

## SUMMARY

1. Concern has been voiced by angling associations and members of the angling public in general over the apparent decline in salmon stocks within both the River Leven and River Crake catchments. Although declared rod catches for salmon have been steadily increasing discussions with angling bodies on the catchments suggest that this is misleading. It is believed that declaration of salmon catches was significantly lower in the years prior to reminders being issued to anglers. It is therefore believed that recent catches are well below those attained in the mid to late 1960s.
2. Net catches within the Leven Estuary are thought to illustrate a more realistic trend of historic catches. The declared net catches show elevated numbers of salmon caught in the mid to late 1960s and fluctuating cycles of low and medium catches from the 1970s to the current catches of around 30% of those experienced in the peak period. It is not known whether the high catches of the 1960s are sustainable and therefore a realistic maintainable target.
3. The distribution of juvenile salmon within the Leven catchment is limited by the inaccessibility of a large area of the catchment, (refer to consultation draft for map information). The major areas of salmon production include the main River Leven, lower River Rothay below Rydal Water, the lower tributaries of the River Rothay and Troutbeck. Salmon fry densities have been found to be low catchment wide in the surveys of 1992 and 1996 with parr densities being average in areas of good habitat.
4. Distribution of juvenile salmon within the Crake catchment is also limited, but not to the same extent as the Leven catchment, by inaccessible areas. Salmon fry densities were found to be average in the survey of 1993 with the lower river tributaries exhibiting the greatest densities. Salmon parr were also found in the lower river tributaries but greatest densities were found above Coniston Water in Yewdale Beck. Areas of concern relate to the main River Crake where neither salmon fry or parr achieve densities that would be expected for main river sites based on the National Fisheries Classification Scheme.
5. Salmon egg deposition targets for the River Leven stand at 1.14 million eggs and for the River Crake 0.396 million eggs. Using the compliance assessment methodology developed by WRc the River Leven has failed to achieve its target for the period 1991 to 1995 inclusive. During the last three year period of failure (1993 -1995) the River Leven has only been achieving a mean of 50.5% of its target (range 32.7% - 56.4%). The River Crake has also failed during the period 1993 to 1995 achieving a mean of 52.4% of its target (range 19.8% - 73.0%). Data from 1996 onwards is currently being analysed.
6. There are numerous views held by all those concerned as to the reasons behind the decline in the salmon stocks of these catchments. These issues are dealt with individually within this document and actions are proposed to assist in improving the present situation.

## 1. INTRODUCTION

Under the Environment Act 1995, the Environment Agency has a duty to maintain, improve and develop fisheries under its jurisdiction. To meet its duties and obligations the National Rivers Authority launched the National Salmon Strategy in February 1996. This strategy was subsequently endorsed by the Environment Agency. The Strategy sets out four objectives for the management of salmon fisheries in England & Wales :

- Optimise the number of salmon returning to homewater fisheries
- Maintain and improve the fitness and diversity of salmon stocks
- Optimise the total economic value of surplus stocks
- Ensure necessary costs are met by beneficiaries

A basic principle of the Strategy is that its implementation is tied to the management of individual rivers with the active involvement of all interested parties. Salmon Action Plans, (SAPs), for these individual rivers outline the aspirations for the catchment, identify the issues limiting their achievement and suggest the means by which identified problems should be resolved.

Salmon Action Plans will support the salmon management element of Local Environment Agency Plans, (LEAPs), and will provide the information to enable Regional and National overviews of salmon stocks their fisheries and the issues facing them. This information will then contribute towards the international management of salmon fisheries through various bodies including CEFAS, ICES, MAFF, and NASCO.

SAPs are target based, reflecting the objectives for individual salmon stocks and their fisheries. The setting of targets and the assessment of compliance against them is a rapidly evolving science. For this reason a common best practice has been established within the Agency for the development of SAPs and to also provide consistency for national and international management of salmon stocks.

This final SAP document is intended to provide a statement of the necessary actions and estimated costs. It also identifies the responsibilities for progressing the issues in order to benefit the salmon fisheries on the river. This plan is based on feedback from external consultation.

## 2. PUBLIC CONSULTATION

External consultation began on 20<sup>th</sup> May 1997 following a presentation at the Lakeside Hotel situated on the shores of Lake Windermere. Approximately fifty guests including fisheries interests, conservation groups, riparian owners, and other members of the general public attended the meeting. In total over one hundred copies of the consultation draft SAP were distributed on the evening of the presentation and later to members of the wider public after promotion of the document in the local media. Interested parties were invited to comment on the draft Salmon Action Plan and were given approximately two months to do so. From studying comments some issues and concerns were raised significantly more than others. A total of twenty-two responses were received with the issues of drought orders, general water abstraction, and riverine water quality being the most frequently raised. Other issues frequently commented upon, included smolt survival in relation to hydro electric power station turbines, estuarine water quality, predation by birds, habitat loss, and historic catch record inaccuracies.

### Summary of comments on issues contained within the consultation report

#### **Issue 1**      Low smolt survival during river migration

7 consultees commented on this issue.

Widespread support for screening of intake areas on the River Leven was shown, with some concern voiced over the effects of the drying up of a section of the main river downstream of Eels Dam.

#### **Issue 2**      Poor juvenile production

14 consultees commented on this issue.

Most opinions were of concern over the effects of abstraction from Windermere on migration patterns of salmonids and suitable habitat availability. There was also concern that abstractions may be effecting the siltation levels of the lower River Leven and the Leven Estuary. Many were in favour of improved management of habitat and the continued investigation of low production problems.

#### **Issue 3**      Inadequate data relating to fecundity, smolt survival, male / female breakdown of grilse and MSW, and lake juvenile production

7 consultees commented on this issue.

The main concerns voiced were related to smolt survival at sea but particularly in relation to the hydro-electric turbines on the River Leven.

**Issue 4** Apparent poor survival of adults during estuarine migration

5 consultees commented on this issue.

Widespread support for the continued investigation into the effects of discharges within the Leven Estuary and their relation to migratory patterns of fish stocks. Concerns were also raised over the reduced availability of holding areas within the estuary, particularly around the Leven Viaduct area and the loss of the pool at the site of the old road bridge at Greenodd.

**New issues**

The issues summarised below have been included in the final report as a result of a combination of comments received from consultees and recent work carried out by the Agency.

**Issue 5** Riverine water quality (sewage input @ Honeypot Pool lower R. Leven)

This issue was referred to by many consultees as a possible contributory factor towards the poor returns of migratory salmonids to the Leven catchment. Due to the nature of this new issue and its links with apparent poor survival of adult salmonids during estuarine migration, it will be incorporated into the existing Issue N° 4.

**Issue 6** Entrainment of adult salmonids into HEP millraces at Low Wood and Backbarrow

Agency staff have observed significant numbers of adult salmonids within the mill race at Low Wood which have included some fish spawning within the channel itself. Due to the nature of this new issue it will be incorporated into the existing Issue N° 1.

**Issue 7** Exploitation of non-native river fish stocks

As a result of comments received by consultees and information obtained from the Leven Estuary Project it has come to light that fish are potentially being exploited in rivers other than those in which they will ultimately spawn.

### 3. ACTION PLAN SUMMARY

Within this section the Agency outlines what related work is currently being undertaken and its associated costs and timescales. This is subsequently followed by an additional table describing those issues which the Agency through consultation with the public feels action needs to be taken against.

**Table 1:** Ongoing work relating to the well being of River Leven & River Crake salmon stocks.

ISSUE	ACTION	COST £K	TIMESCALE	RESPONSIBILITY
Smolt / Kelt Mortality	Screening of HEP Intakes	£20-45K	Under Investigation	Agency / Owners of HEP
Estuarine WQ Study	Tracking Study	£28K	1997 / 1998	Agency
Bird Predation	National Study	**	Under Investigation	Agency (R&D)
Stock Composition	Fish Counter Data Analysis	£2K	Annual	Agency
	Periodic Juvenile population studies	Dependent on scale of survey	As Required	Agency
	Redd Counting	£3.5K	Annual	Agency
	Scale Analysis	£0.5K	Annual	Agency
Control Illegal Exploitation	Fisheries Officers	£30K+	Annual	Agency / Owners
Water Quality	Various Studies	**	Ongoing	Agency
Drought Conditions	Regional Ecological Impact Study (incl. R. Leven)	£87K <sup>ø</sup>	1997 / 1998	Agency
Environmental Impacts of In-River Works	Screening of applications	£0.5K	Ongoing	Agency

\*\* = No costings are available at present

ø = Cost for the Region wide study only

**Table 2a:** Issues & proposed actions

ISSUE	LIMITING FACTORS	OPTIONS	RESPONSIBILITY	COST £K	PRIORITY	TIMESCALE
1. Entrainment and potential damage to smolts and adult salmonids during river migration.	1. Unscreened millrace intake areas.	* Installation of adequate screening.	HEP Generator / Agency	£20-45K	H	By 2000
2. Poor juvenile production.	1. Habitat degradation. 2. Limited suitable spawning substrate. 3. Abstraction. 4. Lack of spawners. 5. Drought Orders.	* Create / Improve existing habitat. * Create / Improve existing spawning areas. * Negotiate abstraction regimes which would increase migration opportunities. * Develop flow parameters to be used in the management of future droughts.	Fishery Owners / Agency	£10K*	M	1998 / 1999
			Fishery Owners / Agency	**	M	1998 / 1999
			NWW / Agency	**	M	By 2003
			NWW / Agency	**	M	By 2003
3. Inadequate data relating to :- a) Fecundity b) Smolt survival c) Male / Female breakdown of grilse and MSW	1. Insufficient monitoring covering issues' parameters.	* Monitor smolt numbers. * Micro-tagging programme. * Adult trapping for sex / age determination, and smolt survival (re micro-tagging).	Anglers / Agency	£5Ka	M	1998 / 1999
			Anglers / Agency	£20K	L	By 2003
			Anglers / Agency	£5Ka plus £50K capital	L	By 2003

- \* = Investigation costs only
- \*\* = No costings are available at present
- a = Annual costing only

**Table 2b:** Issues & proposed actions (continued)

ISSUE	LIMITING FACTORS	OPTIONS	RESPONSIBILITY	COST £K	PRIORITY	TIMESCALE
4. Apparent poor survival of adults during estuarine migration, contributing towards poor returns to the lower River Leven.	1. Estuarine water quality. 2. Reduced / unstable holding areas within upper estuary.	* Voluntary discharge regimes to be implemented by industry.	Industries discharging into estuary.	**	M - H	Ongoing
		* Monitor industries initiatives.	Agency	**	M	Ongoing
		* Investigate water quality of lower River Leven.	Agency	**	M	1998 / 1999
		* Create holding areas in tidally effected lower River Leven.	Fishery Owners / Agency	£15K	M	By 2000
5. Exploitation of non-native river fish stocks.	1. Possible lack of estuarine holding areas. 2. Natural tendency to stray / homing accuracy.	* Monitor movement of adults between rivers within the Leven Estuary.	Agency	£100K	L	By 2003

- \* = Investigation costs only
- \*\* = No costings are available at present
- a = Annual costing only

#### **4. MANAGEMENT OF THE PLAN**

The Agency will monitor and report on progress of issues and actions of individual Salmon Action Plans at a local level through various groups. These groups will include fisheries consultatives, angling associations, and the Area Environment Group (AEG).

Annual reporting will be given to the Regional Fisheries Advisory Committee in the form of a Regional Salmon Action Plan summary covering all rivers with SAPs in the North West Region. The Regional SAP summary is expected to consist of the following components relating to each SAP river.

- Tabular summary for rod and net fisheries illustrating current and five year mean statistics;
- Tabular summary for participation in rod and net fisheries illustrating numbers of resident and visiting anglers (where this information exists), and the number of licenced netmen;
- Tabular summary of stock status covering estimates of run size, relationship between current and target number of eggs deposited, and juvenile abundances;
- Tabular summary of planned action and progress against those plans.

There will also be a National Plan which will collate all regional information on SAPs and include information on significant events at Regional / National / International level impacting on the execution of plans and fishery performance. These may include some or all of the following.

- Administrative, economic or legislative changes affecting exploitation at high seas, coastal, or regional level, (local events to be included in individual river reports);
- Environmental events affecting natural mortality or fishing effort (e.g. extreme flows affecting various life stages);
- Changes in funding arrangements.

A Local Environment Agency Plan (LEAP) for South Cumbria has now been produced in which the areas covered include both the River Leven and River Crake catchments. There are many issues raised within this document which are to varying degrees related to the well being of salmonid species. These issues may not singularly effect salmonid populations but may do so cumulatively. It is proposed that the LEAP issues summarised on the following page be included in the RFAC annual SAP summary in note form detailing progress of proposed actions.

## **LEAP Issues linked with Salmon Action Plan issues**

- Issue 7 ~ Need for a better strategic response to droughts (page 15 S. Cumbria LEAP).
- Issue 8 ~ Adverse impact of effluent discharges on the Leven Estuary (p.16).
- Issue 10 ~ Eutrophication in Elterwater (p.18).
- Issue 11 ~ Eutrophication of Esthwaite Water (p.19).
- Issue 12 ~ Eutrophication in Grasmere (p.20).
- Issue 13 ~ Impact of water abstraction on the River Leven migratory fishery (p.21).
- Issue 14 ~ Adverse impact of discharges from combined sewerage systems (Elterwater p.23 ).
- Issue 15 ~ Copper enrichment in Coniston Water (p.24).
- Issue 18 ~ Lack of rural sewerage leading to localised pollution (R. Brathay and Troutbeck p.29).
- Issue 20 ~ Failures to meet Water Quality Objectives (WQOs), (Blelham Beck p.31).
- Issue 24 ~ Water pollution from sheep dip chemicals (p.37).

## 5. APPENDIX 1. ALTERATIONS TO CONSULTATION DRAFT

### 1. Alteration to capital value of salmon

Concern was voiced over the capital value figure taken from a study by Radford et al. (1991) of £7,000 per salmon. Discussions with Nigel Milner, Chairman of the Agency's National Salmon Group and Head of the Salmon and Trout Fisheries Centre, resulted in the acceptance of the figure of £4,500 (capital value) per salmon which had been used in recent negotiations for the purchase of local fishing rights. The result of this alteration is that tables 4, 6a and 6b, (section 2.2.2 pages 9 and 10 respectively in the consultation draft), will now be as follows.

**Table 4 :** Value to fishery owners (Market value) and to salmon anglers (Anglers' consumers' surplus)

	<b>Mean declared rod catch 1994-95</b>	<b>Mean total rod catch 1994-95</b>	<b>Mean Regional value per salmon</b>	<b>Market (capital) value to rod fishery</b>	<b>Ratio Anglers' consumers surplus : Market value</b>	<b>Anglers' consumers surplus</b>
LEVEN	121	133	£4,500	£600,000	1:1	£600,000
CRAKE	32	35	£4,500	£160,000	1:1	£160,000
<b>TOTAL</b>	<b>153</b>	<b>168</b>	<b>£4,500</b>	<b>£760,000</b>	<b>1:1</b>	<b>£760,000</b>

**Table 6a :** River Leven fishery nett economic value

<b>VALUE</b>	<b>£</b>
To fishery owners	£600,000
To salmon anglers	£600,000
To netsmen	£800
Minimum Nett Economic Value	£1,200,000

**Table 6b** : River Crake fishery nett economic value

<b>VALUE</b>	<b>£</b>
To fishery owners	£160,000
To salmon anglers	£160,000
To netsmen	£700
Minimum Nett Economic Value	£300,000

The above alterations do not directly effect any of the issues or actions proposed within this Salmon Action Plan.

**2.** Correction within Rod Fishery section.

Part 2 situated on page 3 within the section covering rod fishery methods on the River Leven should read :

Upper Leven            Fly only after 14th July

**3.** Correction to a reference.

Page 9 and 31 quote Small, I. (1988) this should read 1991.

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