

Draft

**Economic & Social Impact of the restoration of the
Kennet & Avon Canal
2010 Update**



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Economic & Social Impact of the restoration of the Kennet & Avon Canal 2010 Update

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Economic & Social Impact of the restoration of the Kennet & Avon Canal

2010 Update

Executive summary

The Kennet and Avon Canal runs for 87 miles, linking the River Avon at Bristol with the River Thames at Reading. The canal was restored to through navigation in 1990 and the restoration was eventually made secure through further work, completed in 2002 and supported by £25 million funding from the Heritage Lottery Fund (HLF).

Following the restoration, two phases of economic evaluations were undertaken to review impacts, carried out by Ecotec in 2003 and 2005. The present study, undertaken by the Economic Development Unit, British Waterways, updates the 2005 study to 2009, through:-

- Assessing the economic benefits delivered by the Kennet & Avon Canal for the local economy, arising from increased tourism and leisure activity;
- Determine and quantifying where possible the ecosystems services delivered by the Canal.

As far as possible, both sets of impacts are broken down by local authority area.

Where possible, impacts are compared with:-

- The pre-HLF project baseline in 1995, taking account of the fact that the canal was navigable throughout at this time, all be it with restrictions;
- An assessment of what was forecast would happen if the canal reverted to 30% cruiseway status, undertaken as part of the economic appraisal for the HLF project by Coopers & Lybrand in 1995.

Local economic impact

The study estimates that around 11.2 million tourism, recreation and functional visits were made to the canal in 2009. This compares with 7.7 million visits in 1995, a growth of 46%. Visits to the canal have continued to grow since the HLF project was completed in 2002.

These visits generated some £42 million gross direct expenditure in the local economy by visitors to the canal in 2009. This rises to £55 million if indirect and induced spend is added.

This expenditure supports some 1,306 leisure & tourism-related jobs in the canal corridor. This has grown from 815 jobs in 1995, pre-restoration. The original economic appraisal supporting the application for HLF funding stated that a high proportion of these jobs would be lost if the canal reverted to 30% cruiseway. So the net jobs supported by the canal in its current navigable state are 1,230, compared with the situation if canal maintenance was reduced and navigation largely ceased.

In summary, direct and total visitor spend, plus annual visits and jobs supported, by local authority in 2009 was:-

Reading

Direct visitor spend	£664,000
Direct, indirect & induced spend	£863,000
Visits p.a.	188,000
Jobs supported	20

West Berkshire

Direct visitor spend	£12,293,000
Direct, indirect & induced spend	£15,980,000
Visits p.a.	3,491,000
Jobs supported	386

Wiltshire

Direct visitor spend	£14,459,000
Direct, indirect & induced spend	£18,796,000
Visits p.a.	3,344,000
Jobs supported	444

Bath & North East Somerset

Direct visitor spend	£14,698,000
Direct, indirect & induced spend	£19,107,000
Visits p.a.	4,193,000
Jobs supported	455

Total – all areas

Direct visitor spend	£42,113,000
Direct, indirect & induced spend	£54,747,000
Visits p.a.	11,216,000
Jobs supported	1,306

Additionally the Ecotec 2005 study found that between 1995 and 2005 there had been some £375 - £435 million private and public sector investment in canalside properties. (This work hasn't been updated in the present study.) Many of these were residential, but around 2,700 jobs were supported in commercial canalside developments, particularly in Reading. These jobs aren't necessarily directly related to the canal, but are supported by developments focussing on the regenerated canal corridor.

Impact on ecosystems services

It is recognised that inland waterways make a valuable contribution to people's quality of life. They provide recreation, transport and land drainage. They act as a focus for the regeneration of waterside areas. They provide an important environmental, landscape and heritage resource. In this study, such quality of life benefits have been expressed and analysed in terms of ecosystems services delivered. Unlike the expenditure by visitors and the resultant employment generated, these ecosystems services represent real increases in people's welfare, rather than a spatial redistribution of benefits.

In this analysis, relevant ecosystems services have been identified and the benefits quantified where possible. It hasn't been possible to place a monetary value on all identified impacts, although the major benefits have been captured. Therefore the values will under-estimate the actual benefits delivered. The analysis has been made (at 2009 values) against three scenarios:-

1. The current position (2009);
2. The position prior to the HLF project (1995);
3. The position if the canal reverted to largely un-navigable (ie. 30% cruiseway) status.

The following annual benefits have been identified:-

Ecosystem service	Value 2009 (£s)	Value 1995 (£s)	Value – Un-navigable (£s)
Provisioning services			
Business creation & employment	Not applicable		
Property value enhancement (capital)	£150.9m	£150.9m	£65.7m
Cost effective transport	Not quantified		
Water supply	Not quantified		
Volunteering	Not quantified		
Regulating services			
Carbon saving – sustainable transport & renewable energy	Not quantified		
Land drainage	£2.1m	£2.1m	£0.0m
Waterway habitats	Included elsewhere		
Cultural services			
Recreation	£10.7m	£6.9m	£3.5m
Waterway heritage, landscapes & environment	£1.0m	£1.0m	£1.0m
Outdoor learning	Not quantified		
Cross-cutting services			
Health & well-being	Not quantified		
Wider tourism & regeneration benefits	Not quantified		
Total – annual value	£13.8m	£10.0m	£4.5m
Total – capital value	£150.9m	£150.9m	£65.7m

Note:-

1. All values are shown at 2009 prices, for comparison purposes
2. No change is assumed in property value enhancement between 1995 & 2009, although some growth can be anticipated because of improvements in the quality of the canal environs.

This shows a growth in benefits delivered of at least £3.8m per year since 1995. If the canal was to revert to largely un-navigable status (30% cruiseway) some £9.3m benefits per year would be lost, together with a fall of around £85m in the capital value of properties.

These benefits compare with an annual cost of maintaining the canal of £2.5 million in 2009/10.

The estimated split of benefits and costs by local authority is:-

Bath & North East Somerset

Ecosystem service	Value 2009 (£,000s)	Value 1995 (£,000s)	Value – Un-navigable (£,000s)
Property value enhancement	£54.1m	£54.1m	£37.3m
Land drainage	£155k	£155k	£0k
Recreation	£3,983k	£2,590k	£1,295k
Waterway heritage, landscapes & environment	£189k	£189k	£189k
Total – annual value	£4.3m	£2.9m	£1.5m
Total – capital value	£54.1m	£54.1m	£37.3m
Annual maintenance cost	£0.1m		

Wiltshire

Ecosystem service	Value 2009 (£,000s)	Value 1995 (£,000s)	Value – Un-navigable (£,000s)
Property value enhancement	£47.3m	£47.3m	£0.0m
Land drainage	£1,100k	£1,100k	£0k
Recreation	£3,177k	£2,065k	£1,033k
Waterway heritage, landscapes & environment	£464k	£464k	£464k
Total – annual value	£4.7m	£3.6m	£1.5m
Total – capital value	£47.3m	£47.3m	£0.0m
Annual maintenance cost	£1.4m		

West Berkshire

Ecosystem service	Value 2009 (£,000s)	Value 1995 (£,000s)	Value – Un-navigable (£,000s)
Property value enhancement	£35.8m	£35.8m	£14.7m
Land drainage	£756k	£756k	£0k
Recreation	£3,316k	£2,155k	£1,077k
Waterway heritage, landscapes & environment	£319k	£319k	£319k
Total – annual value	£4.4m	£3.2m	£1.4m
Total – capital value	£38.8m	£35.8m	£14.7m
Annual maintenance cost	£1.0m		

Reading

Ecosystem service	Value 2009 (£,000s)	Value 1995 (£,000s)	Value – Un-navigable (£,000s)
Property value enhancement	£13.7m	£13.7m	£13.7m
Land drainage	£70k	£70k	£0k
Recreation	£179k	£116k	£58k
Waterway heritage, landscapes & environment	£29k	£29k	£29k
Total – annual value	£0.3m	£0.2m	£0.1m
Total – capital value	£13.7m	£13.7m	£13.7m
Annual maintenance cost	Negligible		

Introduction

The Kennet and Avon Canal runs for 87 miles, linking the River Avon at Bristol with the River Thames at Reading. The canal opened in 1810 and was eventually closed to through navigation by the British Transport Commission in 1955. Over the next 30 years the canal was gradually restored to navigation by a partnership comprising British Waterways, the Kennet and Avon Canal Trust, the Association of Canal Enterprises and the riparian local authorities along the waterway. It was officially re-opened to through navigation in 1990. However the canal still suffered from significant and long-standing structural problems of water leakage and embankment stability which, unless they were addressed, would have threatened the canal's future. Therefore a second major phase of work was undertaken, supported by £25 million funding from the Heritage Lottery Fund (HLF), to secure the restoration.

This scheme was completed in December 2002 and the canal was officially reopened in 2003. Immediately after re-opening, British Waterways commissioned Ecotec to undertake a study into the initial economic benefits that the restoration had generated¹. In 2005 Ecotec carried out a further assessment to determine the impacts that had been generated by 3 years after completion of the HLF project².

The present study, by the Economic Development Unit, British Waterways, partially updates the 2005 study to 2009. It does this by making use of readily available data.

The objectives of the 2005 study were to assess:-

- The economic benefits of the canal restoration arising from increased tourism and leisure activity within the local economy;
- The economic benefits of the canal restoration on the supply-side of the tourism and leisure economy, in relation to tourism and leisure businesses within the canal corridor;
- The impact of the canal restoration on property developments.

Tourism and leisure activity generates an economic impact through increased expenditure by visitors, which in turn leads to money being retained locally which supports jobs in local businesses. Such businesses may or may not be located canalside. The canal attracts visitors, who may spend money anywhere within the local economy.

Canals also act as a catalyst for the development of property alongside them. The 2005 economic evaluation identified the following property-related effects:-

- Canals help to establish developer and investor confidence, particularly in disadvantaged areas;

¹ *The economic impact of the restoration of the Kennet & Avon Canal*, British Waterways, 2003

² *An economic evaluation of the restoration of the Kennet & Avon Canal: An update of the 2002 study*, British Waterways, 2006

- Improvements to canal environments have been shown to bring forward the development of previously vacant or underused sites. Their linear form means that canals can also act as a valuable way in which to integrate discrete development schemes;
- Attractive development can enhance the vibrancy and vitality of an area. In particular, tourism and leisure schemes benefit strongly from the striking setting that a canal location provides;
- Evidence suggests that property developments at waterside locations command a premium value when compared to schemes based elsewhere and are also easier to sell/ let. This is particularly true of residential and office developments.

The present study concentrates on updating the first of these tasks ie. assessing the economic impact of the canal in terms of tourism and recreation activity and associated businesses and employment. The 2005 study used the supply-side analysis (second objective) to verify the scale of the leisure and tourism impacts associated with increased activity. It is assumed that a similar relationship will hold between the demand and supply-side approaches today.

The property analysis would require original research and therefore hasn't been undertaken at this stage.

However an attempt has been made to quantify the ecosystems services delivered by the canal, using an approach developed by Jacobs for Defra / IWAC³.

The objectives of the present study can therefore be summarised as:-

- To assess the economic benefits delivered by the Kennet & Avon Canal for the local economy, arising from increased tourism and leisure activity;
- To determine and quantify where possible the ecosystems services delivered by the Canal;
- To break down, as far as possible, both sets of impacts by local authority area.

³ *The benefits of inland waterways*, Jacobs for Defra / IWAC, 2009

Impact on the local economy

Study approach - Tourism & leisure demand model

The demand-side assessment is based on estimating numbers of visitors to the canal (broken down by type of user) and then using multipliers derived from other studies to calculate the resultant visitor spend retained within the local economy and employment supported. The assumptions used in the present analysis are generally similar to those used in the 2005 study. However the opportunity has been taken to update volume and value estimates where new information has become available. These changes are outlined below.

The stages in the analysis are to:-

- Estimate the number of canal visitors, broken down by type (boaters, anglers etc.) Where possible this is drawn from available data (boat licenses, pedestrian counters), but sometimes the information does not exist or it is not available for the required time period. In such instances proxies are used such as national survey data or information drawn from comparable canals. It is also important to take account of additionality since some visits would have taken place in the area regardless as to whether the canal is accessible;
- Determine expenditure by these visitors. Average spend per head estimates, drawn from national and local surveys, are applied to the visitor numbers to obtain an overall expenditure figure;
- Estimate income retained within the local economy and employment directly resulting from the visitor expenditure by means of standard industry multipliers. A further multiplier is used to estimate indirect and induced employment generated through expenditure with suppliers and expenditure resulting from the increased income of direct employees.

Estimates of canal visitors, expenditure and employment are calculated at the level of the whole canal and for each of the four local authorities along its length between Reading and Hanham ie. Reading Borough Council, West Berkshire Council, Wiltshire County Council and Bath and North-East Somerset Council.

Visitor numbers & expenditure

Privately-owned boats based on the canal

The number of privately-owned boats based on the canal is based on the number recorded through the BW Craft Licensing System (CLS). In 2008 this was 1,286 boats, with little change in boat numbers occurring since 2003, due to constraints on moorings – see Appendix 1. (Because the analysis is based on boats recorded through the CLS, it excludes boats without a valid mooring. Such boats constitute an acknowledged problem on the canal. Since theoretically they move between moorings on the canal network, they will be accounted for in economic terms as “cruising boats”.)

Expenditure estimates for privately-owned boats relate to costs incurred whether or not the boat cruises on the canal ie. licence & mooring fees, boat, equipment & running costs and casual expenditure associated with non-cruising visits to the boat. Expenditure figures are derived in the same way as in the Ecotec 2005 study, updated to 2009 levels.

Expenditure on cruising visits is calculated under “Cruising boats” below.

Cruising boats

Estimates of days spent by boaters on the canal (on both privately-owned and hire boats) have been calculated in a different way from Ecotec 2005. In the 2005 study, boats were split between those based on the canal and those visiting, with different approaches used to calculate the number of days spent cruising. Because of the availability of lock counter data it is now possible to estimate boat-days per year spent cruising on the canal by allocating traffic densities to various canal stretches. Then standard assumptions regarding journey time, derived from survey, are used to estimate the number of days spent cruising by both boats and their crews – see Appendix 2.

Boating expenditure relates to casual spend on goods and services by the boat crews during their cruise. The mean spend per person per day is derived from the Inland Waterway Visitor Survey (IWVS). This is an on-going telephone interview survey undertaken by British Waterways to obtain volume, value and preference information about waterway visitors. For sample size reasons, the expenditure figures used in this analysis have been taken as the average of spend for 2007 – 2009 for each visitor category. For cruising boats, the expenditure figure relates to the visitor category “boats with engine”.

Business boats

Various types of business boats are based on the canal – see Appendix 1:-

- Hire boats – 93 hire boats were recorded on the canal through the CLS. Expenditure relates to the amount customers pay to the hire company based on the canal for their holiday, based on approximate shoulder rates for a one week hire.
- Day hire boats – 16 are based on the canal. The cost of hire is based on the typical rate for a 1-day hire on the Kennet & Avon Canal.
- Other business boats – These include trip or passenger boats, together with other boats operating as businesses on the canal. (The latter include hotel boats, floating shops and craft businesses etc.) Expenditure in all cases is based on the typical cost of short cruise trips on the canal. In reality, expenditure will vary substantially between the different categories of boat involved. Trip boats are assumed to be typical of the types of business craft on the canal and thus give an indication of the magnitude of expenditure that

takes place. Trip boat use assumptions have been assumed as in Ecotec 2005.

In all cases, the types of expenditure under “Business boats” relate to the payments made by the public to the businesses operating the boats. For day hire and other business boats, casual expenditure by visitors elsewhere during their trip is added. For hire boats, this casual expenditure is estimated under “Cruising boats” – see above.

Other visitors

Other visitors are categorised as follows:-

- Canoeists (and other users of unpowered boats)
- Anglers
- Cyclists
- Other informal visitors (walkers, joggers, sightseers etc.)

In 2005, Ecotec made assumptions about the change in activity for each of these groups since the first evaluation study in 2002. For change from 2005 to 2009 a different approach has been used. The annual volume of visitors to British Waterways' canals and rivers is now estimated through the on-going Inland Waterway Visitor Survey (IWVS) (see under “Cruising boats” above). This demonstrates a national increase in annual visits between 2005 and 2009 of 17%. This percentage growth has therefore been applied for the canoeist, cyclist and other informal visitor categories to derive visit figures for 2009 for the Kennet & Avon Canal (ie. it is assumed that changes in visits to the Canal reflect the national pattern of change in waterway use.) In theory it would be possible to use the IWVS figures to derive different percentage changes for each of the four groups of visitors. However small sample sizes mean that the figures for canoeists, anglers and cyclists are unreliable.

Overall it is felt to be more appropriate to apply the overall national growth factor to the canoeist, cyclist and other informal visitor categories. Other trend data suggests that canoeing and cycling have been growing over this time period, while general visitors to the outdoors increased substantially in 2009, in part at least due to the general economic climate and the tendency of UK residents to holiday at home.

The need to make use of national trend data for assessing change in visits to the towpath introduces a large degree of uncertainty to the analysis. This was recognised in the Ecotec 2005 report and was one of the reasons why the parallel supply-side analysis was undertaken. In the 2005 study the supply-side estimates of activity and employment were more-or-less in line with the demand-side assessment. It is expected that a similar relationship would hold today, which gives a degree of confidence in the results.

For canal angling, there has been little evidence of growth however, so visit estimates have been kept at 2005 levels.

Expenditure per visit figures has been drawn from the IWVS in respect of the relevant visit categories, as for “Cruising boats”. An allowance has been made for expenditure by people on visits involving overnight stays, as in Ecotec 2005.

Additionality assumptions

To account for expenditure that would have occurred in the area whether or not a visit to the canal took place, similar assumptions have been made as in Ecotec 2005. For activities involving powered boats and also angling, zero displacement is assumed, as there are limited opportunities for these types of activity in the local area. For cycling and informal visitors however high levels of displacement are assumed – 80% for day visits and 85% for visits involving an overnight stay. (These percentages are based on information from BW site surveys.)

In Ecotec 2005, zero displacement was also assumed for canoeing. However in this study we have assumed that some displacement is possible – at a rate of 50%.

Summary of results

In summary, the total number of visits in 2009 by each visitor category, compared with 2005, is estimated as follows:-

Visitor category	Visits 2005	Visits 2009
Privately-owned boats – non-cruising visits	23,400	23,148
Cruising boats*	244,820	168,099
Trip / business boats*	176,400	122,500
Canoeing	116,438	135,000
Angling	106,000	107,000
Cycling	563,577	657,000
Other informal visitors	8,584,956	10,003,000
Total	9,815,591	11,215,747

Note:* *In part the change in these categories between 2005 and 2009 is due to the different calculation methods used.*

Overall change in visits to the canal between the baseline year of 1995 and 2009 is:-

Year	Total visits*	% change from Baseline
1995	7,658,000	
2002	8,466,000	+11%
2005	9,816,000	+28%
2009	11,216,000	+46%

Note: * *Rounded to nearest thousand*

This level of growth in visitor numbers is reflected in other canal restoration schemes. For example, in the case of the Millennium Link project in Scotland, visits grew from 6.2 million in 1997 to 15.1 million in 2006⁴. (The Millennium Link project

⁴ Roger Tym & partners for British Waterways Scotland & Scottish Executive, *Scotland's canals: The economic effects of the Millennium Link and Highlands Canals investment, 2007*

consisted of the full restoration to navigation of the Forth & Clyde and Union Canals in Central Scotland. Unlike the Kennet & Avon Canal in 1995, the Millennium Link canals were largely un-navigable in 1997. Hence the high rate of increase in visits.)

In terms of gross direct expenditure by visitors, spend in each visitor category in 2009, compared with 2005, was:-

Visitor category	Spend 2005 (£,000s)	Spend 2009 (£,000s)
Privately-owned boats – non-cruising spend	5,647	8,891
Cruising boats*	1,966	2,343
Hire boats*	2,787	2,280
Trip / business boats*	879	1,518
Canoeing	373	654
Angling	689	324
Cycling	1,562	1,664
Other informal visitors	20,448	24,439
Total	34,352	42,113

Note:* *In part the change in these categories between 2005 and 2009 is due to the different calculation methods used.*

Employment

Estimates of employment resulting from this visitor expenditure have been calculated in the same way as in Ecotec 2005, using a multiplier approach. There are a number of stages to this process:-

1. An income multiplier is used to estimate indirect and induced spend resulting from the initial direct visitor expenditure. Indirect spend relates to expenditure by tourism and recreation businesses with local suppliers and services, as a result of the initial spend by visitors. Induced spend results from the increased local spending power of local people employed as a result of the initial visitor spend. As in Ecotec 2005 a multiplier of 1.3 has been adopted.
2. Employment multipliers are then used to convert the total gross expenditure to full time equivalent (FTE) jobs. This takes account of the fact that a proportion of the gross direct, indirect and induced spend will be retained within the local area and thus support local jobs. In Ecotec 2005 a multiplier of £34,000 gross spend per FTE job was used. In the current study, this value has been updated to 2009 prices – at £37,500 per FTE job. Because expenditure on boats and boating equipment tends to relate to higher value capital-type items, a higher multiplier has been adopted – assumed at twice the standard multiplier ie. £75,000 per FTE job. The same approach was used in Ecotec 2005.

Summary of results

Overall change in direct, indirect & induced spend, together with resultant employment supported between the baseline year of 1995 and 2009 is:-

Year	Total direct, indirect & induced spend*	FTE jobs supported
1995	27,911,000	815
2002	33,986,000	942
2005	44,657,000	1,205
2009	54,747,000	1,306

Note: * Rounded to nearest thousand

The number of jobs supported by the restored canal has therefore continued to grow following restoration of the canal. Job numbers have increased by 60% since 1995, prior to the HLF-funded scheme to secure the future of the canal as a navigable waterway.

An economic impact appraisal was undertaken by Coopers & Lybrand prior to the HLF scheme in 2005. This study estimated that the canal supported 779 FTE jobs in 1994. If the canal was allowed to revert to a largely un-navigable status, as it was before the 1990 restoration (ie. with only 30% of the waterway being available for cruising by boats), around 706 of these jobs would be lost. These jobs were therefore safeguarded by the 2002 HLF-funded scheme.

This means that, in total, the number of jobs supported or safeguarded by the restoration of the Kennet & Avon Canal was around 1,230 by 2009 (ie. 706 jobs safeguarded plus 524 additional jobs supported).

In addition, the Ecotec 2005 study found that over that period there had been some £375 - £435 million investment in canalside properties. Many of these were residential, but around 2,700 jobs are supported in commercial canalside developments, particularly in Reading. (These jobs aren't necessarily directly related to the canal of course.)

Visitor numbers, expenditure & employment by local authority

Visitor numbers along the canal have been analysed by the four local authority areas. The detailed allocation by visitor category is set out in the Appendices. In summary, direct and total visitor spend, plus annual visits and jobs supported for each local authority is as follows:-

Reading

Direct visitor spend	£664,000
Direct, indirect & induced spend	£863,000
Visits p.a.	188,000
Jobs supported	20

West Berkshire

Direct visitor spend	£12,293,000
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Total – all areas

Direct visitor spend	£42,113,000
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Jobs supported	1,306

Impact on ecosystems services

Introduction

It is recognised that inland waterways make a valuable contribution to people's quality of life. They provide recreation, transport and land drainage. They act as a focus for the regeneration of waterside areas. They provide an important environmental, landscape and heritage resource.

In 2009, Defra & the Inland Waterway Amenity Council (IWAC) commissioned some work to develop a framework to value these benefits⁵. The study aimed to identify and, where possible, place a monetary value on all the benefits to society that waterways deliver. Jacobs categorised these benefits using an Ecosystems Services Approach (ESA). In this approach, inland waterways are considered to form an "ecosystem", which can deliver four types of benefit:-

Provisioning

These may be food, water resources and other types of economic benefit. In the case of inland waterways they might include:-

- Business and employment generated along the canal corridor, particularly through tourism.
- The enhancement in the value of residential properties beside or close to the canal.
- Cost-effective, environmentally-friendly transport opportunities in terms of walking and cycling along the towpaths
- Water supply
- Volunteering activity, which offset public sector costs.

Regulating

Such benefits include responding to climate change and flood alleviation impacts. For waterways they include:-

- Carbon saving in terms of sustainable transport through walking and cycling
- Providing land drainage for the adjacent corridor
- Maintaining waterway-related fauna and flora and creating connectivity between habitats.

⁵ Jacobs, for Defra / IWAC, *The benefits of inland waterways*, 2009

Cultural

These include recreation and aesthetic benefits. For waterway they include:-

- Providing recreational opportunities for local people in terms of a free, attractive and interesting resource on their doorstep
- Conserving for the nation the unique heritage of canal landscapes, structures, buildings and culture (non-use benefits)
- Providing an outdoor learning and education resource for local children

Supporting

These are services which underpin the other categories, such as soil formation and the nutrient cycle. They are less relevant in a waterway context.

In addition the study identified some other benefits that cut across the services delivered:-

Cross-cutting benefits

- Enhancing the health and well-being of the local population.
- Wider regeneration & tourism impacts

The study identified values that can be used to quantify most of these benefits in the context of marginal change, as opposed to allowing an estimate to be made of the total value of the resource or ecosystem. Also they are form of welfare values, which relate to real increases in peoples' quality of life, as opposed to simply redistributing benefits between people.

In this analysis therefore we apply those values where relevant to the Kennet & Avon Canal looking at the marginal change between the 1995 baseline and 2009. Where possible comment is made on the implications for the various ecosystems services delivered if the canal was to revert to its pre-1990 largely un-navigable state.

Provisioning services

Business creation & employment generation

Although these constitute a provisioning service, they are really redistributive rather than welfare benefits. If businesses weren't created or developed because of the canal, investment would take place somewhere else within the economy, although probably not in the same geographical location. These benefits are relevant at the local level however and relate to the local economic impact as analysed in the first part of this report.

This shows that around 1,306 jobs are supported by the canal its current state, compared with 815 in 1995 and only 73 if the canal was to revert to a largely non-navigable state.

Property value enhancement

There is evidence to suggest that property values are enhanced by proximity to canals. Canals create an attractive living environment in terms of visual amenity, as well as providing opportunities for leisure and recreation activities. Various studies have been undertaken to place a value on this premium. For residential properties a premium of up to 20% has been estimated for new waterside properties in a good quality waterway environment. Also the premium has been found extend outwards from the waterside to encompass nearby properties, although at a lesser rate. For older properties or those in poor quality areas, the premium may be lower than this.

Evidence for a premium in relation to commercial properties is much less clear cut. In some cases waterside commercial property may generate a rental premium and be let more quickly than accommodation in non-waterside locations. However this may well vary from place to place.

GIS analysis of the canal corridor area indicates that there are 3,540 buildings within 50m of the canals (waterside properties) and a further 12,849 buildings (hinterland properties) within 50 to 200m. These include both residential and commercial buildings. Only buildings with an area above 30m² are included, as any buildings with an area less than this are highly unlikely to be habitable. Also it is not possible to distinguish between individual properties and apartment buildings, so the actual number of properties may well be higher than the simple count indicates. For the purposes of this analysis, it is assumed that the under-estimate of properties in relation to split dwellings is balanced by the inclusion of a number of commercial properties.

Jacobs suggests 2009 suggests a range of residential property value uplifts associated with the change from a non-navigable waterway to fully navigable status, varying according to proximity to the canal:-

Distance from the canal (m)	Property value uplift (%)
Waterside	15%
Within 100m	10%
Between 100m & 500m	5%

For this analysis, since the majority of properties are existing stock, the uplift might be expected to be lower than Jacobs suggest. Therefore a more conservative estimate of uplift is assumed:-

Distance from the canal (m)	Property value uplift (%)
Waterside	7.5%
Within 200m	3.75%
Over 200m	0%

The Land Registry⁶ indicates that the average residential property by county in 2009 was:-

⁶ See www.landregistry.gov.uk/

Local Authority	Mean property value (£)
Bath & North East Somerset	£216,511
Wiltshire	£182,034
West Berkshire	£216,234
Reading	£189,457

The total uplift can therefore be estimated by local authority by applying the uplift percentages to the mean property values for waterside dwellings and those within 200m of the canal:-

Local Authority	No. properties – waterside	No. properties – 50 - 200m	Uplift in value (£m)
Bath & North East Somerset	929	4,802	£54.1m
Wiltshire	1,355	4,212	£47.3m
West Berkshire	927	2,567	£35.8m
Reading	329	1,268	£13.7m
Total	3,540	12,849	£150.9m

Therefore the uplift in the capital value of properties as a result of the canal being restored is estimated at £150.9 million (at 2009 values). Since the canal was already navigable in 1995 (all be it in a restricted way), no change in value is assumed between 1995 and 2009 (at 2009 values). In reality there may have been some uplift over this period, because of improvements to the overall waterway environment. However it is difficult to place a value on this, so a conservative approach has been taken and no uplift assumed.

However if the canal was to revert to a largely un-navigable state, then the loss in value is assumed to be of a similar magnitude to the uplift resulting from restoration. Not all the uplift would be lost however, since parts of the waterway would remain navigable. It is assumed that the stretches of waterway still with cruiseway status are those defined as “cruising waterways” under the Transport Act 1968. Assuming the properties receiving benefit from the value uplift are in proportion to the length of waterway in each local authority area, the remaining uplift would be:-

Local Authority	Uplift in value - 2009 (£m)	% value remaining (un-navigable)	Uplift in value – un-navigable (£m)
Bath & North East Somerset	£54.1m	69%	£37.3
Wiltshire	£47.3m	0%	£0.0
West Berkshire	£35.8m	41%	£14.7
Reading	£13.7m	100%	£13.7
Total	£150.9m	3,540	£65.7

Cost effective transport

There is currently no freight or passenger transport on the canal. However the canal towpaths are extensively used for walking and cycling, with the towpaths in and out of towns along the route being used by commuters and other functional visitors.

Some of these journeys will be displaced from private cars, with possible resultant savings in travel time and reduced congestion for other road users, together with a more pleasant and healthy travel experience.

We don't know the number of visits made by commuters and other functional users to the towpath of the Kennet & Avon Canal. However an estimate can be drawing upon the percentage of functional visits nationally, as determined through the Inland Waterway Visitor Survey. The mean percentage of visits in 2007-09 that fell into this category was 20%. Applying the same percentage to the overall visits to the Kennet & Avon Canal in 2009 suggests that the number of functional informal visits was around 2,001,000, together with some 131,000 cycling visits.

However we don't know the number and length of journeys displaced from private cars. Because of these difficulties in estimation, we have assumed that the transport benefits are contained with the recreational benefits analysed under Cultural Services below.

Water supply

BW supplies water to nearby commercial interests on a largely sale and return basis. This avoids the use of potable supplies and normally results in a significant cost saving compared with the former. Jacobs (2009) estimates the value of this water supply function at £332.50 per megalitre of water (at 2008 prices).

In the case of the Kennet & Avon Canal, water is made available to Thames Water (at Fobney from the R.Kennet). This is based on Thames Water's own abstraction licence pre-dating the 1963 Water Resources Act. Similarly water is supplied to the Royal Berkshire Fire Brigade. Since in both cases, the water is taken from the River Kennet and is not related to the navigability of the canal, the financial benefits associated with the supply of this water have not been included in this analysis.

Volunteering

Volunteers give their time free of charge for a range of activities associated with the management and development of the canal. The Kennet & Avon Canal Trust is one of the largest such organisation in the country in terms of members and has been very active in supporting the restoration of the canal. In relation to the restoration and on-going management of the canal, the involvement of volunteers has resulted in cost savings for the project. Also the volunteers gain benefit from their activity through a sense of achievement and physical & mental health benefits (ie. "private" benefits).

It is possible to place a monetary value on both these effects. The value of work done can be related to typical daily rates for the types of work being undertaken – professional, skilled and unskilled. Private benefits could be assessed using a consumer surplus approach.

Because of a lack of accurate data on volunteering over time, it has not been possible to place a value on volunteering activity in this analysis. To some extent the private benefits associated with volunteering will be included under the wider recreational benefits associated with this canal – see under Cultural Services below. The value of private benefits is likely to be under-estimated though. However no assessment has been made of the value of work done by volunteers, although the value is likely to be substantial in the case of the Kennet & Avon Canal.

When considering marginal change, it is assumed that there has been little change in volunteering activity between 1995 and 2009, although the nature of activities involved may well have altered. Volunteers were of course heavily involved in the restoration of the canal. However if the canal reverted back to an un-navigable state, it is assumed that many of the opportunities for volunteering would disappear.

Regulating services

Carbon saving – sustainable transport & renewable energy

As well as the financial savings associated with transport on waterways and towpaths (see under Provisioning Services above), walking and cycling on waterway towpaths, as an alternative to travel by private car, gives rise to carbon savings. As already mentioned, the implications of use of the canal towpaths for transport are difficult to determine. Therefore it hasn't been possible to estimate a value for carbon saved.

Carbon savings are also possible through the development of water-based renewable energy, such as hydro power. There are current no such schemes on the Kennet & Avon Canal however.

Land drainage

The Kennet & Avon Canal has become part of the drainage infrastructure of the corridor through which it passes. It can also be managed to reduce flood risk on adjacent water courses. Jacobs (2009) recognise that this drainage function could be significant, but were unable to determine an approach to place a value on this.

A study by Ecotec in 2007 of the benefits of canals in Wales⁷ used a replacement cost approach to estimate the drainage function, drawing upon research undertaken in the late 1980s. Jacobs considered that this work was now rather old and such an approach would be likely to underestimate benefits delivered. However in the absence of an alternative, it has been used here to give some appreciation of the possible values.

⁷ Ecotec, Waterways in Wales: *Economic costs and benefits of the Welsh Canal Network*, 2007

The 1980s research valued the drainage benefits arising from all artificial canals at £22 million per year. At 1988 prices this gives an average value per kilometre of canal of around £8,600 (at 1988 prices). Updated to current prices this represents a value of around £17,200. Assuming a positive land drainage function is delivered by the canal over its whole length between Reading and Bath (ie. including the R.Kennet section but excluding the R.Avon between Hanham and Bath), the length of waterway involved is 121 km, giving an annual drainage value of £2,081,000.

This value is allocated between local authorities as follows:-

Local Authority	Length (Km)	Annual drainage value (£s)
Bath & North East Somerset	9	£155,000
Wiltshire	64	£1,100,000
West Berkshire	44	£756,000
Reading	4	£70,000
Total	121	£2,081,000

There is unlikely to have been much change in the drainage function of the canal between 1995 and 2009. If the canal reverted to non-navigable status, it is likely that the drainage function would have to be maintained through, for example, maintaining a water course over much of the canal and/or creating new drainage capacity. This would be at a cost of course, so, for this valuation, it is assumed that expenditure equivalent to the annual benefit would be incurred to deliver the drainage value of just over £2 million p.a. In effect this means that the drainage value would be lost if the canal was allowed to become un-navigable.

Waterway habitats

These are dealt with under Cultural Services below, reflecting either the use value of habitats or a range of non-use values.

Cultural services

Recreation

A number of methods exist to place a value on recreation, such as contingent valuation (ie. willingness-to-pay) and travel cost approaches. Such approaches place a money value on people's enjoyment in undertaking recreational activities, often called their "consumer surplus". Jacobs (2009) derived a range of values for different recreational activities, using a benefits transfer approach. Many of these were based on original work undertaken by Newcastle University in 1989. In this analysis it has not been possible to accurately breakdown recreation on the Kennet & Avon Canal into specific activities. Consequently an overall value per visit of £0.51 (at 1989 values) has been assigned, based on the mean values from the original research, rather than using the Jacobs breakdown. This value fits within the mean ranges for specific activities quoted by Jacobs and approximates to £0.95 at 2009 prices.

To simplify the analysis, this consumer surplus value is applied to all visits to the canal – boating and non-boating – although it is likely that the consumer surplus value for boating (and particularly boat ownership) and angling is significantly higher than this. Jacobs (2009) suggest adding the consumer surplus value to the actual amount of money spent during canal visits to give a total visit value. However this has not been done in this instance, as it is likely that this actual spend (a high proportion of which is on food and drink) would have occurred anyway (although not necessarily in the local area) and therefore raises issues of additionality.

Applying the consumer surplus value of £0.95 per visit to the total number of visits made in 2009 (11,216,000) gives an overall recreational value of £10,655,000. This is broken down by local authority as follows:-

Local Authority	Visits p.a.	Recreational value (£s)
Bath & North East Somerset	4,193,000	£3,983,000
Wiltshire	3,344,000	£3,177,000
West Berkshire	3,491,000	£3,316,000
Reading	188,000	£179,000
Total	11,216,000	£10,655,000

This compares with a recreational value of £7,275,000 (at 2009 prices) in 1995. using the same allocation of visits between authorities, the growth in value between 1995 and 2009 is:-

Local Authority	Value 1995 (£s)	Value 2009 (£s)	Change 1995-2009 (£s)
Bath & North East Somerset	£2,590,000	£3,983,000	£1,393,000
Wiltshire	£2,065,000	£3,177,000	£1,112,000
West Berkshire	£2,155,000	£3,316,000	£1,161,000
Reading	£116,000	£179,000	£63,000
Total	£6,926,000	£10,655,000	£3,729,000

If the canal reverted to a largely non-navigable status, some recreational activity would still take place. Boating would still be possible on some stretches of the waterway, particularly the river sections, and activity would still take place on the towpath.

Where towpath monitoring has taken place in association with restoration or regeneration schemes, a substantial uplift in visits can be seen as a result of restoration and access / environment works. In recent years, monitoring at 10 sites in Scotland, West Midlands and London where such improvements have taken place demonstrated a mean increase in visits of 124% as a result of the changes implemented. A similar reduction in visits could be expected if a canal was to revert to non-navigable status, with associated deterioration in towpath quality. Therefore, in the case of the Kennet & Avon Canal, a conservative reduction of 50% in visits is assumed. This would give the following comparison in values between 2009 and the reversion:-

Local Authority	Value 2009 (£s)	Value non-	Change (£s)
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		navigable (£s)	
Bath & North East Somerset	£3,983,000	£1,295,000	£2,688,000
Wiltshire	£3,177,000	£1,033,000	£2,144,000
West Berkshire	£3,316,000	£1,077,000	£2,239,000
Reading	£179,000	£58,000	£121,000
Total	£10,655,000	£3,463,000	£7,192,000

Waterway heritage, landscapes and environment

The heritage, landscapes and environment associated with canals is valued whether people visit them or not. In the case of the Kennet & Avon Canal, a series of community surveys were undertaken in local towns in 2003. 91% of respondents to this survey agreed that the Kennet & Avon Canal made “their part of England special”. The respondents ranged from regular frequent visitors to people who never visited the canal.

As in the case of recreation, it is possible to estimate the value placed on a resource by people, whether they visit them or not, using a contingent valuation approach. Jacobs (2009) suggest using a value derived from specific canal-related studies undertaken in the 1990s, although they caveat that with concerns over the robustness of the estimates. The study they quote gives a mean value of £5.55 per household at 1995 prices. The median value is considerably lower than this - £0.75 per household (£1.07 per household at 2009 prices). Jacobs suggest taking a conservative approach and using this value, which is perhaps appropriate as there could be some overlap between the non-use and recreational values.

A further issue regarding non-use values concerns the area over which the values are aggregated. The population placing a value on the Kennet & Avon Canal is likely to be national and perhaps international. Therefore the non-use value can't simply be aggregated by the local population or households.

Ecotec (2007) suggests a possible solution to this issue, by aggregating the non-use value by total households in England & Wales and then deriving a non-use value per kilometre of canal, based on the total length of the British Waterways network. Using the mean non-use value of £1.07 and 21.66 households in England & Wales (from the 2001 census), the total non-use value would be £23.2 million. Allocated over the BW network of 3,200 km, the valuation per km would be £7,250. For the 138 km length of the Kennet & Avon Canal, the total value would therefore be £1,001,00.

This can be allocated amongst local authorities along the corridor as follows:-

Local Authority	Waterway length (km)	Non-use value (£s)
Bath & North East Somerset	26	£189,000
Wiltshire	64	£464,000
West Berkshire	44	£319,000
Reading	4	£29,000
Total	138	£1,001,000

It is difficult to assign a change to this value over time. No doubt people's values regarding heritage do alter, but there is no evidence to demonstrate changes in values regarding waterways. Therefore the relative values for 2009 and 1995 are assumed to be the same. If the canal became un-navigable, it is possible some people would value it less, but equally others may place a greater value on it through wishing to see it conserved or brought back into use. Therefore again the relative value is assumed to be unchanged if the canal became un-navigable in part again.

Outdoor learning

Inland waterways form an outdoor learning resource for children and young people. Schools often use the waterways as an outdoor classroom and this activity is supported by British Waterways through the WOW website - www.wow4water.net/. Material is available through the site for use by both teachers and children. Some of this is specific to the Kennet & Avon Canal and facilitates visits by school groups.

Jacobs (2009) were unable to assign a value to such visits, although they will be included to some extent under recreational visits – see above.

Cross-cutting benefits

Health & well-being

Waterways, along with other outdoor routes and spaces, deliver benefits to people's health, through creating opportunities for outdoor exercise, and mental well-being. It is known that physical exercise and improved mental health reduce illness and lead to significant cost savings for the National Health Service. For example, as quoted by Jacobs (2009), 9% of the NHS budget (around £5.2 billion p.a.) is spent on dealing with the consequences of diabetes. It is known that the risk of Type II diabetes is 33%-50% higher for inactive people. In total it is estimated that around 6% of the NHS budget is spent on issues associated with inactivity. Therefore increasing people's activity through use of the waterways can help reduce this cost to the NHS.

Jacobs (2009) consider the impact on health & well-being to be a cross-cutting benefit in terms of an ecosystems services approach. In terms of reduced costs to the NHS, it is difficult to assign a particular value to waterways, as people may well visit waterways along with other outdoor recreation resources. Also there may well

be some overlap with recreational (use) benefits. Therefore no value has been assigned to this impact in this analysis.

Wider regeneration & tourism impacts

The local economic impacts related to tourism and regeneration have already been mentioned, leading to increased employment in the locality of the canal. The re-opened canal will also generate wider benefits associated with the increased recognition of the canal and the area through which it passes. The canal corridor has a brand value which acts as a catalyst to attract both tourism and inward investment.

These benefits were recognised by Jacobs (2009), but it was not possible to place a value on them.

Summary

In this Section the impact of the canal on the quality of life of inhabitants of the UK has been analysed, using an ecosystems services approach. The analysis has been made (at 2009 values) against three scenarios:-

1. The current position (2009)
2. The position prior to the HLF project – 1995
3. The position if the canal reverted to largely un-navigable (ie. 30% cruiseway) status

A conservative approach to the analysis has been taken. In some cases it has not been possible to value certain services. Where this has occurred it is noted in the text. Inevitably this will lead to an under-estimate of the value of services delivered. Also in applying values, conservative assumptions have been made regarding issues associated with additionality and with possible double counting. Again this means the values may well be under-estimated.

In summary the overall extent of services delivered by the canal in 2009 is as follows (Comments on the confidence associated with the values have been made, based on Jacobs (2009) and subsequent work undertaken to test the framework developed⁸):-

Ecosystem service	Value 2009 (£ms)	Note
Provisioning services		
Business creation & employment	Not applicable	Local economic impact, not welfare measure
Property value enhancement	£150.9m	One-off value. Confidence – medium, due to the variability of premium estimates from different sources
Cost effective transport	Not included	This is an additional unquantified benefit
Water supply	Not included	This is an additional unquantified benefit
Volunteering	Not included	This is an additional unquantified benefit
Regulating services		
Carbon saving – sustainable transport & renewable energy	Not included	This is an additional unquantified benefit
Land drainage	£2.1m	Confidence – low, as methodology involves allocating national data to the local level
Waterway habitats	Not applicable	Considered reflected in use and non-use values under Cultural Services
Cultural services		
Recreation	£10.7m	Confidence – high. Similar values are used in other recreation contexts. A conservative approach has been taken by using only the consumer surplus value.
Waterway heritage, landscapes & environment	£1.0m	Confidence – low, due to uncertainties over aggregation.
Outdoor leaning	Not included	This is an additional unquantified benefit
Cross-cutting services		
Health & well-being	Not included	There may be some overlap with recreation benefits
Wider tourism & regeneration benefits	Not included	This is an additional unquantified benefit
Total – annual value	£14m p.a.	
Total – capital value	£151m	

In total therefore the canal currently delivers benefits valued at around £14 million per year to inhabitants of England & Wales, together with delivering a one-off enhancement in capital values (of properties) of £151 million. The majority of these benefits will accrue to local people.

⁸ Jacobs, for Defra / IWAC, *The benefits of inland waterways: Phase 2 – Testing the framework*, 2010

This compares with an annual cost of maintaining the canal of £2.5m (2009/10). Costs are split as follows by local authority:-

Local authority	Maintenance cost 2009/10 (£,000s)	Re-allocated costs 2009/10 (£,000s)*
Bath & North East Somerset	£74	£93
Wiltshire	£1,098	£1,383
West Berkshire	£769	£969
Reading	£4	£5
Unattributable	£505	
Total	£2,450	£2,450

Note*: *Unattributable costs are re-allocated to local authority in proportion to those costs that are directly attributable.*

In terms of change over time, annual benefits are as follows:-

Ecosystem service	Value 2009 (£s)	Value 1995 (£s)	Value – Un-navigable (£s)
Property value enhancement	£150.9m	£150.9m	£65.7m
Land drainage	£2.1m	£2.1m	£0.0m
Recreation	£10.7m	£6.9m	£3.5m
Waterway heritage, landscapes & environment	£1.0m	£1.0m	£1.0m
Total – annual value	£13.8m	£10.0m	£4.5m
Total – capital value	£150.9m	£150.9m	£65.7m

Note:-

1. All values are shown at 2009 prices, for comparison purposes
2. No change is assumed in property value enhancement between 1995 & 2009, although some growth can be anticipated because of improvements in the quality of the canal environs.

This shows a growth in benefits delivered of at least £3.8m per year since 1995. If the canal was to revert to largely un-navigable status some £9.3m benefits per year would be lost, together with a fall of around £85m in the capital value of properties.

The estimated split of benefits by local authority is:-

Bath & North East Somerset

Ecosystem service	Value 2009 (£,000s)	Value 1995 (£,000s)	Value – Un-navigable (£,000s)
Property value enhancement	£54.1m	£54.1m	£37.3m
Land drainage	£155k	£155m	£0k
Recreation	£3,983k	£2,590k	£1,295k
Waterway heritage, landscapes & environment	£189k	£189k	£189k
Total – annual value	£4.3m	£2.9m	£1.5m
Total – capital value	£54.1m	£54.1m	£37.3m

Wiltshire

Ecosystem service	Value 2009 (£,000s)	Value 1995 (£,000s)	Value – Un-navigable (£,000s)
Property value enhancement	£47.3m	£47.3m	£0.0m
Land drainage	£1,100k	£1,100k	£0k
Recreation	£3,177k	£2,065k	£1,033k
Waterway heritage, landscapes & environment	£464k	£464k	£464k
Total – annual value	£4.7m	£3.6m	£1.5m
Total – capital value	£47.3m	£47.3m	£0.0m

West Berkshire

Ecosystem service	Value 2009 (£,000s)	Value 1995 (£,000s)	Value – Un-navigable (£,000s)
Property value enhancement	£35.8m	£35.8m	£14.7m
Land drainage	£756k	£756k	£0k
Recreation	£3,316k	£2,155k	£1,077k
Waterway heritage, landscapes & environment	£319k	£319k	£319k
Total – annual value	£4.4m	£3.2m	£1.4m
Total – capital value	£38.8m	£35.8m	£14.7m

Reading

Ecosystem service	Value 2009 (£,000s)	Value 1995 (£,000s)	Value – Un-navigable (£,000s)
Property value enhancement	£13.7m	£13.7m	£13.7m
Land drainage	£70k	£70k	£0k
Recreation	£179k	£116k	£58k
Waterway heritage, landscapes & environment	£29k	£29k	£29k
Total – annual value	£0.3m	£0.2m	£0.1m
Total – capital value	£13.7m	£13.7m	£13.7m

Appendices

- 1 Boats based on the Kennet & Avon Canal by local authority
- 2 Days cruised on the Kennet & Avon Canal by local authority – 2009 estimates
- 3 Towpath visits by local authority – 2009 estimates
- 4 Economic impact analysis – whole canal
 - 4a Economic impact analysis – Reading
 - 4b Economic impact analysis – West Berkshire
 - 4c Economic impact analysis – Wiltshire
 - 4d Economic impact analysis – Bath & North East Somerset