the Study framework) was needed to take forward the issues from the seminar and to carry on after the Study has finished. The new group could look at several Chalk rivers, not just the Itchen. The Steering Group agreed to this proposal.

Issue LU4. Value of Sites of cultural heritage

This issue was considered as part of the development of an interim sustainable management strategy for the Itchen cSAC using information from the County library and other local planning authority sources (see the interim strategy document).

1.2

Land Use and Land Care Questions

Question LU1. What is the impact of current and future planned and unplanned land use changes?

The potential impacts of current and future land use changes could influence sediment dynamics in the Study area through changes in the concentration of routine water quality determinands of suspended solids and phosphorous amongst others. Use of sustainable drainage systems or SUDS, and maintenance of sediment traps was recommended through the action plan associated with the interim sustainable management strategy.

Question LU2 to LU9.... Land Management – Urbanisation, Ecological Interests and Land Care

The River Itchen provides opportunities for use of the river water as an amenity and educational resource. But for maximum value, the river must be clean enough for maintaining fish stocks for angling, and for minimising health risks for contact water sports. The amenity value can be maximised if there is an absence of odours, litter or algal cover. Analysis of water quality monitoring data shows that urbanisation in the Study area particularly around Alresford, Winchester, Eastleigh and the fringes of Southampton may lead to increases in the volume and flow of surface run-off in wet weather conditions. In areas linked to combined sewerage systems (see Maps 010 and 031 of ref X(GI)03) significant loads of several pollutants may be expected.

Urbanisation of the upper catchment in the Alresford area appears to have little direct effect on the river. Urbanisation in the lower catchment very probably contributes to the short duration flow peaks observed at the gauging station in Management Unit 6 monitored at Riverside Park following rainfall. The associated peaks in ammonia are probably closely linked with the urban drainage system, either through storm tank discharge or combined sewer overflows. Although only routine monitoring data are available for BOD, similar spate induced peaks may be anticipated due to similar causes.

Details of the currently known plans and projects assessed through the Habitat Regulations Review of Consents Stage 3 activities and associated with the Study area are given in ref X(PR)08.

At the time of writing, a Test and Itchen Land Care officer is in post at the EA and this is considered to be a positive development towards the long term resolution of the sediment dynamics and siltation problem. The Test and Itchen Landcare project is a response to the issue of: diffuse pollution of water by soil, nutrients and chemicals, impacts on the wildlife of the Test and Itchen rivers, excessive water runoff and localised flooding, soil quality and management, landscape change and decline of the Atlantic salmon. The aim of the Test and Itchen Landcare project is to bring about modest changes to land and infrastructure management that helps to tackle the issues.