



Report of the Director of City Development

Report to Executive Board

Date: 14 January 2009

Subject: Fish Migration – Response to Council White Paper

Electoral Wards Affected:

River Aire : Castleford,
Rothwell, Garforth & Swillington, City &
Hunslet, Burmantofts & Richmond Hill,
Kirkstall, Armley

River Wharfe: Otley, Adel &
Wharfedale, Harewood, Wetherby

Ward Members consulted
(referred to in report)

Specific Implications For:

Equality and Diversity

Community Cohesion

Narrowing the Gap

Eligible for Call In

Not Eligible for Call In

(Details contained in the report)

EXECUTIVE SUMMARY

1. River water quality is now sufficient to support return of salmon to the Aire and Wharfe. This can bring social, economic, health and environmental benefits to the whole city.
2. There are a number of weirs across the rivers that impede the movement of salmon and other fish upstream to their spawning grounds, as well as preventing resident fish washed downstream in floods to return upstream.
3. Enhancement to the rivers for salmon and other species is consistent with the regeneration of Leeds and current policies.
4. Projected costs for the infrastructure to enable fish migration within Leeds are (based on Environment Agency estimates) £2,150,000 for the Aire and £1,000,000 for the Wharfe.

1.0 Purpose Of This Report

- 1.1 To give members information on the benefits of enabling the return of salmon (and other fish species) to Leeds
- 1.2 To give members up to date information on current work in this area
- 1.3 To highlight the main obstacles and associated costs to removal of these obstacles.
- 1.4 To identify potential funding streams to enable this project to take place

2.0 Background Information

- 2.1 This report is in response to White Paper WP3 24/6/08 submitted by Councillor J Illingworth noting that local rivers were famous for their fish prior to the industrial revolution and that the return of salmon would add considerably to Leeds reputation. A subsequent White Paper amendment A1 to WP3, submitted by Councillor W Hyde, 1/7/08 instructed the Chief Executive to undertake a review of all costs which are likely to be associated with the provision of any necessary infrastructure in order to achieve this objective, plus a list of all potential funding sources.
- 2.2 The Rivers of Leeds have a history of degradation brought about by mining, industry, navigation and discharge of untreated effluent which, by 1825 had created a “reservoir of poison”. Now due to improvements in water quality, better regulation and de-industrialisation there has been a rebirth in the fish populations of the river’s of Leeds. However the presence of weirs, which were built to impound water for industry and navigation, on these rivers has an impact on the future sustainability of the recovering fish populations as the structures are a barrier to migratory fish trying to reach spawning grounds and to resident fish washed down in floods returning upstream.
- 2.3 The lifecycle of the Atlantic salmon requires both freshwater and ocean habitats – see Appendix(1). Fish from the Aire and Wharfe will return from the ocean to spawn in the place of their birth along these rivers.
- 2.4 The quality of the habitat of the river is also of vital importance to the success of any population of salmon. This includes gravels within the river and bankside habitats for cover and food sources.
- 2.4 **Current Work:** The Environment Agency has carried out a number of river restoration projects following water quality improvements on the River Aire which has included provision of fish passes shown in Table (i):

Weir	Improvement
Hirstwood weir	During repair work the owners incorporated features that allow greater river flow. Trout and some coarse fish can now ascend the weir during high flows
Thwaite Mills Pass	Salmon and Freshwater Fisheries Act 1975 and planning consent conditions. The weir was rebuilt with a fish pass
Fleets Weir fish pass	Water Resources Act 1991 – two gauging weirs were built at Lemonroyd enabling all fish species to move upstream
Rothwell weir pass	Planning conditions consent – As part of a river diversion, a weir was placed in the new channel to stabilise flows. The EA required a fish pass be installed.
Castleford Weir	Fish pass installed. The work has been done by EA, British Waterways and Wakefield Council. It has taken 4 years from scoping to build completion. Cost £350,000. This has opened up both the Aire and Calder and fish can now reach Knostrop weir.

Table (i)

- 2.5 Yorkshire Water is currently spending £110 million on improving the water quality in the River Aire under the requirement of the Freshwater Fish Directive. This again bolsters habitat quality for fish within the rivers of Leeds.
- 2.6 The Environment Agency has produced a number of reports for restoring fish passage to the River Aire: “Restoring your fisheries. The river Aire Fish pass action plan 2005”; “River Aire Restoration (RARE) Lower and Middle River Aire fish pass proposal”; “River Aire Fish pass Study: Knostrop Weir 2005”.
- 2.7 The EA are currently leading a partnership to assess the feasibility of a combined fish and canoe passage at Armley Mill weir. Working with LCC, X-Leisure and the White Rose Canoe Club, the British Canoe Union and local stakeholders the aim is to make the Cardigan Fields and Armley museum into a combined destination; bring new people to the site and link with regeneration plans for the area.
- 2.8 The Water Framework Directive requires good ecology in rivers by 2015. This could set a target for the return of salmon to the Aire (taking the presence of Salmon as an indicator of good ecology for the river).
- 2.9 **Economic Benefits:** An Environment Agency Report “*Economic Evaluation of Inland Fisheries*” (ref: SC050026/SRI 2007) showing the value of salmon to the public gave a mean Willing to Pay (WTP) figure of £15.80 per household per year. In calculating the “Willing To Pay” figure the EA carried out surveys of the general public asking how much they might be willing to pay to help maintain salmon stocks. It should be noted that figure may be an overestimate as respondents may have also been considering their WTP towards general river water quality when deciding on their response. This makes it difficult to separate out the specific WTP for salmon abundance from other aspects of river quality but steps were taken in the report to minimise this problem. For Leeds, based on 310,919 households, this would represent a figure of £4,912,520.

- 2.10 Added to this is the value of angling to the region. Angling is one of the most popular participation sports (contributing over £3 billion to the UK economy). An increase in rod licences will generate income for the region, and schemes such as the “Hooked on Fishing” which targeted young people at risk of offending, are estimated to save the taxpayer £2,500 if a young person is prevented away from a court appearance and detention.
- 2.11 Fish passes are also likely to enhance nearby property values and add value to new business premises or high cost waterside developments.
- 2.12 Fish passes have the potential to become major tourist attractions leading to associated employment generation, and could be included along the Trans Pennine trail as an added attraction. Increase in fisheries based tourism can make an economic difference to rural poverty and the development of market towns. The salmon ladder in the town of Pitlochry in Scotland is a major tourist attraction for the area.
- 2.13 **Social and Health:** The presence of salmon within the river is likely to draw more people to use the river for recreation, particularly if viewing points were created in appropriate locations relative to local parks and open spaces. This will have associated health benefits which in turn will reduce costs in health care.
- 2.14 There would be an associated increase in angling which is and is recognised as being fully inclusive, therapeutic and a healthy outdoor pursuit.
- 2.15 Promotion of such schemes and the associated wildlife will help raise environmental awareness amongst the public and foster civic pride in the area.
- 2.16 **Biodiversity:** It is not only salmon that will benefit from the provision of fish passage on the rivers of Leeds. Other species include River Lamprey *Lampetra fluviatilis*, Brown Trout *Salmo trutta*, the European eel *Anquilla anquilla* and Otters *Lutra lutra*. All of these species are priority species in the UK Biodiversity Action Plan and several of them are listed in the Berne Convention and the EC Habitats Directive with other species such as heron and kingfishers also benefiting.
- 2.17 Otters are present on both the Aire, (confirmed by a recent EA survey), and the Wharfe. As a protected species under the Wildlife & Countryside Act 1981 and the EC Habitats Directive, otters are classed as a European Protected species & therefore given the highest level of protection. Otters will therefore have to be accommodated in any fish pass structures. For example, at Armley weir canoe portage steps will be built next to the fish pass/canoe run. This will double up as an otter ramp thereby allowing them to pass along this stretch of the river.
- 2.18 Protection of current good habitat and enhancement where habitat is lacking could also form part of the scheme in line with the SPD Biodiversity and Waterfront Development.

3.0 Main Issues: Not all of the weirs along the Aire and Wharfe present a complete barrier to migratory fish (Full list of weirs detailed in Appendices 3 & 4). Some weirs may be passable for certain periods (i.e. during flood conditions) but salmon have to reach spawning habitat by December or January (at the latest) and the succession of high weirs slows down the salmon's progress so as to prevent this happening. Fish passes on a couple of the most difficult weirs may have a dramatic effect on salmon's ability to ascend the river and for resident populations of fish to return upstream after flood events.

3.1 River Aire

Low weirs downstream of Knottingley are passable for certain periods (i.e. during flood conditions) and there are records of salmon at this site (Appendix 2 photo b). With the possible exception of Knostrop Lock in flood conditions salmon can probably ascend each one of these weirs.

The main weirs that require works to allow fish migration are:

Weir	Ownership	Cost of fish pass
Knostrop	British Waterways Scoping works for this project has already been done by the EA	£750,000
Crown Point Grade 2 listed	British Waterways This is not a complete barrier in the right conditions. Some works would allow greater fish passage	£150,000
Armley Grade 2 listed	Leeds Council & X-Leisure	£350,000
Newlay	Tbc A large housing scheme is planned just downstream of the weir	£350,000
Rodley	Possibly Yorkshire Water	£350,000
Kirkstall Grade 2 listed	Tbc. Passable in half flood conditions	£200,000
Total		£2,150,000

Some of the weirs are listed, for example Armley Weir is a Grade II listed structure.

River Wharfe

Weir	Ownership where known
Boston Spa	
Flint Mill (Boston Spa)	Has a fish pass but is in need of some improvement
Pool	
Otley Garnett's Mill	Planning permission currently granted and has a condition that requires fish pass provision
Burley	West Riding Anglers Club. This weir is on the Leeds Bradford border (in Bradford).
Linton – above Linton Falls in the upper reaches of the Wharfe	Private Ownership

The Environment Agency did not provide specific costing for fish passes on the above weirs as the focus of their work has been on the weirs of the River Aire. The average cost of a fish pass is £250K so using that figure for the above the weirs in Leeds total would be approx. £1million.

3.2 **Potential funding sources:**

- Planning gain money –this could be through the use of planning conditions and Section 106 agreements. Calculation of the contribution would need to be decided on a case by case basis taking account of overall scheme viability and other contribution priorities where a contribution is provided. It may be the full cost or a % contribution.
- Heritage Lottery Funding
- Private sponsorship
- Big Lottery – Access to Nature
- Sport funding via the British Canoe Union
- Environment Agency contribution
- Landfill Community Funding, WREN, Veolia, SITA
- In-kind contribution
- Leeds City Council contribution
- Health providers

4.0 **Implications For Council Policy And Governance**

4.1 **Waterfront and Biodiversity SPD:**

Biodiversity enhancements will be sought as part of waterside developments. There is specific reference to fish passes as one of the options within this document.

4.2 **Local Development Framework:**

As the “Biodiversity and Waterfront Development “ is a current SPD it will be incorporated into the LDF, and with it the requirement for enhancements which can include fish passes as part of development will be supported.

4.3 **Area Action Plans**

4.3.1 **Aire Valley Leeds Area Action Plan:**

Provision of fish passes on this stretch of the River Aire is in support of:

- **Objective 5:** overcoming physical, social and environmental barriers that act as barriers to regeneration.
- **Objective 8:** to maximise the opportunities afforded by the waterways network.
- **Objective 9:** to improve the quality of the environment. The design and environment section 7C talks of landmark “gateway” buildings, public art and landscape features. Provision of a fish pass could provide this on a dynamic scale. Key sites within this area are at Knostrop Weir, Thwaites Mill weir and Skelton Lake.

4.3.2 West Leeds Gateway Area Action Plan

Provision of a fish pass would be consistent with the objectives of the plan to “maintain, improve and increase the safety, quality and usability of green space and green corridors for the enjoyment and improved well being of the local community”. The design and environment section D3 talks of landmark “gateway” buildings, public art and landscape features. Provision of a fish pass could provide this on a dynamic scale as part of the Armley Mills development. It would also be consistent with the biodiversity policies in D6. The key site in this area is Armley Mill weir.

4.3.3 Leeds City Centre Area Action Plan

Provision of a fish pass would be consistent with the objective of the plan to “promote and maintain a high quality safe environment”.

4.4 “Vision for Leeds 2004 - 2020” - The Community Strategy

Provision of fish passes would deliver projects and benefits consistent with the aims of this strategy. Economic benefits in the increase in tourism and Leeds as a “Salmon city” with office spaces looking out on a river with this magnificent fish, as well as the benefits to local people from increased tourism and angling and the chance to celebrate the value of the rivers running through their city creating civic pride.

4.5 Leeds City Centre Initiative 2020 Prospectus

This recently published document includes within the sustainability section an action on the removal of barriers to fish migration in the city.

4.6 Regional Spatial Strategy: Policy ENV8 Biodiversity

This policy states that biodiversity policy should make clear reference to the central role of the environment in sustaining the regions economic, social and cultural life and places and a clear emphasis on the conservation and enhancement of key habitats across the region. Biodiversity opportunity maps within this policy identify the River Aire and River Wharfe as varying between Category 1 and Category 3 depending on location. This is interpreted as meaning that policy in the LDF should recognise river networks and seek to enhance the physical and biological continuity of such ecosystems, and that opportunities for strategic habitat restoration should be sought. Removal of barriers to fish migration on the rivers is clearly consistent with these objectives.

4.7 Leeds Waterfront Strategy

The inclusion of fish passes is consistent with the aims of this strategy.

4.8 Aire Action Leeds

This partnership has given full commitment to achieving fish passes on the River Aire.

4.9 Flood Alleviation Scheme

The opportunities for inclusion of fish passes could be considered within the Leeds FAS. The impacts the FAS may have upon current and potential spawning areas and fish populations will need to be considered where barriers and altered flows may occur as part of the scheme. The scheme may also want to consider potential viewing points along the river should fish passage become a reality, and assess how some of the large structures proposed along the river would interact with this aspiration.

5.0 Legal And Resource Implications

- 5.1 No direct implications unless Leeds City Council decides to contribute directly towards the cost of some of the fish pass projects. No scheme for funding such work exists in the current capital programme.
- 5.2 Officer time may also be spent on partnership projects i.e. Armley Mill and Knostrop weir.

6.0 Conclusions

- 6.1 Restoring fish passage along the rivers of Leeds would be of benefit to the city. Leeds has invested heavily in its city centre and enhancement of the river is a key element in its continued regeneration. This would be an excellent publicity and marketing tool. It would show that Leeds has a healthy environment and can offer a good quality of life. Waterfront properties could command better prices. Fish passes are a natural spectacle drawing crowds as salmon leap up them. This will in turn attract more visitors and people to the city. The building of fish passes on a number of weirs coupled with habitat enhancement and improvements along the Aire and Wharfe will create sustainable rivers.
- 6.2 The result will be a vibrant life rich river and associated environment with which people will come into contact. This will be an enriching experience for people helping to engender civic pride, enhance quality of life and create a sense of ownership of the waterways.

7.0 Recommendations

- 7.1 That contributions towards the provision of fish passes is considered from appropriate developments in line with current policy and SPD.
- 7.2 That LCC continues to work in partnership with EA and BW to achieve fish migration throughout Leeds
- 7.3 That support for the provision of fish passes is included within the relevant Area Action Plans

Background Papers

Restoring your fisheries. The river Aire fish pass action plan 2005
River Aire Restoration (RARE) Lower and Middle River Aire fish pass proposal
River Aire Fish pass Study: Knostrop Weir 2005
An Environment Agency Report "*Economic Evaluation of Inland Fisheries*" (ref: SC050026/SRI 200)

Salmon life cycle

Salmon need both freshwater and ocean habitats for their life cycle.

Salmon eggs are laid (spawned) upstream of freshwater rivers with good areas of gravel, cobbles and boulders on the river bed and a good flow of fresh clean water.

On the Aire these areas are present in the 7-8miles between Rodley and Shipley and for several miles past Saltaire, and for the Wharfe spawning has been recorded at Boston Spa. The eggs hatch out in spring.

Young salmon in these rivers require natural grassy banks with some deciduous trees near the river providing both insects for food and some shade as cover from predators.

After approx 2 years the developing salmon (known as smolts) migrate from the rivers to the sea to their feeding grounds.

After 1-2 years at sea the adult salmon then return to their river during September, October and November where they may often “hold up” in deep cool water in pools. Climate playing a crucial part in this part of the life cycle.

When it is time for them to spawn (spawning usually takes place when the first heavy frost of winter has occurred) they will move upstream to the place where they were born.

90-95% of the adult fish die after spawning and the survivors (which are predominantly female) return to the sea and may return to spawn another 2 or 3 times in their life.

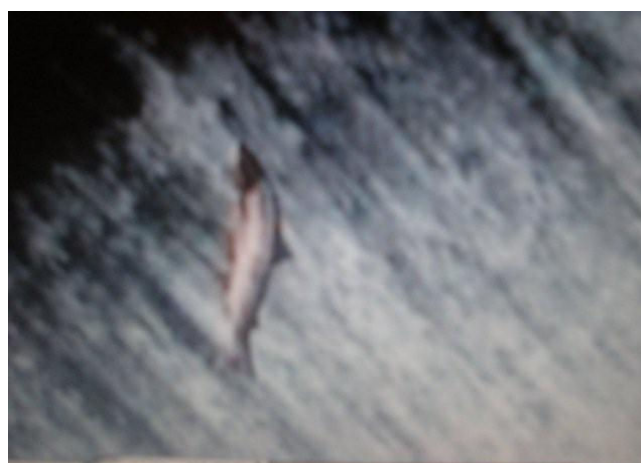
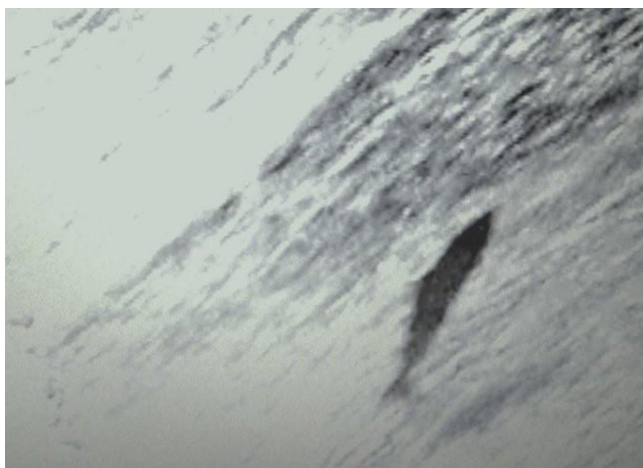
Castleford Fish Pass (£350,000)



This gives some indication of the type of structure that is required. This weir has to be broken into with a section being removed. A concrete channel is then constructed with a series of baffles. The baffles slow down the water making it passable to fish.

For some great photos of salmon leaping at Stainforth Force over a 2008 October weekend:
http://www.flickr.com/photos/andy_rush/272215275/in/set-72157594332746618/

Salmon photos from Knottingley, October 2007



Appendix 3: River Aire – all weirs

Weir	Local Authority	Ownership	Notes	Fish pass approx. cost £K
Knottingley	(Wakefield MDC).	.	A very high weir but with deep water below that facilitates the ascent of salmon. Can be ascended in high flood conditions. A new EA camera at Castleford Fish pass upstream of Knottingley should reveal numbers of fish ascending the weir. Reports of salmon upstream of Knottingley confirm that fish do currently manage to ascend this weir	To be advised by EA
Skelton Grange	LCC	RWE NPower	Weir to be removed as part of a planning consent	To be advised by EA
Knostrop Lock	LCC	British Waterways	A very difficult weir due to a curve at the bottom of the weir. A fish pass is required at this weir.	750,00
Crown Point <i>Grade 2 listed</i>	LCC	British Waterways	Not a barrier to salmon but smaller changes to the weir would allow greater movement	150,00
Dark Arches	LCC		Not a barrier to salmon	N/A
Armley Mills <i>Grade 2 listed</i>	LCC	Leeds Council & X-Leisure	The EA and LCC are currently involved in discussion of a joint fish and canoe pass for this site.	350,00
Burley Mills <i>Grade 2 listed</i>	LCC		Not a barrier to salmon as easily floods	N/A
St. Ann's Mill	LCC	LCC	Not a major weir. The site is currently being sold so there is an opportunity to condition provision of a fish pass	To be advised by EA
Kirkstall Abbey <i>Grade 2 listed</i>	LCC	Tbc	Passable by salmon in half flood conditions	200,00
Newlay	LCC	Tbc	There are no current plans for a fish pass at this site. Large housing developments are taking place just downstream of the weir.	To be advised by EA
Rodley	LCC	Yorkshire Water	Recommended for a fish pass as part of their AMP5	To be advised by YW

Appendix 4: River Wharfe all weirs

Weir	Local Authority	Ownership	Notes	Fish pass approx. cost £K
Tadcaster	Selby	John Smiths Brewery	Fitted with a fish pass on the left bank	N/A
Boston Spa	LCC		Slightly upstream on Thorp Arch Bridge in Boston Spa. Salmonoids do ascend but requires a fish pass	250,000
Flint Mill (Boston Spa)	LCC		Currently has a fish pass but EA comment that it could do with some improvement	Unknown – to be advised by EA
Wetherby	LCC		Weir reconstruction in 1982 included a fish pass on the right bank	N/A
Harewood Bridge	LCC		Not a barrier to salmon in half flood conditions	To be advised by EA
Harewood Mill	LCC		Not a barrier to salmon	N/A
Arthington	LCC		Weir washed away in 1944	N/A
Pool	LCC		Requires a fish pass	250,000
Otley Garnett's Mill	LCC		Planning permission currently granted (2006) with a condition for the provision of a fish pass	Under planning permission
Otley High Dam	LCC		Weir collapsed in 1960	N/A
Burley	Bradford	West Riding Anglers Club	Requires a fish pass	250,000
Addingham Low Mill	Bradford		New gauging weir installed by the EA which will allow fish passage	N/A
Addingham High Mill	Bradford		Low weir, probable fish passage in half flood conditions	To be advised by EA
Linton	Craven District and North Yorkshire CC	Bennett	Situated above Linton Falls. Fish pass required – possible hydro scheme that may offer opportunities	250,000