

VALUING IRELAND'S RURAL AND URBAN INLAND WATERWAYS

*RECOGNISING THE DIVERSE BENEFITS AND SERVICES OF THE INLAND WATERWAYS
AND THEIR ROLE IN REGIONAL DEVELOPMENT*

2016



IN BRIEF...

Waterways Ireland is one of the six North/South Implementation Bodies established under the British Irish Agreement in 1999 and manages, maintains, develops and promotes over 1000km of inland navigable waterways principally for recreational purposes. The waterways under the remit of the body are the Barrow Navigation, the Erne System, the Grand Canal, the Lower Bann, the Royal Canal, the Shannon-Erne Waterway and the Shannon Navigation.



This report sets out and applies a monetary value, where possible, to the range of benefits and services – economic, social and environmental – provided by the Inland Waterways under Waterways Ireland’s remit.

The valuations of the benefits in this report are conservative and represent subsets of the full array of values. Further research and collaboration will quantify additional values and expand the evidence base.

A number of case studies are presented here to demonstrate different types of benefits provided by the waterways, and to make the case for ongoing maintenance and investment in the waterways.

It is clear from this research that the benefits provided by the inland waterways to Ireland’s economy and the health of its people are significant and wide ranging.

The current valuation of the rebuild costs of infrastructure under Waterway Ireland’s remit is estimated at **€1.2 billion**. Ongoing maintenance is required to ensure that structures do not fall into states of disrepair that require navigation or towpath closures and subsequent effects on the economic, social and environmental services provided.

NATIONAL POLICY ALIGNMENT

Inland waterways cut across policy themes and support a range of government agendas, including:

- rural development and diversification,
- sustainable communities,
- enterprise facilitation,
- housing growth and renewal,
- urban renaissance,
- place-making and place-shaping,
- visitor economy and sustainable tourism,
- sustainable transport,
- physical and mental health and well-being – preventative approaches to healthcare;
- climate change, carbon reduction and environmental sustainability;
- social inclusion and cohesion, and collaboration between land-holding state agencies

When the navigations were developed, they generated new businesses and connections throughout the country, and they continue to do so, reaching deep into the rural landscape, through remote settlements, stimulating enterprise and visitor experiences and offering an underpinning infrastructure for healthy lifestyles.

BOUNDARY AND BORDER CROSSING ASPECTS OF THE WATERWAYS

Inland waterways, by their nature, cross local and regional boundaries, administrative areas and through a range of rural and urban areas, such as:

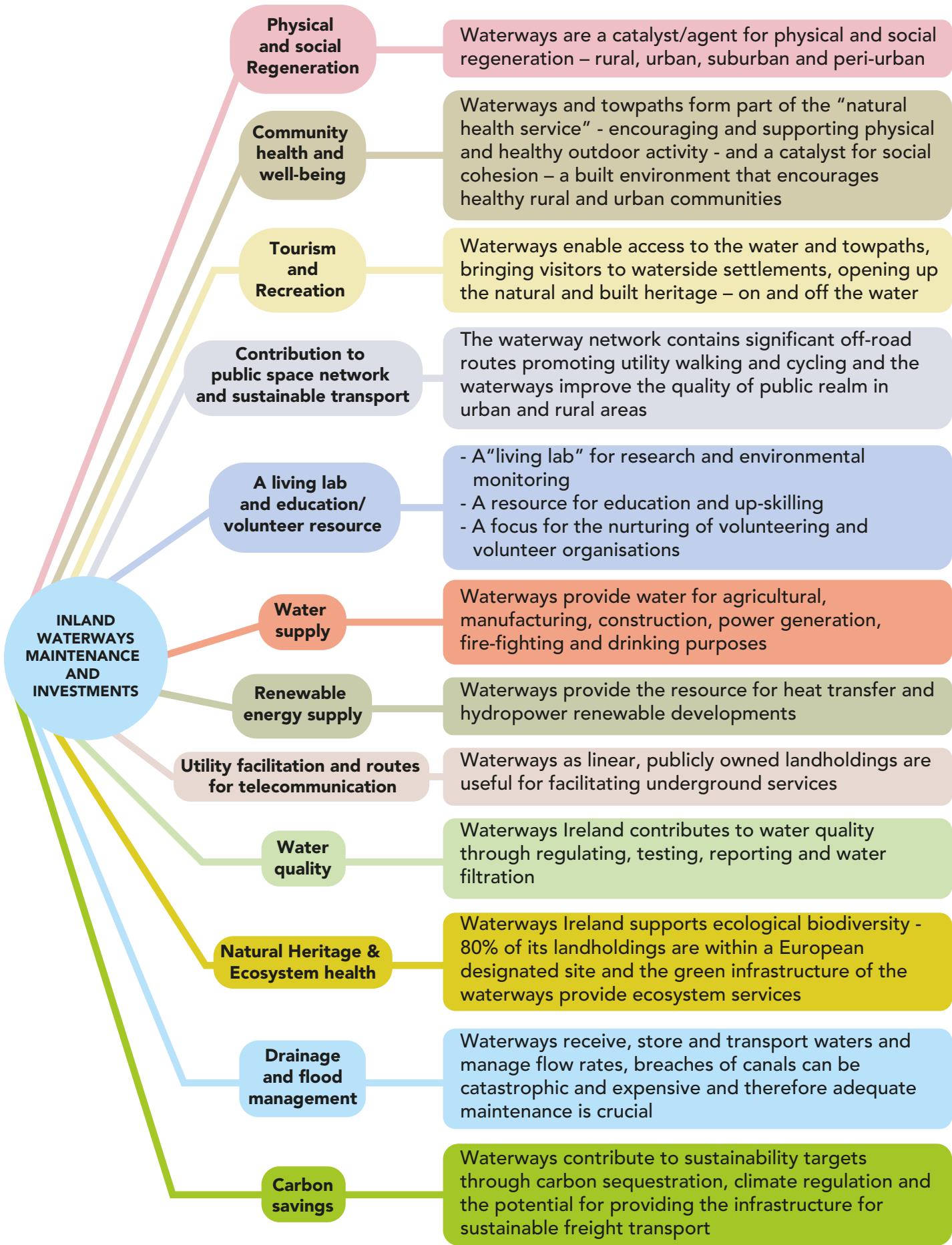
- regenerating bogs, agricultural lands and rural areas away from other infrastructure – with potential for rural regeneration;
- metropolitan areas, suburban areas, brownfield sites – with potential for urban regeneration

Waterways Ireland is also subject to specific challenges arising from the cross-jurisdictional aspect of the network, specifically;

- Currency exchange rates
- Implications of Brexit
- Geographical extent of resource being managed



BENEFITS AND SERVICES



PEOPLE ON THE WATERWAYS - WHO IS USING THE INLAND WATERWAYS AND WHY? ¹

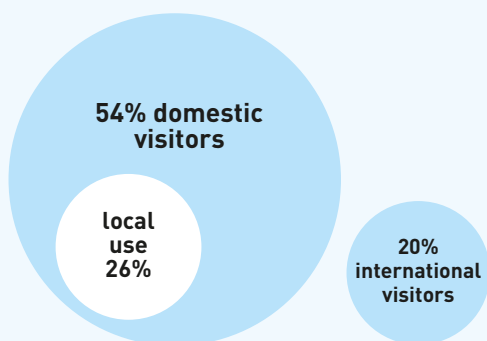
GENERAL TRENDS 2010-2014

INCREASES IN

- walkers
- cyclists
- women
- older people
- shorter visits
- local use
- events



ALL WATERWAYS USERS



GOING FURTHER - POTENTIAL USERS

Marketing Research carried out in 2016 identified the potential visitor market for a Blueway² – adults who would “definitely” or “possibly” be interested in using a Blueway and would consider Ireland for a holiday or short break. This research identified significant potential markets for a Blueway product.

- Britain 19.4M
- France 16.3M (particularly northern France)
- Germany 37M








To attract such potential visitors the key requirements are a **mix of land and water based activities** along with a rich opportunity to experience **Ireland’s culture, music, history and hospitality**, particularly in **landscapes unique to Ireland** and in sheltered waters.



¹. In order to deepen the understanding of the range of uses of the waterways, visitor counting has been initiated by Waterways Ireland and work is underway by Fáilte Ireland to fully capture the benefits of investment in the Blueway. This data will feed into a fuller understanding of the recreation, tourism and community regeneration value of the inland waterways over the coming year.














². Strategic Marketing, Blueway Research February 2016 on behalf of Fáilte Ireland

NATIONAL FIGURES WHERE RELIABLE DATA AVAILABLE

BENEFIT CATEGORY	BENEFIT	VALUE	SOURCES	ROI/NI/ ALL ISLAND	NOTES/ASSUMPTIONS *
Recreation					
	Private boating	€88M	Economic contribution of Private Boat Owners, Waterways Ireland, 2006	All island	EU harmonised Index of Consumer Prices applied to update value for 2016.
	Access to recreation opportunities at lakes and rivers	€53.5-62.5M	What's our Water Worth? Estimating the Value to Irish Society of Benefits Derived from Water-Related Ecosystem Services: A Discrete Choice approach, EPA, 2014	ROI	Figures for marginal change, aggregating values for individual attributes not ideal Further study underway by EPA on "Demand for Water-Based Leisure Activity", results forthcoming – will be very useful for Waterways Ireland
Tourism					
	Cruise Hire	€50M	Ireland's Inland Waterways, Review and Outlook, ITIC, 2014	All island	Industry data source, and therefore may be biased
	Angling	€142M	National Strategy for Game Angling, Market Research, Inland Fisheries Ireland, 2015	ROI	Assuming Waterways Ireland maintenance/environmental monitoring work supporting water and bank quality along 25% of ROI's main rivers
Health					
	Increase in activity due to proximity of Waterway Ireland walks/cycles to local populations	EST. €32M - €38.5M	Health Economics Assessment Tool (HEAT), WHO (appraisal of sample 100-120km of off road cycleway in the midlands)	All island	Assumes 500km of WI towpath available for walking/cycling
Community regeneration					
	Events	€8M	Waterways Ireland data (2015)	All island	Expenditure in local communities as a result of WI supported events, assumes 197,000 participants
Water Quality					
	"Good status" water quality	€16M	Willingness to pay for Achieving Good Status across Rivers in the Republic of Ireland, EPA	ROI	Figures for marginal change, aggregating values for individual attributes not ideal Assuming Waterways Ireland maintenance/environmental monitoring work supporting water and bank quality along 25% of ROI's main rivers

*
In general: ongoing primary research and targeted research collaborations required to generate robust national data.
Figures do not include for displacement

OTHER KEY FINDINGS

		SOURCE
	Cost of replacement of entire Waterways Ireland resource – €1.2bn	Waterways Ireland
	67% of all visitors to Fermanagh specifically chose this destination in order to explore the lakes and surrounding towns and villages	Tourism Northern Ireland's 2014 Visitor Attitude Survey
	80% of Waterways Ireland water and land resource consists of highly valuable European designated habitat. (e.g. annual value of forest biodiversity in Ireland estimated to be €68M , total value of ROI ecosystem services estimated at over €2.6bn/year .)	Waterways Ireland Ecovalue, Valuing the ecosystem services of Irish Forests, Teagasc, 2015 Ireland's National Biodiversity Plan (2011-2016)
	Waterways Ireland responsible for 68 listed buildings and 24 Recorded Monuments	Waterways Ireland
	Potential market for Blueways - number of people "definitely" or "possibly" interested in using a Blueway and would consider Ireland for a holiday; Britain – 19.4M France – 16.3M Germany – 37M	Strategic Marketing, Blueway research, February 2016 on behalf of Fáilte Ireland
	In 2014 – 73% of all users of the waterways were there to walk or cycle – walking along waterways on the increase	Waterways Ireland Visitor surveys 2010, 2014
	29% (414,900) of the adult NI population visit an inland waterway at least once or twice a year – 81% of these do so to walk, 4% of the adult population visit weekly	Use of Inland Waterways in Northern Ireland – the Continuous Household Survey 2011/2012
	Canoe trails – nearly 50% of canoe trail users in NI said that they visit the area more often as a result of the trail, 85% said it enhanced their experience of the area.	Paddling Survey Report, 2010, Outdoor Recreation Northern Ireland
	NI - Average spend canoe paddlers - £231 (out of state), £58 (from NI)	Trends in Outdoor Recreation 2005-2009 (CAAN 2009)
	Average amount of health care savings per person per year as a result of reducing inactivity - €2,900 (UK data)	Economic Benefits of Accessible Green Spaces for Physical and Mental Health, UK Forestry Commission, 2005
	80% increase in bed nights in Clondra following upgrades to waterway and waterway public realm	Fáilte Ireland Tourism Content System Waterways Ireland post investment survey
	Waterways Ireland towpaths form the spine for a number of strategically important off-road cycle schemes in place or in planning	Grand Canal – Midlands Cycling Destination Royal Canal – Dublin – Athlone Eurovelo Route 2 Potential - Ulster Canal
	100 tonne of CO ² saved per 1km of towpath upgraded (UK data)	Town and Country Planning Association Policy Advice Note: Inland Waterways, July 2009

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1

THE INLAND WATERWAYS NETWORK – A WIDE RANGE OF SERVICES AND BENEFITS

1.1 THE INLAND WATERWAY RESOURCE

Ireland's Inland Waterways are a multi-functional resource and have for centuries been a key economic driver, a vital piece of infrastructure, a sanctuary for biodiversity and a source of amenity and tourism for both local and international users.

Employment opportunities are generated by the waterways in rural areas where often little or no infrastructural development occurs. The resulting jobs, many of which are industrial as well as professional, enable monies to be spent in local areas through the purchase of fuel, material supplies and indeed food. This spend, combined with spend from visitors and tourists, sustains local traders and service providers and consequently has the potential to enhance the livelihood of communities along the waterways, in both rural and urban areas.

Where the waterways pass through urban areas, they are also becoming increasingly recognised for the key role they play in place-making and public realm provision, facilitating sustainable transport options to reduce congestion and improve air quality and offering a basis for re-branding areas as part of new development and regeneration.

The utilisation of our inland waterways as a multifaceted resource has yielded society a wide array of benefits over the centuries. The current *valuation* of the assets managed by Waterways Ireland is €1.2 billion¹. This figure represents the cost of functionally rebuilding the asset base, largely consisting of Georgian and Victorian infrastructure within high value habitats which contribute in many ways to landscape character, local communities and the national economy.

However, the *actual value* of the Inland Waterways is much greater than this. Not only are there many businesses and jobs directly reliant on functioning Inland Waterways, there are many other benefits and services reliant on the green and blue infrastructure under Waterways Ireland's remit that can be valued using established methods.


Waterways Ireland are responsible for approximately 1,000km of navigable rivers and canals which amounts to just over one quarter of all main rivers and canals in Ireland. It is also responsible for the canalside towpaths (including approximately 500km of waymarked walking routes), waterside public spaces, waterside infrastructure (moorings, car parks, service blocks) and a range of protected habitats and heritage structures.


Waterways Ireland has a statutory remit to provide a recreation service to the general public and is coming under increasing demand for the facilitation or provision of access and recreational and tourism infrastructure.

Waterway managed by Waterways Ireland	Lengths (km)
Shannon Navigation	238
Royal Canal	154
Grand Canal	131
Erne System	84
Barrow Navigation	65
Shannon Erne	63
Lower Bann	60
Barrow Line	45
Naas	4
Kilbeggan Branch	13.42
Corbally Branch	11.97
Milltown Feeder	10.52
Lough Owel	3
Sub total	38.91
Total	879.94



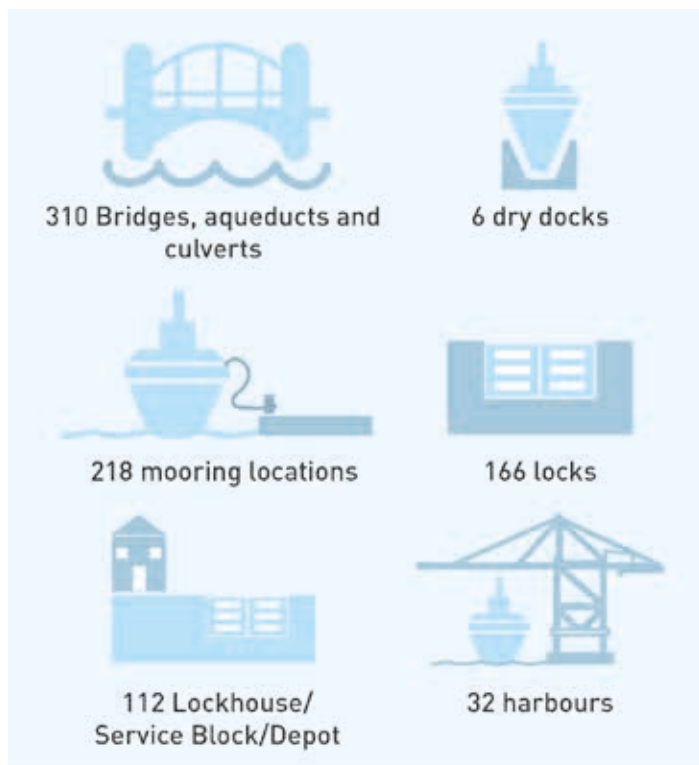
¹. 2015 Asset Register Valuation figures, Waterways Ireland, rounded to two digits figure given, precise figure €1,198,854,335

 Waterways Ireland is responsible for approximately 68 listed buildings/structures and 24 recorded monuments are in in Waterways Ireland ownership in the Republic of Ireland alone.

 Over 80% of the entire Waterways Ireland land and water resource is located within a European designated ecological site.

Designation	Area Coverage
Special Protection Area	66.10%
Special Area of Conservation	44.12%
Natural Heritage Area	0.27%
Proposed Natural Heritage Area	77.26%
Total Area Designated or Proposed	80.58%

Waterways Ireland manages and maintains a wide range of navigational infrastructure – much of which is several hundred years old and contributes to landscape character and local pride as well as continuing to fulfil its original navigation engineering purpose.



310 Bridges, aqueducts and culverts

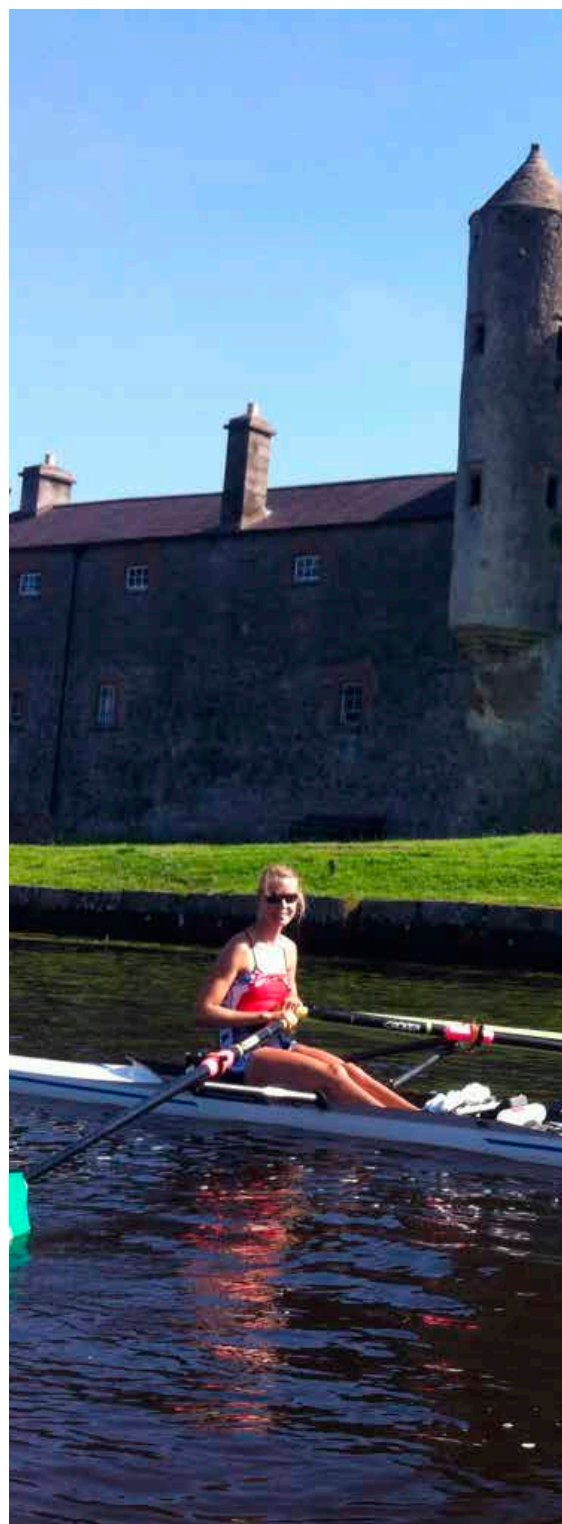
6 dry docks

218 mooring locations

166 locks

112 Lockhouse/Service Block/Depot

32 harbours





1.2 UNDERSTANDING AND VALUING THE BENEFITS PROVIDED BY THE INLAND WATERWAYS

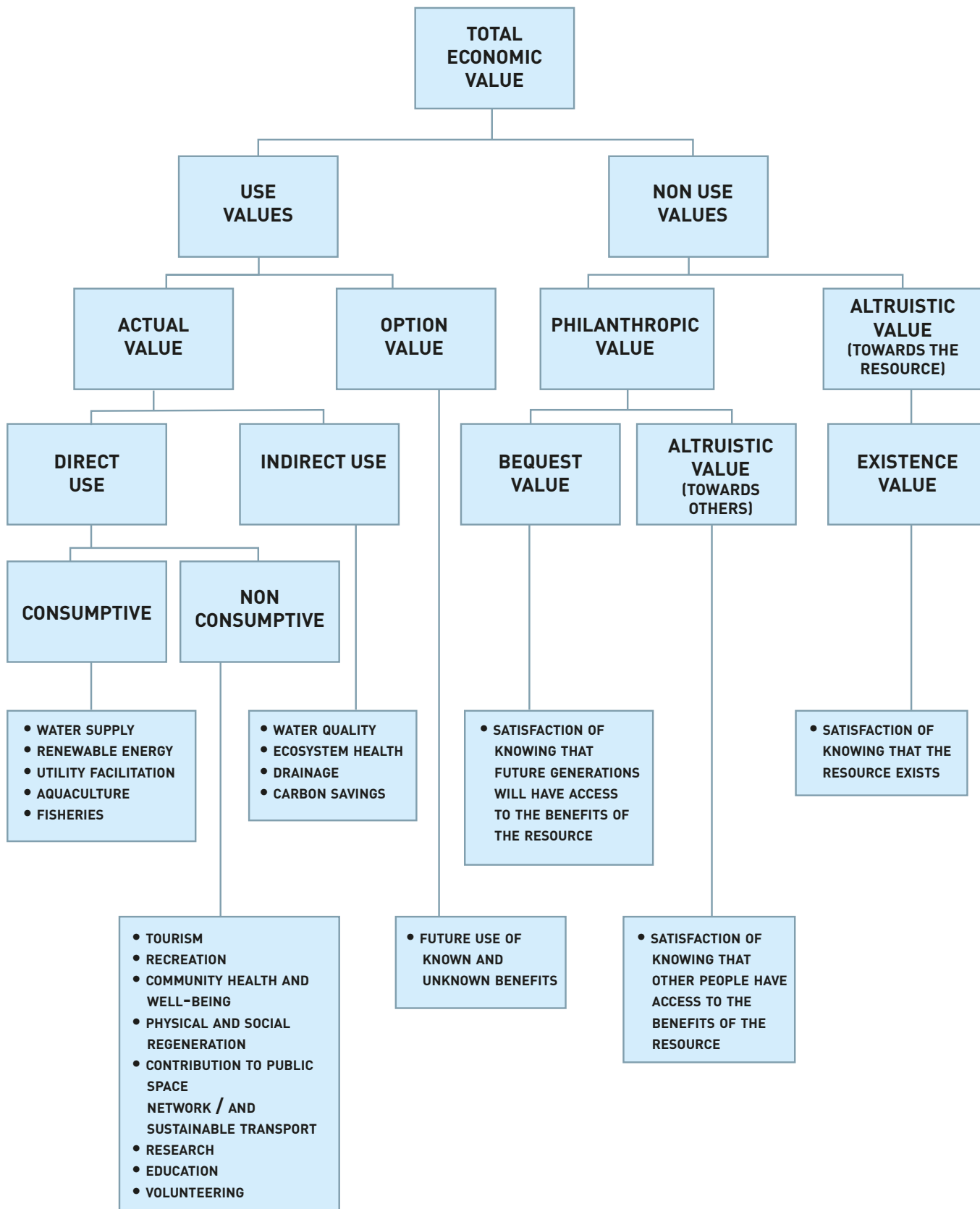
Scoping the values

Why do we need to value the benefits which waterways provide? Economics is about choice and every decision is preceded by a weighing of values among different alternatives. An asset such as an inland waterway provides a range of economic and health benefits to local communities, often in places where other public infrastructure provision is low. In addition, ecological life support systems underpin a wide variety of ecosystem services that are essential for economic performance and human well-being. Current markets, however, only shed information about the value of a small subset of economic benefits and ecosystem processes that are priced and incorporated in transactions as commodities or services.

Use values can be divided further into two categories: (a) *Direct use value*, related to the benefits obtained from direct use of a service. Such use may be consumptive (for instance of water or fish), or non-consumptive use (e.g., tourism or community well-being). (b) *Indirect use values* are usually associated with regulating services, such as drainage or ecosystem health, which can be seen as public services which are generally not reflected in market transactions.

Non-use values reflect satisfaction that individuals derive from the knowledge that services are maintained and that other people have or will have access to them. In the first case, non-use values are usually referred to as existence values, while in the latter they are associated with *altruist values* (in relation to intra-generational equity concerns) or bequest values (when concerned with inter-generational equity).

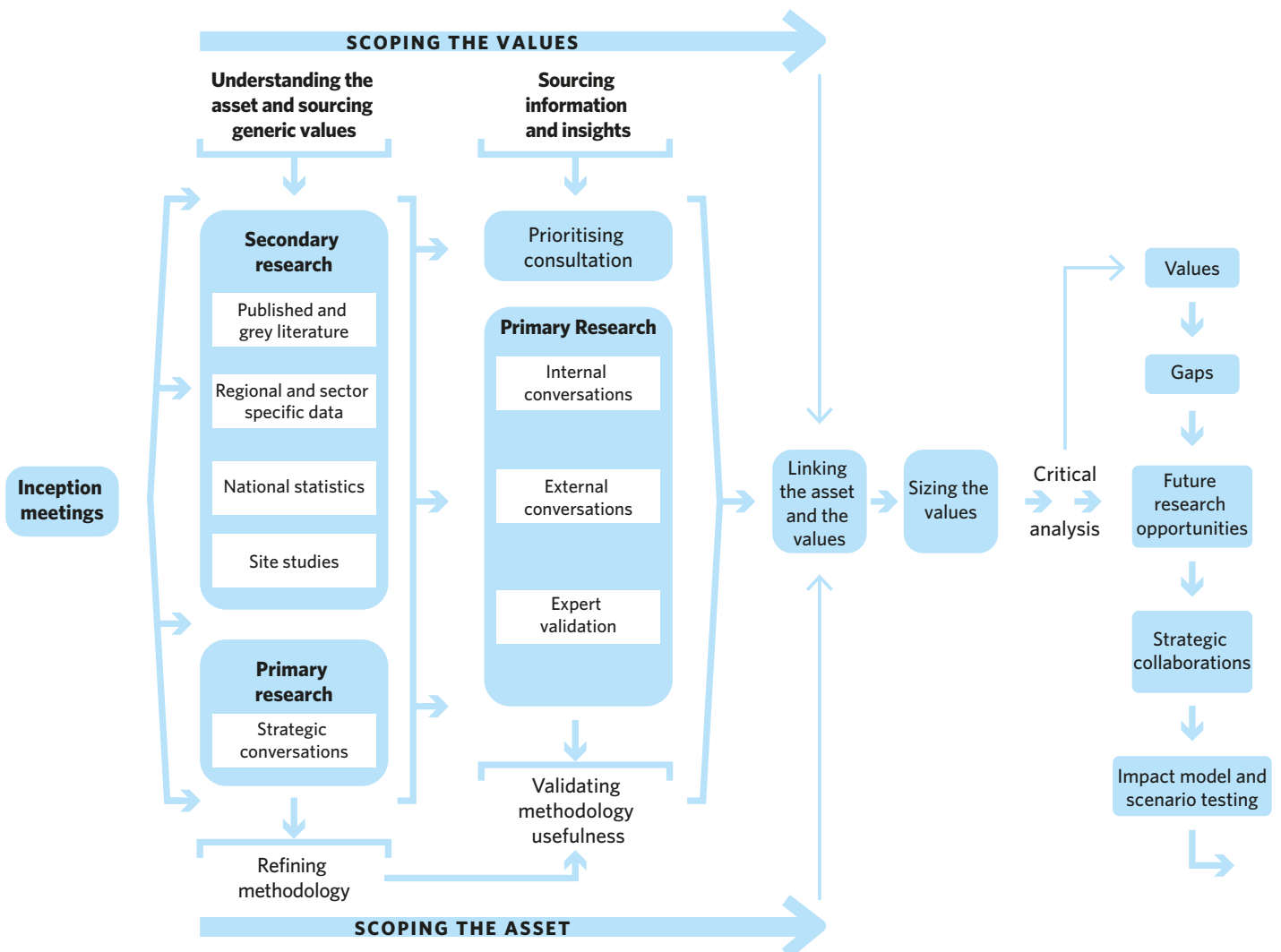
It should be noted that non-use values involve greater challenges for valuation than do use values since non-use values are related to moral, religious or aesthetic properties, for which markets usually do not exist. This is different from other services which are associated with the production and valuation of tangible things or conditions. The schematic below provides an overview of the links between the different categories of values and the links between these and the range of ecosystem services. The full breakdown of identified value categories for the Waterways Ireland asset is given in Appendix B.



Our approach

The project was approached through a combination of desk-based research, including a strong element of stakeholder consultation, evidence and literature review, analysis of gaps and reflection on possible steps for moving the agenda forward. The consultation took the form of a series of semi-structured telephone interviews and other email contact with people within the organisation as well as with other individuals from a number of key organisations similarly focused on the policy relevance of past, ongoing and future research into the benefits of waterways. The main topic for the consultation was a review of the availability of current valuation evidence and a comprehensive review of the conditions under which value evidence is currently used, or potentially could be used, across the different areas of waterways

policy. A key element was assessing the demand for new or improved estimates of values by individuals within the organisation, in different organisations and across related policy sectors. At the same time, existing evidence on values, derived from a wide range of valuation methods - in particular travel cost / random utility methods / willingness to pay and also value transfer - was collected and summarised. This was complemented by a review of other data sources, including geographically-referenced data relating to specific navigations, the use of the waterways and the scope and scale of investment by the organisation in developing, maintaining and managing the waterway resource. Finally the findings were summarised, with suggestions for future research identified and an alternative approach to the research agenda proposed.



The Ecosystems Services Approach

In recent years, and in particular since the publication of the Millennium Ecosystem Assessment (MA 2005), there has been a strong emphasis on the theoretical and practical development of approaches based on identifying, measuring and in some cases valuing the goods and services provided by ecosystems. The concept of ecosystem services captures the dependence of human well-being on natural capital and on the flow of services it provides.

Our methodology is based on the Common International Classification of Ecosystem Services (CICES V4), 2012, where;

Services = contribution to human well being

Benefits = value to society

Values = quantification / sizing of the benefits

This is a holistic approach to the sustainable management of natural resources and can be adapted to man-made systems, for example to navigable inland waterways.

The services include;

- Cultural – recreation, tourism, promoting symbolic, intellectual and experiential benefits
- Regulating and maintenance – flow, purification, climate regulation, life cycle maintenance
- Provisioning – products such as water supply, materials, energy, nutrition

Supporting services are treated as part of the underlying structures, process and functions that characterise ecosystems.



1.3 PEOPLE ON THE WATERWAYS - WHO IS USING THE INLAND WATERWAYS AND WHY?

The inland waterways are used by a wide variety of people for a range of purposes and visitor surveys indicate a number of notable trends. Surveys carried out by Waterways Ireland in 2010 and 2014 indicate that the use of the towpath network for walking and cycling is increasing, that use by local communities for everyday healthy activity and attending events is on the increase and that the range of uses and users is expanding. There are increases in numbers of female visitors and older visitors, and there is an increase in the use of the waterways for shorter periods (70% visited for half a day or less).

GENERAL TRENDS 2010-2014

INCREASES IN

- walkers
- cyclists
- women
- older people
- shorter visits
- local use
- events

There is more of an expectation from waterways visitors for year round availability of facilities (coffee shops, walking routes etc.), and a marked variation in the emphasis of uses waterway by waterway. Walking is very popular along the Barrow for example, while the Shannon-Erne is the most popular for angling and while all waterways are used by boaters, the Shannon and Erne remain the central focus of boating.

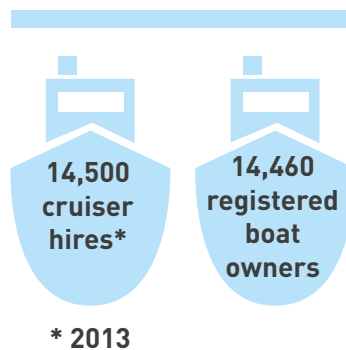
In 2014, 73% of all users of the waterways were there to **walk or cycle**. Walking is the most widely undertaken activity on the waterways and shows increased participation by users between 2010 and 2014 (from 62% to 67%). This is significant, given the geographic reach of the public landholding and the emphasis in the national health policy² for encouraging the incorporation of walking into everyday life for societal physical and mental health benefits.

Surveys were carried out along the Grand and Royal Canals in 2010 and in the urban context, by far the most popular activity along the canals is walking at 72% with other significant proportions using the towpaths as part of their commute to work (22%). Over four out of ten respondents used the canal daily (21%) or several times a week (22%)



67% of waterways visitors are there to walk in a high quality public environment. This increases to 72% in urban areas

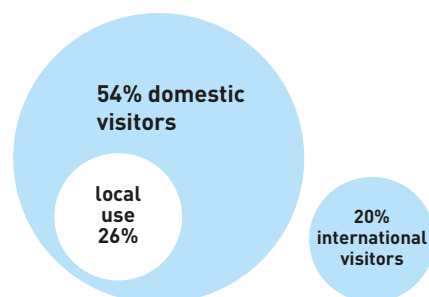
Other uses, measured by the surveys, of the waterways include angling, boat trips, private/hire cruiser or barge, attending an event, use of a day boat, canoeing, picnicking, rowing, jet-skiing, sailing, power boating, water-skiing, paddle-boarding and running/jogging.



Between 2010 and 2014, local use has increased from 21% to 26%, the percentage breakdown of domestic visitors (54%) and International (20%) visitors has remained constant.

While these percentages of types of use are useful, they will need to be cross-referenced with visitor count data being assembled by Waterways Ireland for full determination of values to be generated across the network.

ALL WATERWAYS USERS



2. Healthy Ireland, 2013, Department of Health

GOING FURTHER - POTENTIAL USERS

The waterways are a significant attractor for visitors to parts of Ireland



67% of visitors to Fermanagh have come specifically to enjoy the waterways *



However, the infrastructure is capable of supporting significantly more users than it does at present, and market research would suggest that there is potential for increasing visitors to the waterways through the promotion of Blueways.

Marketing Research carried out in 2016 identified the potential visitor market for a Blueway³ – adults who would “definitely” or “possibly” be interested in using a Blueway and would consider Ireland for a holiday or short break. This research identified significant potential markets for a Blueway product.

- Britain 19.4M
- France 16.3M (particularly northern France)
- Germany 37M

To attract such potential visitors the key requirements are a **mix of land and water based activities** along with a rich opportunity to experience **Ireland’s culture, music, history and hospitality**, particularly in **landscapes unique to Ireland** and in sheltered waters.

The domestic market is also very important, as they are more likely to be able to work Blueway visits around suitable weather.

Blueways are water-based recreational trails, usually located along scenic rivers and inland waterways. They offer a variety of activities both on the water (e.g. kayaking, snorkelling etc) and beside the water (e.g. walking/cycling trails). They are safe and have user services and facilities.



3. Strategic Marketing, Blueway Research February 2016 on behalf of Fáilte Ireland

* Tourism Northern Ireland’s 2014 Visitor Attitude Survey

2

THE VALUE OF INLAND WATERWAYS

It is important to capture the full range of values of the Inland Waterways in order to ensure that maintenance and investment spending is at least sufficient to continue to generate economic, social and environmental benefits identified. By understanding and quantifying the full range of values, the implications of various policy decisions (for example reducing maintenance in certain areas, or increasing investment in others) can be deduced by the preparation of an impact model for scenario testing.

Some of these values are easier to quantify than others – due to the ready availability or otherwise of existing and reliable data. Key data gaps and ways of generating necessary data are identified in Section 4.

Sources of data

Secondary research involved the sourcing and distilling of relevant data over a wide range of disciplines; socio-economic assessment, benefit transfer and ecosystems services. Given the focus of the assignment and the timescale for completion, there was a strong justification for the research to use a methodology of systematic review. However, in practice, the methodology of systematic review was adapted to enable consultation outcomes, the assimilation of additional information resulting from the primary research and the outcomes of client liaison and reporting to be captured. Working closely with the client team, we used a process of real-time review to adapt the 'work in progress' according to the level and quality of the findings and the consultation feedback. This was driven partly by the nature of the subject matter and the very broad range of sources, methodologies and approaches associated with the valuation of waterway assets. Our sources included published and grey literature; peer reviewed research papers; international, national and regional studies; sector specific surveys and reports and specialist journals. Our approach of critical appraisal included studies; data extraction and management; analysis & interpretation of findings.



2.1 A WIDE RANGE OF BENEFITS AND SERVICES

The Inland waterways are not homogenous and many studies have been carried out into the specific characteristics and potential of each particular waterway⁴.

This report sets out and applies a monetary value, where possible, to the range of benefits and services – economic, social and environmental – provided by the Inland Waterways under Waterways Ireland's remit. This approach provides an evidence base for policy and management decisions, and ensures the recognition of the full range of benefits provided by Inland Waterways in relation to economic development, public health, tourism, sustainable transport, regeneration, biodiversity, flood management, underground utility facilitation and - as Ireland transitions to a low carbon economy - their potential importance in renewable energy generation, heat transfer, sustainable freight transport and water supply.

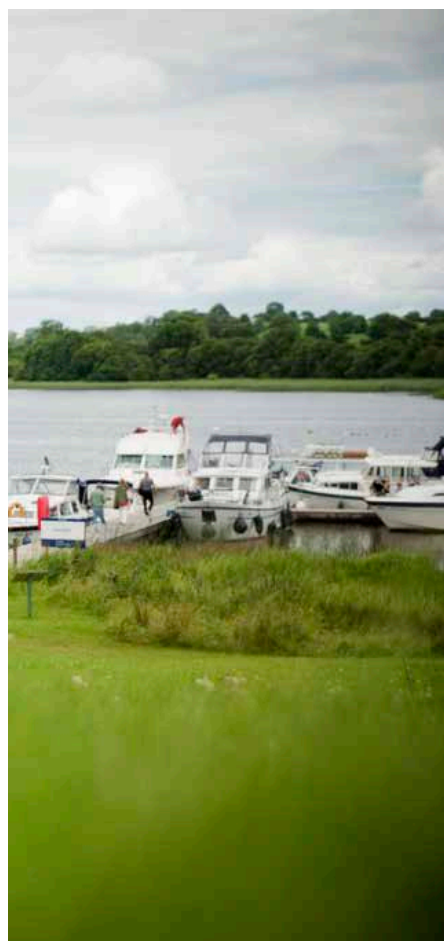
While the following sections describe a broad overview of the range of values across the entire inland waterway system, chapters include case studies from each waterway which best exemplify and amplify the particular value under discussion.



⁴ e.g. Action Plan for Grand Canal Dock and Spencer Dock, Brady Shipman Martin, 2013; Dublin City Canals, Recreational and Tourism Product Identification Study, Scott Wilson 2010; Lough Ree and mid-Shannon Product Development Study, Scott Wilson, 2010; Recreation tourism and product identification study, Grand Canal Rural, Tourism Development International.

2.2 THE ROLE OF INLAND WATERWAYS IN TOURISM AND RECREATION

Inland waterways make a significant contribution to the visitor economy and to the recreation sector. They are important destinations in their own right and they provide access to the water through a range of enabling public infrastructure such as marinas, jetties, moorings, piers, docks, harbours, slipways, canoe steps, navigation markers, locks etc. They also provide a range of waters' edge infrastructure such as towpaths, bridges, car parks, trails, service blocks, pump out facilities, walking and cycling trails, fishing stands and bird hides. This infrastructure is key to enabling visitors and people locally to access the resource for a wide range of water and land based activities as well as providing links to other visitor attractions and services.



<i>Tourism value: Enabling the participation of overseas and domestic visitors in activities and events on and beside the waterways and supporting the visitor economy</i>			
Activities: Water based	Activities: Land based	Events	Supporting services
Boat Trips - Private Cruiser/ Barge - Day Boats - Hire Angling Watersports - Sailing - Canoeing - Rowing - Power Boating - Jet Skiing - Water Skiing Wildlife watching	Walking: towpaths, waymarked trails Cycling Picnicking Wildlife watching	International Regional Local	SMEs and jobs in tourism businesses - Waterside accommodation – hotels, B&B etc SMEs and jobs in service sectors - Waterside pubs and restaurants - Waterside activity providers
Key sources		Indicative values	
Activity Product Usage amongst Overseas Visitors in 2012, Fáilte Ireland		€550 million – generated by overseas visitors who participated in walking €220 million – generated by those who cycled	
Economic value of trails and forest recreation in the Republic of Ireland, Coillte, 2005		€307 million annually – spent by trail users €95 million – the non-market value of trails	
Activity product usage among overseas visitors in 2011, Fáilte Ireland		Overseas anglers stay longer -11.9 nights- and spend more per day - +€15 - than general overseas visitors	
Socio-Economic Study of Recreational Angling in Ireland, IFI, 2013		€755 million – direct and indirect spending by all recreational anglers – of which €121 million is accounted for by out of state anglers. Recreational angling supports some 10,000 jobs	
National Strategy for Game Angling IFI, Market Research, 2015		€569 million- the contribution of angling on all inland waters (RoI) of which €215 million is accounted for by tourism expenditure which supports some 7,739 jobs	
Waterways Users Survey, Waterways Ireland, 2014		Percentages of types of use available – but needs to be cross-referenced with visitor count data	
Events		97 sponsored events generated some €7.9m expenditure and attracted some 197,137 participants (2015)	
		Lock passage counts by type of boat required	
		Further analysis of Waterways Ireland monitoring points within IFI study required	



TOURISM

An overview of the performance of tourism on the island of Ireland

- In 2014, almost 7 million overnight trips were made to Ireland and close to 2 million overnight trips to Northern Ireland by inbound tourists. Related expenditure was a total of €3,505m (£2,828m) in Ireland and £446m (€553m) in Northern Ireland.
- Average expenditure per trip was lower in Northern Ireland than in Ireland. This was due to a shorter average length of trip taken in Northern Ireland of 5 nights compared to 8 nights in Ireland. However, overall expenditure per night was similar in both parts of the island.
- Almost half (48%) of all visits made to Ireland were for holiday/leisure purposes while the main reason for visits to Northern Ireland was to visit friends or relatives (51%).
- While visits to friends or relatives tended to be slightly longer in duration than holiday or business visits, the average expenditure for these trips was lower. The average nightly expenditure for holiday visits was almost twice that for visits to friends or relatives in both Ireland and Northern Ireland.
- Although residents of Great Britain (England, Scotland, and Wales) were the largest single group of visitors to Ireland (41%), they represented a smaller proportion of the total overnight trips (to Ireland) than was the case in Northern Ireland (66%).
- The proportion of overnight visitors from mainland Europe to Ireland (36%) was more than double that to Northern Ireland (15%).
- The top 5 markets in terms of visitors to Ireland were Great Britain, North America (USA and Canada), Germany, France, and Italy. For those visiting Northern Ireland the

top markets were Great Britain, North America, Germany, France and Australia.

- While over half of all visitors to Northern Ireland (55%) stayed with friends or relatives, less than a third of visitors to Ireland (29%) did likewise. A higher proportion of visitors to Ireland than Northern Ireland chose to use hotel accommodation during their trip.
- Visitors from North America (Canada and USA) spent more per night in Ireland than in Northern Ireland. This may be partially explained by the larger proportion of North American visitors to Ireland who stayed in commercial accommodation than those who visited Northern Ireland, who were more likely to stay with friends or relatives.
- Almost 90% of all hotels registered in the island of Ireland were located in Ireland. One fifth of hotels on the island of Ireland were located in Dublin and Belfast.
- Over 26 million passengers were handled by the nine airports in Ireland during 2014. Dublin Airport, with 82% of the passengers, experienced the largest throughput. In Northern Ireland, almost 7 million passengers were handled by the three airports with Belfast International Airport accounting for over half (58%) of these passengers.
- Air travel represented over 90% of the total airport/seaport passengers in Ireland and almost 80% in Northern Ireland, demonstrating the greater importance of sea ferry travel to Northern Ireland. Over 2.75 million passengers passed through Ireland's seaports in 2014 while in Northern Ireland, the throughput was almost 2.1 million passengers.

Waterways Ireland maintain the enabling infrastructure for a range of services

Tourism and Recreation on the waterways can only take place if the enabling infrastructure is in place and operational. A summary of key Waterways Ireland assets was carried out in 2015 – along with an estimation of their replacement value - a total of €1.2 billion. Reductions in ongoing maintenance can lead to higher replacement costs.

TOURISM AND THE WATERWAYS

Tourism activity around waterways acts as a catalyst for entrepreneurs to provide restaurants, convenience stores, recreational services and indeed holiday accommodation throughout rural and urban Ireland.

Investment in the waterways results in increased employment opportunities in the recreation/tourist/ heritage industry, particularly through the provision of facilities in rural areas and the development of existing popular areas.

Employment opportunities are created in rural areas where often little or no infrastructural development occurs. The resulting jobs, many of which are industrial as well as professional, enable monies to be spent in local areas through the purchase of fuel, material supplies and indeed food. This spend, combined with spend from visitors and tourists, sustains local traders and service providers and consequently enhances the livelihood of communities along the waterways, in both rural and urban areas.



The economic benefits of waterways enabled tourism activity.

A small number of studies in Ireland have looked at the economic benefits of **walking tourism** or walking routes, for example URS/Scott Wilson for West Cork⁷ (2012), Bergin and O'Rathaille⁸ (1998) and O'Donnell and Boyle⁹ (1999) and forest and wilderness trails, for example Fitzpatrick Associates¹⁰ (2005) and Optimize¹¹ (2012). In addition, there have been some studies of the social and economic benefits of urban cycling.

In terms of the performance of walking and **cycle tourism** in Ireland, the most recent product specific research available from Fáilte Ireland dates from 2012¹². It indicates that the 578,000 overseas visitors who engaged in walking while on holiday in Ireland generated some €550 million with those who participated in cycling generating a return of some €220 million in visitor revenue.

In relation to **angling**, while some information is available

on domestic angling, there has been an absence of recent in-depth research on overseas angling tourism. *An Economic Evaluation of Irish Angling* by B.J. Whelan was published in 1988. More recently, Fáilte Ireland has undertaken a number of angling research assignments and reports including an *Angling Tourism Marketing Strategy (2007)* in conjunction with the Central Fisheries Board and a *New Strategy for Irish Angling Tourism (2009)*. Much more recently, in conjunction with a number of publishing houses and Inland Fisheries Ireland, Fáilte Ireland carried out two comprehensive online surveys for both the GB and German markets (*Survey of GB Anglers 2011 & On-line Survey – German Anglers 2012*). Similar surveys are not available for any other markets.

Although there have been a number of studies on recreational fishing in Ireland that have analysed angler numbers and expenditure patterns using surveys, only two Irish studies¹³ have involved the estimation of demand functions for recreational fishing. In a comprehensive study by Inland Fisheries Ireland - *Socio-Economic Study of Recreational Angling in Ireland (2013)* - the contingent valuation method was employed to estimate the value to the general public and to anglers, respectively, of preserving Ireland's natural fish stocks and the current quality of recreational angling in Ireland. The preparation of the *National Strategy for Game Angling, 2015* sought to build on the outcomes of the 2013 study and in its associated Market Research report provided a further assessment of values based on anecdotal reports, other surveys and interviews to help decision making both in respect of marketing and product development.

In 2004 and again in 2010, Waterways Ireland commissioned research to obtain information on the demographic profile of waterway users, to gather data on waterway products and to measure awareness of Waterways Ireland as the management authority of the navigations. The survey was commissioned again in 2014 to;

- Obtain a demographic profile of waterway users
- Measure awareness of Waterways Ireland as the waterways management authority
- Obtain a profile of waterways products used and to identify emerging niche products
- Measure the market in terms of market share held by different products
- Provide comparisons with historical research data where appropriate

⁷. West Cork. Maximising the Benefits of Walking Tourism, URS & Scott Wilson, 2012. ⁸. Recreation in the Irish Uplands, Bergin, J., O'Rathaille, M., 1998. ⁹. Waymarked Ways in Ireland - User Profiles, Numbers and Route Management Strategies, O'Donnell, V., Boyle, K., 1999. ¹⁰. Economic value of trails and forest recreation in the Republic of Ireland, Fitzpatrick Associates, 2005. ¹¹. Cost Benefit Analysis of the Expansion of the Dublinbikes Scheme, Optimize, 2011. ¹². Activity Product Usage amongst Overseas Visitors in 2012, Fáilte Ireland. ¹³. The second study is O'Neill, C., Davis, J., 1991. Alternative definitions of demand for recreational angling in Northern Ireland, *Journal of Agricultural Economics*, 42(2), 174-179

Walking and Cycling

Developed recreational trails along inland waterways are an integral part of the walking tourism product in Ireland. In terms of the performance of walking and cycle tourism in Ireland, the most recent product specific research available from Fáilte Ireland dates from 2012¹⁴ and highlights the performance of these activities relative to each other as follows;

Table 1: Overseas visitors engaging in cycling & walking, 2012

	Cycling	Walking
Nos. engaging (000s)	149	578
Expenditure (€m)	200	550

Table 2: Market distribution of overseas visitors (%)

	Cycling	Walking
Britain	24	25
Mainland Europe	59	49
France	18	9
Germany	9	3
North America	11	20
Other Long Haul	6	5

Enterprises and jobs supported by the waterways – a Case Study of the Erne Waterway

Cruising and angling are central to the Erne Lakelands tourism offering. The waterway supports the following water based activity businesses;

- 11 Boat Hire / Tour Boat Businesses
- 8 Boatyard, Boat Building, Boat Maintenance, Chandlery Businesses
- 16 Activity Centre Businesses
- 7 Angling Centres & Tackle Shops
- 8 Ghillies / Instructors

*The combined turnover of these businesses is at least **€2.5million** which directly supports between **134 and 218 FTEs***

In addition to this we know that;

- *The Erne Lakelands account for some 20 -25% of the **angling** market in Northern Ireland – hence values*

*of between **£3.32m and £4.15m** can be attributed to this sector which indirectly supports between **116 and 145 FTEs***

- *The Erne Lakelands account for some 22% of the hire cruise sector which is estimated to be worth in the region of **€8.8m** to the local economy, and indirectly supports some **124 FTEs plus 24 seasonal employees***

Tourism in the Erne Lakelands

According to Tourism Northern Ireland’s 2014 Visitor Attitude Survey¹⁵, Fermanagh attracts the greatest proportion of overnight leisure visitors of all the regions in Northern Ireland, with just over half staying in the destination. These overnight visitors are fairly evenly split between domestic visitors and those from out-of-state. Visitors to Fermanagh enjoy an outdoor experience, with many choosing to visit this region specifically to enjoy the lakes. While visitors don’t necessarily come for a specific attraction, the wide range of places to see both new and familiar to some were key reasons to visit.

The survey enables us to identify the origin and characteristics of visitors to Fermanagh as follows:

- 42% of visitors come from Northern Ireland
- 23% from the Republic of Ireland
- 12% from North America
- 8% from other European countries
- 12% from USA and Canada
- 2% from elsewhere
- 48% of visitors interviewed in Fermanagh were day trippers. Of the 28% of out of state visitors taking a day trip in the area, 14% were in NI for the day only and 13% were staying elsewhere in NI. Of the 20% of domestic (NI) visitors taking a day trip in the area, 18% were taking a day trip only in NI and 2% were staying elsewhere in NI.
- Compared to most other regions, a high number of visitors travel with a partner or friends
- The average number of people in the travelling party was 3.51
- 44% of visitors were aged between 35 and 54; 28% under 35 and 28% were 55+
- Visitors were slightly less likely than most other regions to have children in their party (31%), hence wanting lots for children to do was less of a motivation for taking the trip in the first place, compared to many other regions
- 83% of visitors had decided to visit this region before arriving in NI

14. Activity Product Usage amongst Overseas Visitors in 2012, Fáilte Ireland. 15. Source: Millward Brown Ulster, on behalf of Tourism NI

- 73% of visitors from GB and other overseas arrived via the Republic of Ireland
- Visitors were less likely, compared to other regions, to be visiting to see a specific attraction. This destination has a broader appeal both for those wanting to discover or explore somewhere new or those who had been before and wanted to return. **More so than for most other regions, visitors to Fermanagh wanted to visit a number of different places**
- **67% of all visitors specifically chose this destination in order to enjoy the lakes, exploring the surrounding towns and villages**
- Self-catering accommodation was favoured by almost one quarter of visitors staying over in the Fermanagh Destination (higher than for most other regions) with B&Bs (18%) and hotels (17%) also popular choices in this destination

Coarse and Game fishing in the Erne Lakelands

While Fermanagh is a popular location for angling (evidenced by the lakes, loughs and rivers in the area and anecdotally by licence applications¹⁶ through DCAL and the Loughs Agency, who both have responsibilities across the District), there is very little data on the numbers and real value of angling tourism to the destination, except through individual events/competitions and through a limited number of fishing lodge style businesses. **We know that the coarse and game fishing sector is high yield** (4.9 days per trip and £707 spend per trip) and extends visitation beyond the summer months.

There are a number of studies which provide information on the demand from this sector in Fermanagh. There is much anecdotal evidence for the importance of the sector and the former Fermanagh District Council invested significantly in angling related events, as well as completing an Angling Strategy for the Council in January 2015. This draws on research undertaken by others and deals with all angling related issues, not just tourism and visitation.

2013 research¹⁷ for angling in Ireland estimated the value of out of state angling as being €280 million (direct and indirect expenditure), with evidence of a decline in recreational angling participation levels over the past decade. 2005 research in NI, estimated that angling from domestic and visitor markets was worth £20.5m¹⁸, with game angling accounting for £13.4m; coarse angling for £3.2m and sea/shore angling for £3.9m. It is estimated that the Erne Lakelands account for some 20 % -25% of the game and coarse angling market – hence values of between **£3.32m** and **£4.15m** can be attributed to this sector.

Social and Economic Impact of Recreational Fisheries, Angling and Angling Resources in Northern Ireland

- *NI residents spent on average a total of 14 days away from their home while engaged in angling. The median number of days spent away from home was 5.*
- *The most popular form of accommodation used when angling away from home was camping/ caravan accommodation, followed by B&B / Guesthouse accommodation, self catering accommodation, hotel accommodation and fishing lodge accommodation.*
- *Typical overall annual expenditures vary between £1,253 per local angler in the case of game angling, £1,459 in relation to sea/shore angling and £1,425 in respect of coarse fishing*
- *The overall net economic impact of recreational angling (including domestic and visitor angling) on the Northern Ireland economy is estimated to be the region of between £22.5m and £31.5m (based on 2005 participation and expenditure figures). The sector is estimated to support between 778 and 1,089 FTE jobs. It is further estimated that the Erne Lakelands account for some 20% to 25% of this market – hence values of between **£3.32m** and **£4.15m** can be attributed to this sector which supports between **116** and **145 FTEs**.*

Cruising in the Erne Lakelands

The inland waterway cruising market is also a niche product which the Erne Lakelands has a strong foothold in. Germany remains the No.1 source of demand, accounting for almost half (48%) of all-Ireland rentals in 2013, a total of over 1,800 rental weeks. Germany with combined demand from Switzerland and Austria, accounts for almost two out of every three (63%) of total rental demand and 80% of demand from overseas visitors. The Irish Tourism Industry Confederation (ITIC) estimated that the boat rental sector (throughout Ireland) catered to an estimated 14,500 visitors in 2013, generating an estimated €20m in direct tourist expenditure (estimated at €40m in economic activity, when induced and indirect expenditure are included)¹⁹. Two companies (Carrick Craft and Emerald Star/Le boat) account for just over two thirds of total capacity, with a reported 50 boats – out of a total availability of 225 boats – for hire from NI operators within four bases on the Erne system. The Erne Lakelands account for some 22% of this sector which is estimated to be worth some **€8.8m** to the local economy in terms of economic activity whilst supporting some **124 FTEs²⁰** plus **24 seasonal employees**.

¹⁶. Which don't differentiate between residents and visitors. ¹⁷. Socio-Economic Study of Recreational Angling in Ireland (for Inland Fisheries Ireland by Tourism Development International). ¹⁸. DCAL, the Loughs Agency, Irish Lights Commission and NITB conducted a Social and Economic Impact appraisal in NI in 2007 (PriceWaterhouseCoopers and Indecon). ¹⁹. Ireland's Inland Waterways Review & Outlook, June 2014, ITIC. ²⁰. 14.1 = estimated no. of FTEs supported per £1 Million of tourism expenditure. See Cognentsi (2007) Tourism in the Northern Ireland Economy, Volume 1, March 2007, Northern Ireland Tourist Board and the Department of Enterprise, Trade and Investment.

KEY SOURCES

Economic value of trails and forest recreation in the Republic of Ireland, Coillte, 2005

ABSTRACT: The research has involved extensive primary research work, through both postal and on-site surveys. A questionnaire was sent to 3,000 households in Ireland while some 640 trail and forest users were interviewed on-site at 15 locations throughout the country. This primary research was supplemented by a review of existing literature, three international comparative case studies, and consultations with key stakeholders.

VALUES: The direct economic expenditure by Irish trail users on items such as food, drink, accommodation and trail equipment was found to be €307 million annually, while the non-market value of trails was found to be €95 million. The direct economic impact of forest recreation by Irish residents was estimated to be €268 million, while the non-market value of forest recreation is estimated at €97 million. Developed recreational trails are an integral part of the walking tourism product in Ireland. Fáilte Ireland data indicate that overseas visitors who engaged in walking in Ireland in 2003, spent an average of €673 while here. This study's on-site survey validated this information and found that overseas walking visitors expected to spend €787 during their visit to Ireland in 2005.

Activity product usage among overseas visitors in 2011, Fáilte Ireland

ABSTRACT: According to a Fáilte Ireland survey conducted in 2011, overseas angling tourists have a longer than average length of stay and spend on average more compared to all overseas visitors. Anglers are an important contributor to the regional distribution of bed nights, particularly along the South West and the Wild Atlantic Way.

VALUES: Overseas anglers have a longer than average length of stay (11.9 nights) compared to all overseas visitors (8.2 nights). Anglers spend on average €15 more than overseas visitors per day generating an overall spend of €858 per angler. Anglers tend to stay in rented accommodation (27%) or with friends/family (22%). German anglers in particular have a high preference for self-catering accommodation. Guesthouses & B&Bs are twice as popular amongst anglers (16%) compared to hotels (8%). Anglers spend over two-thirds (68%) of their money on bed and board and food and drink while staying in Ireland, this compares to an average of 62% for all visitors. The number of regional nights spent in the West increases significantly for those engaging in angling (29% compared to 17% for all visitors).

Socio-Economic Study of Recreational Angling in Ireland, IFI, 2013

ABSTRACT: Anglers were surveyed at given angling locations and were asked to provide information detailing their expenditure patterns as well as their motivations and angling preferences corresponding to their 'current angling trip'. The report indicated that up to 406,000 individuals participated in recreational angling in the Republic of Ireland in 2012. Of these, 252,000 were Irish adults²¹. Domestic anglers therefore accounted for over half (62%) of recreational anglers in the RoI. Anglers from Northern Ireland represented an important source accounting for one in ten (10%) of recreational anglers (41,000 visits). Overseas anglers accounted for 28% of all recreational anglers equating to approximately 113,000 anglers.

VALUES: The study indicated that direct spending on angling in the RoI amounted to €555 million in 2012, with indirect spending worth an additional €200 million and totalling €755 million. Direct expenditure of recreational angling by out-of-state anglers was estimated to be €121 million. Recreational angling was also found to directly support 10,000 existing Irish jobs, many of which are located in the most peripheral and rural parts of the Irish countryside and along the coastline. Based on the results of the research, the aggregate non-market value of the angling resource to the Irish public (where there are 3,608,000 individuals above the age of 15) was estimated to be €57.6 million per annum. The equivalent figure for the 406,000 estimated active anglers using Irish waters on a yearly basis was €27 million per annum

National Strategy for Game Angling, Market Research, IFI, 2015

ABSTRACT: As part of the preparation of this Strategy, a desk review of current market research was undertaken. Markets were evaluated based on species targeted, customer requirements, facilities required, area and guiding needs. The study also identified gaps in market research and provided recommendations to address these gaps.

VALUES: The estimated contribution of angling, including multipliers supported in the Republic of Ireland by angling type for 2014 / 2015 was;

Sea:	€158 million
Bass:	€71 million
Salmon and Sea Trout:	€210 million
Pike:	€102 million

²¹ More recently, in 2015 IFI commissioned an omnibus survey in conjunction with Millward Brown which suggested that some 7.6% of the population aged 15 years or older considered themselves to be recreational anglers; this gives an increased total of 273,600 domestic anglers based on April 2014 population data (CSO).

Coarse:	€96 million
Brown Trout:	€148 million
Stocked Fisheries:	€13 million
Other Angling Type:	€39 million
TOTAL:	€837 million

Excluding sea bass and other angling, the estimated contribution of angling on all inland waters (rivers²², lakes and canals) can be estimated to be in the region of **€569 million**. In arriving at an indicative assessment of employment supported by recreational angling in the Republic of Ireland, the expenditure estimates presented in the report in respect of overseas anglers (€124 million) and Northern Ireland anglers (€14.7 million) were legitimately classified as tourist spending. However not all of the estimated €476 million in domestic recreational angling expenditure could be classified as 'tourist' spending. To arrive at an estimate of domestic tourist angling expenditure, the volume of overnight trips needed to be taken into account. This was estimated to be 37% of total domestic angling expenditure. Taking this, overseas and Northern Ireland expenditure into account, total tourist angling expenditure was estimated to be approximately €316 million. Applying the Fáilte Ireland formula of 36 jobs supported for every €1 million in tourist expenditure, recreational angling was estimated to support approximately 11,350 jobs (based on 36 jobs per million in tourist expenditure). These are indicated below relative to the type of angling involved.

Sea:	€57 million	2,043
Bass:	€33 million	1,192
Salmon and Sea Trout:	€90 million	3,235
Pike:	€32 million	1,147
Coarse:	€38 million	1,377
Brown Trout:	€51 million	1,853
Stocked Fisheries:	€4 million	127
Other Angling Type:	€11 million	380
TOTAL:	€316 million	11,354

Here again excluding sea, bass and other angling, the estimated contribution of angling on all inland waters (rivers²³, lakes and canals) can be estimated to be in the region of €215 million with the number of jobs supported being in the region of 7,739. While information at catchment or navigation level was not captured, the type of angling for which estimates are available should provide an indication of the respective performance

of the different fisheries under the jurisdiction of Waterways Ireland.

Ireland's Inland Waterways, Review and Outlook, ITIC, 2014

ABSTRACT: The purpose of the study was to assess the current position and future prospects for the cruiser hire industry - a small but vital niche market in the context of Irish tourism which attracts out of state visitors who wish to experience the destination from the waterways.

VALUES: Some 225 boats are currently available from the Inland Boating Rental Association's five member companies. Currently these companies operate from five bases on the Shannon; one on the Shannon-Erne Waterway and one in Enniskillen.

Fleet sizes range from five to over eighty, with two companies (Carrick Craft and Emerald Star/le boat) accounting for just over two thirds of total capacity. In addition, an estimated fleet of up to fifty boats are available for hire from Northern Ireland operators with four bases on the Erne system. Six berth boats are the most popular and account for 36% of the available fleet, with four berths being the next most popular (23% of available fleet). A characteristic of recent fleet acquisitions and renewals has been a gradual shift to the inclusion of larger and more luxurious boats in the fleet. Correspondingly there has been a reduction in the number of smaller boats, particularly two berth boats, available for hire. Almost 14,500 visitors hired a cruiser in 2013. A total of almost 3,800 boat rental weeks generated upwards of an estimated €9m in rental income. 83% of the demand is from out-of-state, with Germany the number one source market. Most recent estimates (2011) from IBRA suggest that the sector and its associated spend is worth just over €50m per annum in economic activity, with boat rental companies sustaining upwards of 55 full time jobs and employing over 110 seasonal employees. The Irish Exchequer earns up to €2m per annum in VAT on rentals (at 13.5%) and duties on fuel.

Waterways Users Survey, Waterways Ireland, 2014

ABSTRACT: This survey was conducted with a sample of 1,247 recreational waterway users in October and November 2014. In terms of the origin of users, 8 in 10 waterway users were from the island of Ireland. More specifically, the Republic of Ireland accounted for 63%; Northern Ireland for 18%; GB 7%; USA 3%; Australia 2%; Canada 1%; New Zealand 1% and Rest of the World 1%.

22. Not including estuarine / tidal areas. 23. Not including estuarine areas / tidal areas.

VALUES: Just one in six international visitors (16%) claimed to travel to Ireland specifically to use the waterways. This is considerably lower than was the case in 2010 when 4 in 10 (41%) overseas visitors were in the country as a waterway tourist. This decrease is believed to be a direct effect of the fieldwork timing in 2014. The further the visitor has travelled to Ireland, the less likely they are to be visiting the country specifically to use the waterway. In 2010 the research showed that 8 in 10 overseas visitors (79%) would return to Ireland as a result of their waterway experience. This has halved to 38% in 2014 and is likely to be correlated to the lower incidence of visiting Ireland specifically to use the waterways. The survey shows international users were visiting Ireland for a shorter period although with the majority (68%) having a trip duration of 1 week or

longer. In terms of expenditure, in 2010 16% of users had purchased equipment spending an average of €1,732. The incidence of purchase was much lower in 2014 when just 10% of users bought equipment of any kind and the average amount spent was somewhat lower at €1,478 on average. Similarly, the decreased use of hire cruisers/barges (from 8% to 2%) has affected the average spend on boat hire which was reduced from €764 to €210.

When the average expenditure on items purchased during the waterways visit is compared, it is evident there was a reduction in the amount spent on accommodation, food, drinks and non-food shopping which may be linked to the amount of time spent on the waterway (70% spent half a day or less). Expenditure on food shopping and other items remained relatively stable with fuel spend showing the only increase over time.



RECREATION

Waterways Ireland encourages a wide range of recreational activities on and around the waterways. These include canoe-polo, water skiing, kayaking, jet skiing, wake boarding, canoeing, rowing, wind surfing, sailing, private boating, hire boating/barging, power boating, commercial passenger craft, angling, cycling and walking.



Informal Recreation value: Enabling the participation of local people in activities on and beside the waterways and supporting the water based recreation economy	
Activities: Water based	Activities: Land based
<p>Angling – see Tourism</p> <p>Boating</p> <p>Watersports</p> <ul style="list-style-type: none"> - Sailing - Canoeing - Canoe Polo - Rowing - Power Boating - Jet Skiing - Water Skiing - Wake Boarding <p>Swimming;</p> <ul style="list-style-type: none"> - wild swimming (e.g. parts of the Barrow) - urban swimming (e.g. Canals and Urban docks) - competitive swimming (e.g. TriAthlone) - water park swimming (e.g. Baysports on Lough Ree) 	<p>Walking</p> <p>Dog walking</p> <p>Cycling</p> <p>Running/Jogging</p> <p>(see also section 2.3 for walking and cycling in terms of health and well-being)</p>
Key sources	Indicative values
Use of Inland Waterways in Northern Ireland – the Continuous Household Survey 2011 / 2012	29% (414,900 people) of the adult NI population visit an inland waterway at least once or twice a year; 81% of these do so to walk; 4% of the adult population visit weekly
What's Our Water Worth? Estimating the Value to Irish Society of Benefits Derived from Water-Related Ecosystem Services: A Discrete Choice Approach, EPA, 2014	€214m – €250m for river bodies €204m – €237m for lakes
Willingness to Pay for Achieving Good Status across Rivers in the Republic of Ireland, EPA,	€65.35m per annum –WTP to achieve good status of rivers
Economic Contribution of Private Boat Owners, Waterways Ireland, 2006,	€36,334,696 – 2006 €87,916,800 – 2016 (estimate)
Waterways Users Survey, Waterways Ireland, 2014	Percentages of types of use available – but needs to be cross-referenced with visitor count data
Demand for Water Based Leisure Activity, EPA	Forthcoming

The recreational use of waterbodies in Ireland

Waterbodies are spread generously throughout Ireland – north and south which means that there are no regions in the country which are devoid of them. In addition, the overall environmental quality of Irish waterbodies is good, with non-polluted waters being within driving distance of every person in the country. Consequently, in terms of availability, there is no obvious reason for regional variation in general waterbody use throughout the country. In terms of visitation²⁴ by type of waterbody, overall, the most popular waterbody to visit is the sea (55.90%), followed by rivers / canals (43.92%) and, finally, lakes (27.76%). Consultation carried out as part of this work would suggest that people now living in Ireland originally from parts of the world distant from coasts tend to value the recreational value of rivers and lakes more than Irish people with more of a culture of visiting coasts for recreation. Visitors most regularly go to the sea for nature and bird watching, wind, board or kite surfing and swimming; to rivers / canals for walking, running and jogging, as well as fishing; and almost equally as often to lakes and rivers for rowing, boating, canoeing or cruising (1.65 and 1.63 times per year, respectively). Respondents who walked, ran or jogged at a lake did so approximately 14.79 times in the past 12 months and travelled an average of 23.74 miles to do so. In contrast, those who walked, ran or jogged at a river / canal did so 41.36 times in a year and travelled 7.63 miles.

The Northern Ireland Sport and Physical Activity Survey (2010) has identified that walking, jogging, cycling and angling are among the most popular activities. In terms of **consumer spending**, outdoor recreation accounts for just under £132m. The most important elements are bicycles (£25m), outdoor centres (£18m), clothing (£18m), and boats (£15m). This is spending by Northern Ireland residents. In terms of the **commercial outdoor recreation sector** - all the retailing and accommodation units that are dedicated to the provision of outdoor recreation in Northern Ireland - total income amounts to £139.9m which supports some 880 FTEs. In summary;

- GVA for the voluntary sector is £21.789m (not including volunteers)
- GVA for the Commercial Outdoor Recreation Sector is £26.5m
- GVA for the Commercial Non-Outdoor Recreation Sector is £40.2m

When central and local government income - as derived from taxes and charges - is included, total GVA amounts to £102m, which supports some 3,537 FTEs in outdoor recreation in Northern Ireland. This corresponds to 25% of sport sector employment (excluding gambling). The overall

figure can be notionally extended to include the unpaid voluntary time invested within the outdoor recreation sector. This is equivalent to 580 FTEs, raising the number of people occupied within the sector (full-time basis) to more than 4,100. The full list of activities covered by the survey is detailed below.

LAND	WATER	AIR
<ul style="list-style-type: none"> • Adventure Racing • Archery • Caving • Clay Pigeon Shooting • Climbing • Coasteering and Bouldering • Cycling • Fell Running • Horse Riding • Hovercrafting • Kite Buggy • Land Buggy • Mountain Boarding • Mountain Biking • Orienteering • Paintballing and Combat • Walking • Zorbing 	<ul style="list-style-type: none"> • Boat Charter and Cruising • Boat Trips • Canoeing • Diving • Fishing • Jet Skiing • Kite Surfing • Sailing • Surfing • Waterski and Wakeboard 	<ul style="list-style-type: none"> • Windsurfing • Gliding • Hang-gliding and Paragliding • Microlight Flying • Model Flying • Skydiving and Parachuting

Use of Inland Waterways in Northern Ireland

For the first time in 2011/12, the Continuous Household Survey (CHS) in Northern Ireland included questions on the use of inland waterways and the types of activities participated in when using the waterways. The report found that:

- 29% (414,900 people) had visited an inland waterway at least once or twice within the previous twelve months, with 4% having visited at least once a week.
- Of the 414,900 people who had visited an inland waterway in the last year, just over four-fifths of respondents (81%) indicated that they went 'walking' while visiting an inland waterway, while more than a fifth (22%) had a 'picnic'. Around a tenth of respondents had been cycling, fishing, boating and jogging while visiting the waterway (12%, 10%, 9% and 8% respectively).

24. What's our water worth? Estimating the Value to Irish Society of Benefits Derived from Water-Related Ecosystem Services: A Discrete Choice Approach, EPA (2014)

Boating

Measuring the economic impact of boating is difficult since it is not sufficient to measure the initial or direct expenditure of boat owners alone. Other effects must be taken into account if a complete assessment is to be made. For example a restaurant may be the direct recipient of boat owner expenditure. However, the restaurant purchases customer-related goods from other domestic companies operating within the economy, such as a food and beverage supplier, leading to an increase in income for those working within the company. Next, consumption by those who have received the increased income occurs, as they spend their income, at least partly on domestically produced goods and services. This in turn becomes income for others and in this way the effects of the initial spending will continue to percolate through the economy.

From the report on *The Economic Contribution of Private Boat Owners*, undertaken in 2006 we know that the Shannon Navigation and the Erne System were identified by respondents as the most popular waterways visited in relation to the three most recent trips undertaken. Based on an average spend of €5,482 per annum, the total expenditure by boat owners was estimated to be some **€36,334,696**.

Taking the average spend of €5,482 per annum and applying the EU Harmonised Index of Consumer Prices, average spend in 2016 could be estimated to be in the region of €6,080. Applying this average spend to the most recent record of boat owners on the Waterways Ireland database – 14,460 – results in an updated estimate of some **€87,916,800**.



Watersports – Case Study of the Lower Bann and Lough Erne Canoe Trails

Northern Ireland is known to be an excellent canoeing destination for paddlers with over 50 identified locations across the country used for various disciplines within canoeing. The activity of canoeing experienced a dramatic increase in the number of participants according to a research report on “Trends in Outdoor Recreation (1995-2008)” published by Countryside Access and Activities Network (CAAN) in 2009. The report indicates that the number of participants tripled from 772 to 2600 during the research period.

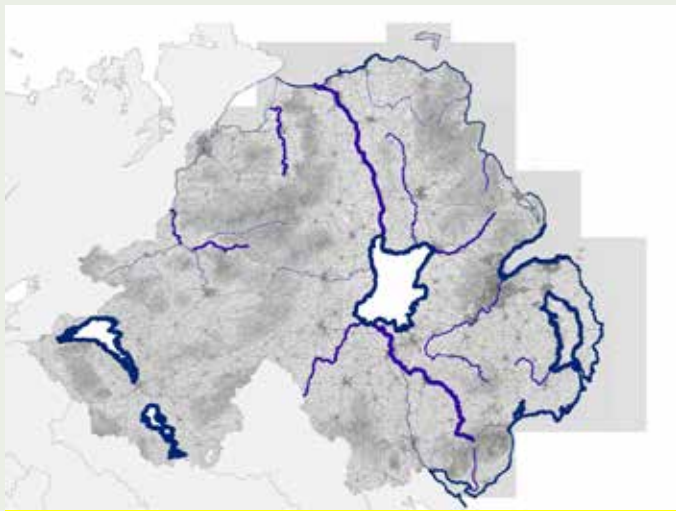
PADDLING SURVEY REPORT 2010, ORNI

Canoe Trails in Northern Ireland

The most popular trails are Lough Erne and Lower Bann. All trails are mostly used for day trips, except Lough Erne (approx. 50% stay over night)

Since the development of the trails;

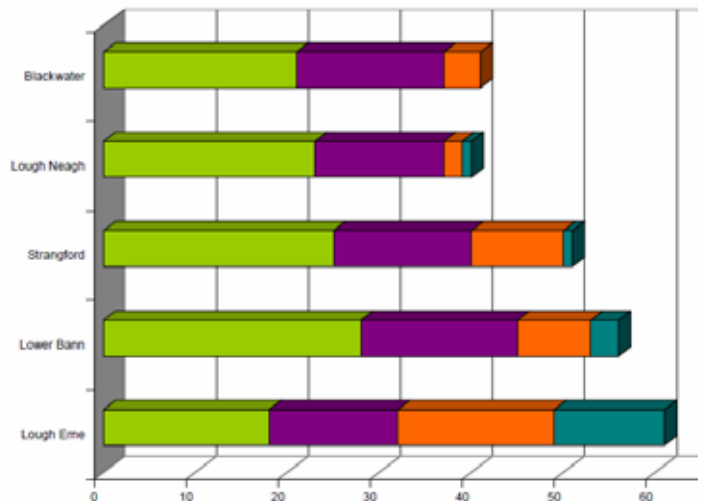
- nearly 50% said they visit the area more often as a result of the trail
- 85% said that it enhanced their experience of the area
- 63% used the official Canoe Trail Guides
- 91% are keen to use the trail again



Paddling locations in NI, where the width of the line indicates the level of usage

Flat Water	Paddled
Blackwater Canoe Trail	36
Lower Bann Canoe Trail	47
Lough Erne Canoe Trail	57
Lough Neagh Canoe Trail	37
Strangford Lough Canoe Trail	39
Quoile Estuary	9
Lough Macnean Upper and Lower	4
Other Castlewellan Lake (5), Lagan (10), Newry Canal (1), Caladonion Canal (1), Mulroy Bay Donegal (1), Lough Killyfole (2), Dun River (1), Lough Mucknoo (1), Donegal (1)	35

Preferred choice of flat water locations for paddling



Length of time spent on the canoe trails

Length of stay	Average Spend	
	Out of State Visitors	Paddlers from Northern Ireland
Day trip	£95	£25
Short break	£153	£157
Holiday	£342	N/A
Average	£231	£58

Average spend by type of trip

KEY SOURCES

What's our water worth? Estimating the Value to Irish Society of Benefits

Derived from Water-Related Ecosystem Services: A Discrete Choice Approach, Environmental Protection Agency, 2014

ABSTRACT: This report outlines the development and implementation of a discrete choice experiment (CE), which is used to determine Irish citizens' preferences for a number of water-related attributes from different types of waterbodies. A key aspect of the report was to provide an estimate of the monetary valuation that Irish citizens place on improvements in key quality attributes (such as ecological or aesthetic attributes) of Irish waterbodies. Despite a number of studies which have explored aspects of water quality and valuation in Ireland, no major CE valuation exercise on water quality features has been conducted to date. Therefore, apart from a few studies that have estimated economic values associated with particular water features, no studies have attempted to estimate generic values for a range of water features for the general population of Ireland. The research presented in this report seeks to fill this gap in the literature both in terms of how economic values generated from this study compare with economic valuations conducted in other regions and also in terms of the knowledge gap that exists in Irish residents' generic values for water related features

VALUES: The CE was used to estimate the Irish public's value for attributes representing the health of ecosystems, water clarity and smell, access to recreational activities and the condition of banks and shorelines. The results from the CE exercise highlighted that the most important attribute for respondents was water clarity and smell. On average, respondents were willing to pay approximately €42 per person per year to achieve good water clarity and smell and they were willing to pay approximately €30 to achieve a moderate level of this attribute. The third and fourth most important attributes for respondents were the good level for the health of ecosystem attribute followed by the low erosion level for the condition of banks or shoreline attribute. The respective Marginal Willingness to Pay (MWTP) for these attribute levels was €25 and €20 per person per year. The moderate levels of these attributes were associated with MWTP amounts of €17 and €14, respectively. The least valued attribute among respondents was the recreation attribute; respondents were only willing to pay €13 to access waterbodies for primary recreation contact and they were willing to pay €11 to access waterbodies for

secondary recreational activities. This latter finding may be due to the fact that the majority of respondents in the survey participated in visual-only recreational activities. The report found that societal welfare was increased the most by improvements at river bodies followed by improvements at lakes and finally improvements at the sea. However, the results were not statistically different. Overall, it can be said that, based on the results of the CE exercise, improving the quality of waterbodies to the best levels of the attributes considered in this study would result in aggregate welfare gains to the Irish public worth **€214 million – €250 million** for river bodies, **€204 million – €237 million** for lakes and €184–€214 million for seas.

Willingness to Pay for Achieving Good Status across Rivers in the Republic of Ireland, EPA, 2014

ABSTRACT: One of the main objectives of this research was to examine public attitudes towards water quality related issues and the importance that the general public places on these compared with other potential environment issues. Findings from the study indicate that the general population places a high rating on water quality related environmental issues. Of the nine environmental issues explored, tackling poor drinking water quality and pollution of rivers and lakes were the top ranked priority issues across the sample. Damage from flooding was ranked joint third with damage to countryside and air pollution, and water pollution at beaches was ranked seventh (destruction of wildlife was ranked sixth, climate change eighth and growth of genetically modified crops ninth). Results from 614 respondents weighted to be representative of the population based on age, gender and social class indicated that 41% are using rivers for recreational purposes. Walking was by far the most popular activity, with 36% of the total sample undertaking this activity along rivers. Between 3% and 4% of the total sample engaged in either nature or bird watching, swimming, fishing or water sports relating to boats.

VALUES: Respondents were presented with a contingent valuation scenario where they were asked their WTP in increased annual taxation for a situation where 100% of river channels in the Republic of Ireland would achieve good status from the current situation of 68.9%. A statistical model was used to model respondents WTP using maximum likelihood estimation. Excluding protest responses, results show that over 50% of the sample indicated a €0 WTP for achieving 100% good status across Irish rivers from the current position. Results from this model indicate that socio demographic factors, such as actual income and subjective perceptions relating to

household financial status as well as education, were found to have a positive impact on the general public's WTP. Recreational use values were also found to have an effect in that average number of trips taken to the river for recreational purposes and average distance travelled for access were both positively and significantly associated with WTP. In addition, environmental values were found to be significantly associated with overall WTP. Finally, WTP values were found to be higher among respondents living in river basin districts where rivers were generally of lower surface water status. Mean WTP for achieving full good status across rivers in the Republic of Ireland was estimated at €19 per respondent per annum. Aggregating this up across the general population indicates a total WTP for achieving good status across rivers in the Republic of Ireland of **€65.35 million** per annum.

Economic Contribution of Private Boat Owners, Waterways Ireland, 2006²⁷

ABSTRACT: The objective of this report was to estimate the economic contribution of private boat owners to the economy. All members of the Waterways Ireland database of registered boat owners were sent a postal questionnaire to detail levels of expenditure and boating usage for the reference period of September 2004 to August 2005.

VALUES: At the high end of the scale there were respondents who spend up to €500,000 on the purchase of a boat, spend up to 365 days of the year boating and who spend relatively high amounts of money on regular and irregular expenditure associated with boating throughout the year. At the other end of the scale there were boat owners who spend as little as €150 on the purchase of a boat, spend only a few days per year engaged in boating and have a relatively low regular and irregular expenditure on boating throughout the year. In between the two extremes were the boat owners whose expenditure and time spent boating could be classified as medium. The typical number of days spent boating for this group was 45 per annum.

The median number of trips taken per annum was 15 and the median number of days spent on each trip is 3. The Shannon Navigation and the Erne System were identified by respondents as the most popular waterways visited in relation to the three most recent trips. The median amount spent on the last three trips was €200. The median number of nights was 3 and the median number of people in the boating party was between 2 and 3. Taking this into account it is possible to aggregate that a

typical trip of 2 people, for 3 days, spending an average of €122 per person per boating day, the contribution would be €732 for that trip. Cruising, sailing/boating, angling/fishing and water skiing were identified by respondents as the activity in which most engaged.

The total expenditure including boat purchase identified by respondents to the questionnaire was €3,859,270. There were 704 respondents, each indicating an average spend of €5,482 per annum. Aggregating this value for each of the 6,628 boat owners on the Waterways Ireland database, the total expenditure was estimated at €36,334,696.

Taking the average spend of €5,482 per annum and applying the EU Harmonised Index of Consumer Prices, average spend in 2016 could be estimated to be in the region of €6,080. Applying this average spend to the most recent record of boat owners on the Waterways Ireland database – 14,460 – results in an updated estimate of some €87,916,800.

Waterways Users Survey, Waterways Ireland, 2014

ABSTRACT: This survey was conducted with a sample of 1,247 recreational waterway users in October and November 2014. The survey outcomes indicate increased numbers taking part in walking and attending an event activity but a decrease in the numbers who were using the waterway for angling and/or private cruiser/barge activities. Almost half of users (45%) claim to know about the waterway as a consequence of living locally to the amenity. This was previously recorded at a level of 33% which suggests there may be greater engagement with the waterway at a local level since the last survey was conducted.

VALUES: The main motivation to using the waterway is to take part in a recreational activity (37%) but this incidence shows a considerable decline since the last study (52%). This decline may be a factor of the increased use by those living locally (up from 21% to 26%) in combination with the timing of the 2014 research (late in the boating season). The Barrow, the Lower Bann and the Royal Canal are most likely to be used for recreational activities. Walking is the most widely undertaken activity on the waterways and shows increased participation by users between 2010 and 2014 (from 62% to 67%). It is evident that some waterways are particularly suited to specific activities and account for higher than average participation i.e. angling, canoeing and rowing on the Barrow, walking, cycling and jogging on the Royal Canal.

²⁷. There is evidence that this survey was to be repeated on 2014 – see <http://afloat.ie/item/26588-take-part-in-the-waterways-ireland-survey-on-boatings-contribution-to-the-economy>.

The frequency of taking part in the most widely pursued activities varies considerably. Participation in walking and private cruiser/barge pursuits is most frequent – an average of 97 and 91 days per year respectively equivalent to participation every 3 to 4 days. Cycling and angling activities are undertaken roughly once a week based on the average of 76 and 55 days respectively over the course of a year. The party composition encountered on the individual waterways reflects the nature of activities undertaken at each location. The Barrow - most likely to be used for angling/canoeing/rowing - was more likely than average to be comprised of those visiting with friends or as part of a club/group and has largest party size, an average 4.04 persons. Similarly, the Royal Canal, which was most widely used for individual pursuits (cycling, walking, jogging) was most likely to have solo users and, correspondingly, has one of the lowest group sizes. In terms of duration of stay 7 in 10 (70%) users spent, or intended to spend, less than half a day on the waterway.

The waterways continue to be very positively rated in 2014 with 95% of users giving a score 'Very good' or 'Good' and this positive perception is apparent across most of the waterways. Although negative ratings are very modest, specific navigations that may benefit from short or medium term improvements are the Barrow and the Royal Canal (two navigations that have above average usage for key activities).

Demand for Water Based Leisure Activity, EPA (Forthcoming)

ABSTRACT: The objective is to estimate using revealed preference data, recreational water-users' valuation of water quality by Water Framework Directive status. The intention is to estimate demand preference models for water-based recreational activity across 24 locations on the island of Ireland as a function of water quality and other characteristics. These models will be used to estimate the value (willingness to pay) of water-based leisure activities (e.g. angling, boating, etc) (distinct from estimates of expenditures associated with such activities) as a function of site characteristics, including water quality. The analysis will be based on Waterways Ireland survey data of recreational water-users and water quality data from EPA and Dept of Environment, Northern Ireland.



2.3 THE ROLE OF INLAND WATERWAYS IN COMMUNITY HEALTH AND WELL-BEING

the “natural health service” – public infrastructure that supports everyday physical activity - a catalyst for social cohesion – a built environment that encourages healthy communities

As significant facilitators of walking, cycling and water based activities, Waterways Ireland has a role to play in reaching national targets in relation to physical and mental health. Public bodies that manage public lands and waters and provide opportunities for outdoor recreation enhance the delivery of programmes under the goals of:

- Increasing the proportion of people who are healthy at all stages of life;
- Reducing health inequalities, and
- Providing opportunities for healthy outdoor recreation, close to people and in all parts of the country.



Community Health & Well-being value: facilitating healthy and fulfilling lives		
Health benefits	Utility benefits	Well-being benefits
<i>Physical outdoor activity</i>	<i>Incorporating physical activity into everyday journeys to work, school getting to somewhere</i>	<i>Social capacity building & resilience Volunteering Education & training</i>
Key sources		Indicative values
<i>Economic Benefits of Accessible Green Spaces for Physical and Mental Health, UK Forestry Commission, 2005</i>		<i>€2,900 – the amount of health care savings per person per year as a result of reducing inactivity</i>
<i>Health Economics Assessment Tool (HEAT), WHO (appraisal of sample 100-120km of off road cycleway in the midlands)</i>		<i>€7.7 million – the amount of public goods benefit as a result of more active lifestyles</i>
<i>Peacock et al. (2005)</i>		<i>The addition of 3km of footpath generates £0.1million (approx. €170,000 in 2016 equivalent) - £1.0million (approx. €1.6M in 2016 equivalent) of avoided costs of physical inactivity to the economy, based on 16% usage by local residents</i>
Waterways Users Survey, Waterways Ireland, 2010 and 2014 <i>Percentages of types of use available – but needs to be cross-referenced with comprehensive visitor count data. Due to the small survey base and 2010 and 2014 surveys carried out a different times of some data not comparable</i>		<i>4% Increase of local use of waterways from 21% to 25%. 5% Increase in walking from 62%-67%.</i>
Waterways Ireland towpath automatic monitor data, 2014 <i>Further details on towpath user numbers required e.g. analysis of patterns of use, return/single direction journeys, amount of current/previous activity of users, factors which would influence higher usage etc.</i>		<i>As a sample – over August 2014 at St. Mullins monitoring point on the Barrow 1003 cyclists, 2416 walkers, (though it is not clear whether users are counted twice if returning along the same route) relatively evenly spread across the week with a noticeable increase in walkers on Sundays, suggesting regular local use with people probably travelling further on Sundays to avail of the towpath.</i>
Waterways Ireland <i>Further details required on nature of events, implications for organisations and members and resulting values generated in terms of social capacity building, education and volunteering programmes</i>		<i>Approximately 100 separate organisations have applied to use the inland waterways for a range of uses from arts and heritage events to water activities, walks and education programmes.</i>

Overview of relationship between public health and public lands in Ireland

HEALTHY IRELAND

'Healthy Ireland' (2013-2025) is a new national framework for action to improve the health and wellbeing of the country over the coming generation. The Healthy Ireland Framework has support from all Government Departments³⁰ and promotes the use of tools such as Health Impact Assessment. It reflects the international experience of a new approach to public health with a considerable emphasis on prevention. Importantly, it provides for new arrangements to ensure effective co-operation between the health sector and other areas of Government and public services.

The imperative for a preventative approach to physical and mental health in Ireland is brought home by stark figures. In Ireland,

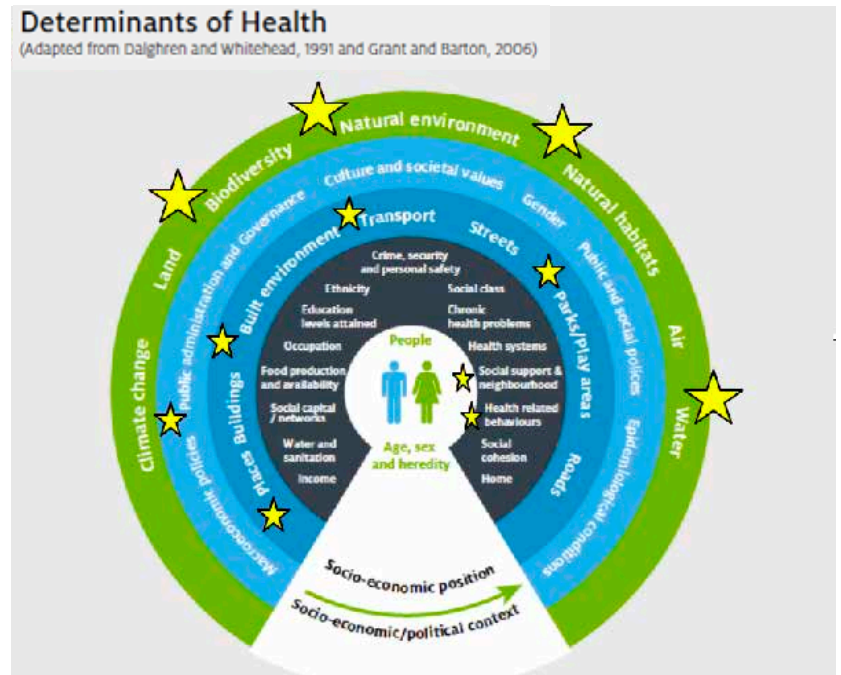
- 61% of all adults and 25% of 3 year olds are overweight or obese
- 75% of people over 50 are either overweight or obese
- Obesity is the leading cause of cancer in non-smokers
- The mortality rate from suicide in the 15-24 age group is fourth highest in the EU

The Healthy Ireland Framework sets a target to increase the number of adults by 5% and the number of children by 5% with a healthy weight by 2019. There is a target to increase by 20% the proportion of population undertaking regular physical activity. While no specific targets are set, there is also a commitment to reduce suicide rates and increase the wellbeing of the population.

Public Health and the Waterways

Introduction

Waterways delivers on the following determinants of population health as set out in the Healthy Ireland Framework:



Along with the obvious physical benefits of walking, hiking, running, orienteering, paddling etc. that accrue to outdoor recreation users there is a growing body of work that indicates that interaction with the outdoors (in whatever form people engage with the outdoors) contributes significantly to their psychological and general mental well-being. The Countryside Recreation Network (UK and Ireland) has produced a valuable synopsis of these benefits – *Public Health and Well Being, The Transformative Power of Outdoor Recreation* - which clearly sets out the potential of public lands to play a part in the health agenda of the country. In Ireland a pilot project is currently being conducted by Coillte and the HSE (Wicklow Mental Health Services) to evaluate the benefits of regular outdoor forest based recreation on health outcomes of prescribed patients. Early results appear to demonstrate real and positive outcomes.

The Irish Sports Monitor series from 2007-2009 has identified that people who live in isolated areas have a tendency to be less active compared to those who live in urban areas. This would indicate that accessibility to well-maintained outdoor recreation facilities or public walking routes is a key factor in the participation in outdoor recreation, a conclusion backed up by a substantial body of international research linking green infrastructure and human health.³¹

30. Healthy Ireland, A Framework for improved health and wellbeing 2013-2025. 31. <http://gievidencebase.botanicgardens.sa.gov.au/contents/human-health-and-well-being?item=1276#Links-between-Green-Infrastructure-and-physical-activity>

Everyday walking and cycling in easily accessible public areas have been identified as key means by which people can build physical activity into their lifestyles.

British Waterways (2008) reports the results of towpath visitor surveys conducted in 2003 which found an average 62% of respondents indicated that the presence of a canal increased the amount of physical activity they regularly undertake.

Waterways Ireland manages and maintains approximately 500km of waymarked walking routes along towpaths in Ireland, as well as unmarked towpaths used for informal walking, passing through urban and rural areas and linking towns, villages and providing off road networks in cities.

The economic benefits of waterways enabled public health and wellbeing

The majority of people using the waterways and towpaths do so free of charge as a ‘means to an end’ or for informal recreation purposes. In addition to the economic stimulus of expenditure, the provision of towpath trails provides non-marketed public good benefits for users and at local and national level. These public good benefits are economic benefit in that they represent an addition to economic welfare. Public good benefits arise from:

- Well-being benefits
- Utility benefits
- Health benefits



WELL-BEING BENEFITS	UTILITY BENEFITS	HEALTH BENEFITS
<p>Access to towpath trails is free. However, users benefit for a variety of reasons which means that, in principle, they would be willing to pay. For users, this public good benefit arises from the pleasure they receive for a variety of reasons from countryside access, to social interaction to exercise, perceived personal health benefits and psychological well-being. These benefits can be broadly grouped into use values (associated with recreation), indirect use values (health, benefits from the surrounding landscape, wildlife viewing opportunities) and non-use benefits (associated with knowing that the amenity is there including for others and future generations).</p>	<p>Local people often welcome the new recreational opportunities. The utility benefits will be similar to those of users from further afield, but the improved opportunity for exercise and alternative sustainable transport will also improve the liveability of the local environment. In particular, it provides children, young people and anybody without access to a car with safer access to the countryside and amenities such as schools or shops. In the final round of the An Taisce’s Green School Travel survey for 2013, 58.5% of school children claimed that they would prefer to cycle to school when in fact only 3.6% actually do so. Distance, but also road traffic and safety would be factors that discourage parents from allowing their children to cycle to school. Potentially, these benefits will be transferred to an increase in property values. However, this positive impact may have more relevance to urban and suburban waterways, where well-managed facilities are used for amenity, exercise and cycle commuting.</p>	<p>Health is an area in which private and public benefits are intertwined. There are significant long-term health benefits from maintaining personal fitness, although it is notoriously difficult to attribute overall health benefits to any one activity. Many instances of heart disease, type-2 diabetes, breast cancer and colon cancer could be avoided by maintaining a moderate level of activity for 30 minutes each day. There is also evidence that outdoor exercise is beneficial to psychological well-being. In Ireland, around 60% of adults take insufficient physical activity and 16% are classed as inactive (ESRI, 2011). Children can be deterred from taking exercise by a lack of safe roads or other exercise opportunities aside from field sports. Only 51% of boys and 38% of girls undertake the amounts of exercise recommended by the Health Service. By the age of 15 these figures have fallen to 27% and 13%. As well as supplying utility benefits to the individual, physical exercise contributes to improved public health, to reduced personal and state expenditure on healthcare.</p>

Value to public health of local walking/cycling use of inland waterways

A case study – St Mullins on the Barrow, August 2014

Increases in local physical activity

Using the available data from Waterways Ireland visitor surveys and monitoring and bearing in mind the caveats associated with the surveys, the following assumptions could be made for a single monitoring station at St. Mullins along the Barrow:

- 3419 individual walking/cycling incidences recorded by automatic counter over August 2014
- It is not possible from the counter data available to accurately differentiate between local walkers/cyclists and those using the long distance Barrow Way however, the Waterways Visitor Survey, 2014 has found that 25% of waterways use is local.
- Therefore it is assumed that 855 individual local walks/cycles were undertaken in August 2014
- Being conservative, it is assumed that each walker/cyclist is returning along the same towpath, and therefore total number of walks/cycles undertaken is 428
- The 2014 visitor survey found that 3 in 10 of visitors are regular users
- Therefore 129 of these trips may have been undertaken by individuals who regularly use (say weekly) the towpath. With this assumption, 129 of these trips represents 32 individual walkers/cyclists.
- Adding these 32 regular users with the remaining 299 less regular walkers/cyclists (assuming they only walked/cycled once in the month) – a total of 331 individual walker/cyclists can be assumed to have used the towpath at St. Mullins in August 2014.
- Using the Visitor survey data of a 4% increase in walkers from 2010-2014, this would represent an increase of 13 local people using the towpath in this location from 2010.
- **Using the figure of €2,900 per person for the health savings of reducing inactivity, and assuming that each of these 13 people had generally reduced their inactivity rather than transfer from other activities, this could result in a conservative value of €37,000 per annum health savings arising from the provision of walking/cycling infrastructure for local use in the month of August 2014 in this single location along the waterway network. If it was assumed that the automatic monitor is recording individual walks rather than return trips, this figure would rise to €74,000 per annum health savings.**

While the figures stated above would need to be tested with more targeted research, this exercise shows how Waterways Ireland visitor monitoring/surveys could be tailored to build a national picture on health care savings resulting from increases in physical activity of those living near inland waterways as a result of the provision of walking and cycling infrastructure. Important data to capture would include; current or previous activity levels of visitors, numbers of visits per week and length of walks/cycles etc.

General public goods benefits arising from more active lifestyles

We know that 100-120km of off-road cycle-paths in Offaly are potentially worth €7.7m in public goods benefit as a result of more active lifestyles – using the World Heritage Organisation's Health Economics Assessment Tool. The Grand Canal forms the spine of this proposed walking / cycling network forming over 50% of the enabling infrastructure to achieve these savings.

It is possible to extrapolate generally, bearing in mind the total of 500km of waymarked walking routes managed and maintained by Waterways Ireland, a figure of **€32M - €38.5M in total for public goods benefit as a result of more active lifestyles** arising from the existence of the waymarked walking network along towpaths.

The role of Inland Waterways in education, upskilling, and fostering a volunteering culture

Inland waterways can provide opportunities for education and training in history, activities and nature. There is also evidence that outdoor education contributes to children's creative development and ability to cope in real-life situations. Outdoor education improves exposure to a range of cultures, talents and interests as well as improving social skills through participation and interaction. This is particularly important for children from low-income or disadvantaged backgrounds. A number of the most deprived communities in Ireland live within 5km of a waterway, increasing the potential to maximise these benefits.³²

Education is central to the promotion and realisation of the full range of benefits provided by inland waterways.

General evidence on WTP values has shown that the better informed or more knowledgeable the public is, the higher is their willingness to participate, protect and pay for inland waterways. It is also an investment in the future sustainable use of the waterways.

Outdoor fieldwork is found to positively reinforce the link between affective and cognitive learning. Outdoor adventure activities are also proven to improve student's personal efficiency and social skills.

Overall, strong evidence of the benefits of outdoor education has demonstrated both short term and long-term positive effects.

Job creation, skills development and labour market

Effective and sustainable management of our outdoor recreation infrastructure has the potential to create jobs, diversify local skill-sets and stimulate activity in the labour market.

- Maintaining and developing outdoor recreation facilities will demand significant manpower, boosting rural employment opportunities
- Skills acquired developing local outdoor recreation facilities are transferrable, allowing Irish businesses to successfully bid for work in other markets
- Offering opportunities to work on outdoor recreation projects has significant potential to stimulate the labour market and upskill the workforce

Understanding the value of volunteers

While Waterways Ireland does not have a formal volunteer programme at present. It is worth noting that tools are available to apply values to volunteer input.

The responses to the draft Waterways Ireland Heritage and Biodiversity Plan in 2014 indicated that more than 50% of respondents were willing to "assist Waterways Ireland in the implementation of the Plan" which would suggest a potential pool of volunteers and volunteer organisations willing to engage in activities supporting the waterways.

VIVA³³ is a measurement tool that assesses the 'outputs' of volunteer programmes (the value of volunteers' time) in relation to the 'inputs' (the resources used to support the volunteers). It therefore provides informative and readily grasped indicators of the scale and significance of voluntary work and the payback on an organisation's investment in volunteering. This method allows the estimation of a VIVA ratio. This is produced by dividing the total volunteer value by the total volunteer investment. For example, a total value of €50,000 and expenditure of €10,000 yields a ratio of 5. The Ratio has a simple meaning: 'for every €1 we spend on volunteers, we get back €5 in the value of the work they do', a five-fold return on the organisation's investment.



32. AIRO deprivation indices. 33. VIVA – the Volunteer Investment and Value Audit, A self-help guide, second edition, Katherine Gaskin, 2011

KEY SOURCES

Economic Benefits of Accessible Green Spaces for Physical and Mental Health, UK Forestry Commission, 2005

ABSTRACT: The overall aim of the study was to investigate the economic benefits, in terms of physical and mental health, of changes in the provision of accessible greenspace

VALUES: Permanent reduction of 1% unit in the UK sedentary population (from 23% to 22%) is estimated to deliver a social benefit of up to £1.44bn per year (£479m if older people are excluded from the calculation). This does not include psychological benefits from greenspace. The evidence on this aspect is limited but benefits may be substantial. It is estimated that healthcare savings equivalent to €2,900 per additional active person per year could be realised by reducing inactivity.

Health Economics Assessment Tool (HEAT), WHO

ABSTRACT: An approximate estimate of the public good benefits can be achieved by using the Health Economics Assessment Tool (HEAT) developed for the World Health Organisation (WHO). The HEAT tool does not calculate values for the population who are fit, inactive or taking insufficient exercise. Rather, it averages the benefits across the general adult population. The tool estimates benefits only for adults based on reduced mortality. Although there are significant benefits to reduced morbidity, the medical links and economic evidence is currently lacking. Therefore, the tool's estimates are argued to be conservative.

VALUES: By way of example of how this tool might be deployed for those who use the towpath trails for cycling or walking the chart below highlights the sensitivity analysis of health benefits under different assumptions.

		low	Most likely	high	higher
Proportion of trail users exercising more often					
Locals	Cycle/ walk 15km once per week	5%	5%	10%	10%
"	Cycle/ walk 15km twice per week	2.50%	5%	10%	10%
"	Cycle/ walk 15km three times per week				5%
Visitors	Cycle / walk 15km once per week	2.50%	5%	5%	5%
Economic benefits (€'000s)					
Locals	Cycle / walk 15km once per week	€636	€740	€1,480	€1,480
"	Cycle / walk 15km twice per week	€740	€1,480	€2,960	€2,960
"	Cycle / walk 15km three times per week	€0	€0	€0	€2,220
Visitors	Cycle / walk 15km once per week	€2,780	€5,563	€5,563	€5,563
Total		€4,156	€7,783	€10,003	€12,223

The highlighted column assumes that 10% of local users adopt fitter lifestyles due to the presence of the towpath trails such that;

- A cohort of 5% of local users cycle (or walk at moderate pace) an additional 15km single trip twice per week due to the availability of the facility.
- An additional 5% of local people cycle (or walk) an additional 15km single trip once per week.

In addition, it is assumed that:

- 2.5% of regional users cycle (or walk) 15km more once per week

On the basis of these assumptions, the estimated most likely public good benefits amount to nearly €7.7 million per year. This estimate is continuous and not discounted.

2.4 THE ROLE OF INLAND WATERWAYS IN PHYSICAL AND SOCIAL REGENERATION

Waterways as a catalyst/agent for change – rural, urban, suburban and peri-urban

Inland waterways are successfully being used as tools in place-making and place-shaping; in re-branding; in confidence-building; in attracting and generating investment; and in improving the quality of life in areas undergoing transformational change through regeneration, renewal and growth.



Regeneration value: <i>forming a central role in improving the places the inland waterways traverse</i>		
Focus for renewal, restoration, reuse	Realise property values	Engender a sense of place
<i>Regeneration related housing</i>	<i>Enhancing property values</i>	<i>Focus for placemaking and shaping</i>
<i>Regeneration related office and business use</i>	<i>Providing a catalyst for diversification</i>	<i>Attractive setting for development</i>
<i>Regeneration related restoration / reuse of waterways infrastructure</i>		<i>Tool for re-branding and image-changing</i>
<i>Regeneration related visitor accommodation</i>		
<i>Community asset transfer</i>		
<i>Social / community enterprises</i>		
<i>Facilitating asset transfer</i>		
<i>Key sources Action Plan for Grand Canal Dock and Spenser dock, WI, 2013</i>		<i>Indicative values - Up to 20% increase in property adjacent to urban inland waterway</i>
<i>Recreational Use of Towpaths, A Study Commissioned by the Inland Waterway Committee of the Heritage Council, Roger Butler, Inland Waterways Consultant, 2009</i>		<i>500km (approx.) the length of waymarked towpath walking trails under WI remit</i>
<i>Post-investment appraisal, Clondra, Waterways Ireland Further study is required to understand the additional dwell time and revenue spend of visitors and can be aligned with work being carried out by Failte Ireland over 2016</i>		<i>Increases in bed nights (80%), lock passages (28%) and Tidy Towns marks. Re-establishment of Development Association and Tidy Towns group and instigation of community-led projects and events.</i>
<i>While much UK data is available for benefit transfer, Irish research is required to provide more relevant data in terms of values derived from physical and community regeneration</i>		

Inland waterways and physical/community regeneration – a rural case study

Clondra, Co. Longford – Waterways Ireland collaborating for economic and social regeneration

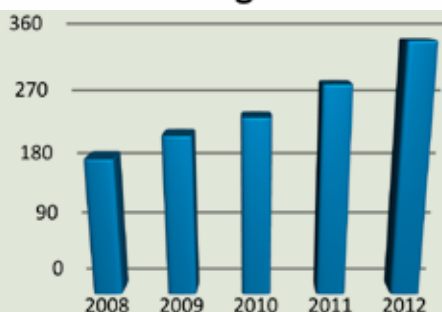
The waterway in this part of Longford is a key driver of social/economic potential. Building on its critical location at the junction of the Royal Canal and the Shannon, in 2008, Waterways Ireland and Longford County Council jointly developed waterway and waterside facilities at Clondra, Co. Longford. The community, visitor and boating facility development cost €1.3m, funded by Fáilte Ireland and took 18 months to deliver including;

- a community room,
- an information office,
- showers,
- toilets,
- a playground,
- a barge garden,
- restoration of Richmond harbour on the Royal Canal,
- installation of floating jetties on the Camlin River
- hard and soft landscaping
- street lighting

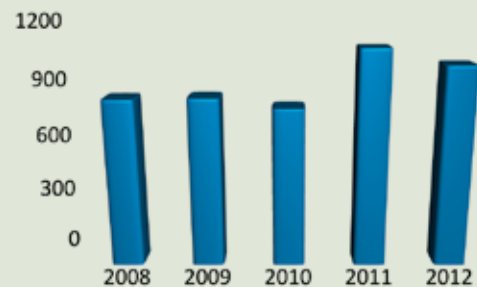
Waterways Ireland initial assessment of the impacts of the Clondra investment (qualitative and quantitative) has determined that:

Registered accommodation providers in Clondra have experienced a significant increase in the number of bed nights sold³⁴. The number of bed-nights sold in registered accommodation has increased by almost 80% between 2008 and 2012. The number of boats travelling to Clondra increased by 28% since between 2008³⁵ and 2012. Further study is required to understand the additional dwell time and revenue spend of visitors.

Bed Nights Sold



Clondra Lock Passages



A number of businesses have established and others have increased their revenue, including:

- establishment of boat hire base;
- establishment of canoe school;
- opening of self-catering accommodation.
- establishment of a Chandlery and Boat Repair business
- increased revenue for local pub
- the formulation and adoption of the first ever Local Area Plan for Clondra by Longford County Council;

³⁴. Fáilte Ireland Tourism Content System. ³⁵. Waterways Ireland Lock Passage Register

Waterways Ireland supporting social capacity building & community resilience

Recognising the value of active citizenship for mental health, Action 2.6 of Healthy Ireland, tasks “all relevant government departments, statutory agencies, C & B bodies and private sectors” to “analyse existing community support infrastructure to promote and enable active citizenship and volunteering across the lifecycle. Where possible, these supports will be consolidated and strengthened, so as to increase the proportion of children and adults of all ages involved in these activities”.

As part of the approach to developing a Blueway along the Shannon, Waterways Ireland investment into the waterside facilities and amenities at Clondra has resulted in the resurgence of active citizenship in the village. Former community structures and community arrangements were revitalised and re-established – **the Clondra Development Association and Tidy Towns committee** - and local residents became pro-active in developing a range of complimentary services and initiatives. This social capacity building has resulted in:

- a significant increase in Tidy Towns marks for the village.

Year	Marks
2008	250
2009	258
2010	268
2011	272
2012	275

- the establishment of a number of **community activities** (classes, workshops, festivals)
- a **pro-active community** which has developed a range of complimentary services and initiatives.
 - **Three looped walks** were developed linking Clondra with Tarmonbarry, Clondra with Killashee and Clondra with Longford.
 - **Refurbishment of the Old Lock House** was begun.
 - **Picnic and barbeque facilities** were developed and **interpretation signage and brochures** were produced.

Clondra now has two festivals and a range of summer camps are available which all utilise the facilities developed by Waterways Ireland and Longford County Council

the development of the harbour “was like a shot in the arm – we approached issues with a new sense of purpose and drive”.

we realised that the harbour development provided us with a great foundation and we began to bolt on other developments to it – it was the catalyst for all we see today

new blood was infused with the old into the community association, different groups were re-established, while the Tidy Towns committee has a renewed purpose

the community has a huge sense of pride of place since the development

The project also stimulated the formation and adoption of the first ever Local Area Plan for Clondra by Longford County Council. Further surveys are taking place within areas being developed as Blueways over 2016 – there is an opportunity here for including questions to the surveys which can monitor and provide evidence for starting to apply monetary values to the effect of Waterways Ireland on supporting social capacity building & resilience.

INLAND WATERWAYS AND PHYSICAL/COMMUNITY REGENERATION – URBAN CASE STUDIES

Grand Canal Dock and Spencer Dock, Dublin

Grand Canal Dock and Spencer Dock represent the urban gateway to the Grand and Royal Canals. Located in Dublin’s Docklands, the regeneration of the former docklands around the two canal docks has presented Waterways Ireland with a singular opportunity to position the dock areas as significant city leisure destinations and the city’s principal water-focused amenity destination area. The vision is to capitalise on the distinctive setting, heritage value, cultural and gateway status of the Docks’ areas to reinforce the docks as significant social and economic drivers for the city and to accentuate their importance as the gateways to the inland waterways network of Ireland.

Waterfront locations have been shown to raise the value of properties located close to them, in the case of residential properties by up to 20% of their value³⁶. These effects, while powerful, accrue to the landowners in the first instance and only occur once. However, they can help support the sustainable development of an area by increasing the desirability of a location for new residents and businesses.



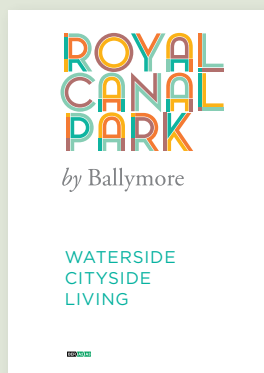
Ashtown, Dublin

Dublin City Council prepared a Local Area Plan for Ashtown/Pelletstown using the Royal Canal as a key determinant of building, green infrastructure and open space layout. New developments at Ashtown draw heavily on their proximity to the canal – and the fact that the canal is in good working order - to provide high quality open spaces and visual amenity for new residents. Residential development and associated open space was created alongside approximately 1km of the canal towpath, with new surfaces, safe access points and moorings, dedicated cycleways and significant

landscape work. Works were funded as part of planning gain linked to the development and were constructed by a contractor working for the developer. Waterways Ireland has taken over the long term maintenance.



Royal Canal Park



This new development uses the Royal Canal as a key part of its branding and marketing. The canal, and its healthy state is used to communicate quality of life, green surroundings and links to the city – “7 minutes by bike to the Pheonix Park”. Ultimately, the name of the new development shows the marketing value of proximity to the restored canal.

³⁶. Action Plan for Grand Canal Dock and Spencer Dock, Waterways Ireland, 2013

2.5 THE CONTRIBUTION OF INLAND WATERWAYS TO THE PUBLIC SPACE NETWORK AND SUSTAINABLE TRANSPORT

connecting places to enable sustainable transport options and maintaining the quality and usability of public spaces

Contribution to public space network and sustainable transport <i>Providing off-road connectivity, supporting sustainable forms of transport and enhancing sense of place</i>			
Facilitating journeys to work / getting to somewhere	Way-finding Connection of open spaces and parks	Linking and connecting redevelopment and regeneration sites	Sense of continuity – sustainable management of heritage resource Facilitating / safeguarding views and prospects – visual amenity Provision of spatial complexity
Connecting urban areas with the wider countryside			
Key sources		Indicative values	
<i>Valuing Walking – Evaluating improvements to the public realm, D Heuman, P Buchanan, M Wedderburn, R Sheldon, Colin Buchanen and Accent MR, August 2005</i>		WTP benefit per km walked: (stg. 2005) Evenness 0.008 Signs 0.005 Info panels 0.008 Total 0.021	
<i>Dublin City Canals, Scott Wilson, Recreation, Tourism and Commercial Product Identification Study and Development of a Maintenance and Investment Framework, January 2010</i>		By far the most popular activity along the canals is walking with 53% “utility walking”, that is walking to a specific destination 43% of those who live or work near the Grand and Royal canals in Dublin use it daily or several times a week – the most popular use being using the towpath as part of their commute to work (22%), cycling (28%), sitting (27%), access to the LUAS (13%) or jogging and running (13%)	
<i>SQW Consulting 2008, Planning for cycling: Executive Summary, Stockport</i>		Total benefits: (for each new cyclist, cycling regularly for one year, assuming that 50% of cycle trips replace a car trip) Urban off-road: £641.46 Rural off-road: £579.06	
<i>Recreational Use of Towpaths, A Study Commissioned by the Inland Waterway Committee of the Heritage Council, Roger Butler, Inland Waterways Consultant, 2009</i>		500km (approx.) the length of waymarked towpath walking trails under WI remit	
<i>Garner et al (1995)</i>		Assessment of 2 scenarios: 1. Maintaining current river recreation 2. Improving river, though river restoration scheme Today’s vist: £6.86/adult With restoration scheme: £8.75/adult/visit £25.67/adult/year	
		<i>Further data on the number of users of urban canals would be required to complete the generation of values for contribution of inland waterways to sustainable transport</i>	
		<i>Further information on number of public spaces managed by Waterways Ireland would be required to complete calculations on values associated with contributing to the public space network.</i>	

The Inland waterways supporting sustainable transport

For historic reasons, Ireland has a very high distribution of individual private landholdings, which can present challenges when planning and implementing sustainable transport routes. This was demonstrated by the relative ease of the implementation of the Dublin-Athlone section of the Eurovelo 2 route across Europe - following the Royal Canal for 91km - and the difficulties experienced in implementing the Galway Eurovelo route which crosses private land. Waterways Ireland's continuous linear land ownership in the form of waterways and towpaths - play an important role in widening travel choices for cycling and walking in both rural and urban areas.

The towpath network provides a motor-vehicle-free environment in which to travel to work, school or home.

It has been estimated that and 100 tonnes of carbon dioxide (CO₂) are saved per 1km of towpath upgraded³⁷.

Towpaths are generally flat, with few steep gradients and with appropriate design and care can be readily accessed by wheelchair users, those with restricted mobility and parents with child buggies while also accommodating cyclists, anglers and moorings where necessary. The interventions required for shared accessibility were set out in a 2009 Heritage Council report³⁸.

Many Dublin City strategic documents refer to the value of the Grand Canals in providing transport links, open space and heritage value to adjoining city areas³⁹. National Policy supports walking and cycling as sustainable transport methods which will reduce congestion in cities⁴⁰ and encouraging walking is key to delivering sustainable transport solutions. Walking and cycling are the only transport modes that have positive externalities i.e. their use has benefits for society. Walking reduces traffic, is good for health, lowers crime, revitalises urban areas and improves air quality.

The shortage of mass transit around Dublin had led to increased traffic congestion, with an overall congestion level of 38%. If only peak morning and evening hours are considered, the congestion index surges to 81%, ranking Dublin as the ninth most congested city of any size among more than 200 cities monitored. The Waterways Ireland towpaths in the city context therefore offer valuable sustainable transport links, if connected into a wider network of cycle and walking infrastructure. The Royal and Grand Canals have formed strategic links in both implemented and planned cycle networks.

Within rural areas, the towpaths provide walking and cycling links between settlements and are the focus for broader sustainable rural transport networks such as the Midlands Cycle Destination project, which relies on the Grand Canal as a key linking route.

The links between active travel and health

There is increasing evidence of the link between adult obesity levels and travel behaviour, one indicator of which is that countries with highest levels of active travel generally have the lowest obesity rates⁴¹. Targets of 30 minutes of moderate exercise for adults such as brisk walking on at least 5 days of the week can be achieved by helping people build activity into their daily lives. Those that walk or cycle on canal towpaths are likely to be less at risk from the health impacts of traffic-related air pollution.

As well as being a transport artery, waterways are a form of open space, performing a variety of functions. As part of the open space network, inland waterways and towpaths perform multiple functions, such as:

- strategic links between areas;
- important wildlife corridors;
- a recreation and sport resource;
- accessible amenity in urban areas;
- access to the countryside;
- visual amenity; and
- a community resource.



³⁷. Town and Country Planning Association Policy Advice Note: Inland Waterways, July 2009 ³⁸. Recreational Use of Towpaths, A study commissioned by the Inland Waterways Committee of the Heritage Council, 2009. ³⁹. Dublin City Canals, Scott Wilson, Recreation, Tourism and Commercial Product Identification Study and Development of a Maintenance and Investment Framework, January 2010, Section 2. ⁴⁰. Smarter Travel Policy – A Sustainable Transport Future 2009-2020, National Cycle Policy Framework. ⁴¹. Bassett, D, Pucher J, Beuhler R, Thompson D, Crouter S, 2008, Walking, cycling and obesity rates in Europe, North America and Australia, Journal of Physical Activity and Health, 5:795-814

KEY SOURCES

Dublin City Canals, Scott Wilson, Recreation, Tourism and Commercial Product Identification Study and Development of a Maintenance and Investment Framework, January 2010

ABSTRACT:

Scott Wilson were commissioned by Waterways Ireland in conjunction with Dublin City Council, Fáilte Ireland and the Dublin Docklands Development Authority to undertake a study to identify the recreational, tourism and commercial potential of the Dublin City Canals (Royal Canal and Grand Canal) and associated docks within the Dublin City Council boundary. Between 12th January and 6th February 2009 a web based questionnaire was made available to identified stakeholders with an interest in Dublin Canals and Dublin Residents. 450 full or partially completed questionnaires were received.

VALUES:

56% of respondents lived near the canal, while 45% were canal users and 21% worked near the canal. Over four out of ten respondents used the canal daily (21%) or several times a week (22%), 17% of respondents used the canals once a year or less. By far the most popular activity along the canals is walking, either recreational walking (72%) or walking to a specific destination (53%), with other significant proportions using the tow paths as part of their commute to work (22%) or as access to the LUAS (13%) or for jogging or running (16%). Boating was the next most significant activity, involving over a quarter of respondents (28%). The next two most popular activities were cycling (28%) and sitting (27%). Visits to waterside cafes/restaurants or bars were taken by 23% of respondents. There was a wide range of other activities undertaken by a smaller proportion of visitors, namely nature studies, visiting events, fishing, visiting tourist facilities, canoeing and rowing.

KEY SOURCES

2004 Waterways User Survey (Grand Canal data)

ABSTRACT: In 2004 Waterways Ireland commissioned an extensive user survey which included use of the Grand Canal. Survey points included the Grand Canal Dock (100 questionnaires completed).

VALUES:

Profile of Waterway Users

While the majority of respondents on the Grand Canal were resident in the Republic of Ireland (87%), there was a small number of users from overseas (Britain (6%), Germany (2%) and 1% or less from other countries).

The majority of users were **regular users (41%)** and/or **locals (30%)**. Seventy three percent of respondents on the Grand Canal were male. The average party size was 3.6 persons, however a significant proportion of respondents were at the canal on their own (29%).

Activities

The main activities undertaken by respondents on the Grand Canal were walking (32%); private boating (26%) and angling (25%) and most of these users were experienced or very experienced at these activities.

Valuing Walking – Evaluating improvements to the public realm, D Heuman, P Buchanan, M Wedderburn, R Sheldon, Colin Buchanen and Accent MR, August 2005

ABSTRACT:

This paper examines how pedestrians value the walking environment. It reports on stated preference research into walkway improvements and examines how benefits to users have been assessed for a number of walking projects. This paper focuses on the evaluation of quality benefits, which represent some of the most important reasons for funding and justifying improvements to the walking environment. A distinction is made between “striders” – those who walk with a clear destination and “strollers” – users who may not have a clear destination. Since walking is a public good, there is no fee for the quality of experience that users obtain from making use of the public realm. However, users clearly do value the public realm and were it feasible (or sensible) to charge for it then users would be willing to pay for improvements. Stated preference techniques offer a means to assess that willingness to pay. 700 interviews were undertaken in a range of locations. The findings of this research has been incorporated into WAVES, a model developed by Colin Buchanen to place money values on quality benefits for walkways.

VALUES:

The results show that pedestrians are willing to pay for improvements to the areas that they use. The values for improving street lighting, crowding, kerb level, information panels, pavement evenness, directional signage bench provision and cleanliness were most frequently between £50 and £100. The mean total willingness to pay for the combined series of measures was £119. The largest variation in values was related to whether the walking was to take place in a “built up” or “open environment”. Evenness of pavements was more than three times as important and cleanliness was 25% more important in built up areas, rather than open

areas. This would suggest that respondents are more tolerant of path unevenness in less built up areas.

SQW Consulting 2008, Planning for cycling: Executive Summary, Stockport

ABSTRACT:

This research sets out a summary of the monetary values that have been estimated for one new cyclist, cycling regularly for a year. A model was developed with four different scenarios: urban on-road, urban off-road, rural on-road and rural off-road. The greatest impact that cycling has is on the health benefits of additional cyclists. If new people can be convinced to cycle, around two thirds of the economic benefit generated does not depend on the location or type of facility.

VALUES:

The scenarios suggest that the annual economic benefits range from around £540 to £640 per additional cyclist with the greatest economic benefits for cycling generated by urban off-road projects and least by rural on-road ones. The average benefit per additional cyclist is £590 per year. The benefits quantified include health, values of loss of life, NHS savings, productivity gains, reduction in pollution and congestion, and improvement in ambience.

Total benefits: (for each new cyclist, cycling regularly for one year, assuming that 50% of cycle trips replace a car trip)

- Urban on-road: £601.06
- Urban off-road: £641.46
- Rural on-road: £538.66
- Rural off-road: £579.06



2.6 THE ROLE OF INLAND WATERWAYS IN WATER SUPPLY

agricultural, manufacturing, construction, power generation, fire-fighting, drinking

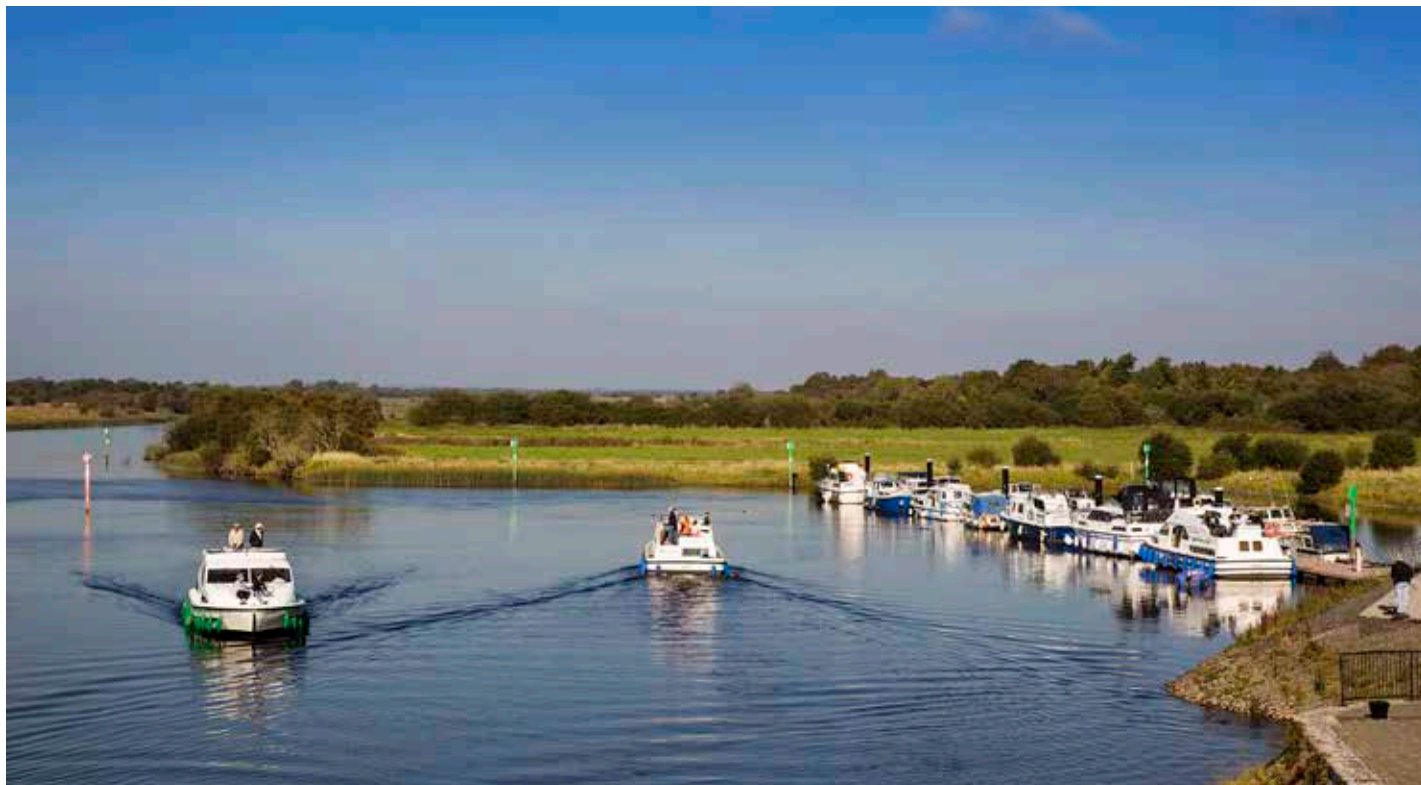
Water Supply Systems

Waterways Ireland has a role in the supply of water for agricultural, manufacturing, fire-fighting, construction, power generation and drinking purposes. Having the ability to abstract water and the capacity to sell it can provide financial benefits for the organisation. Waterways Ireland currently sells water, primarily for commercial and manufacturing purposes rather than for residential water supply purposes. In addition to this, water is made available in rural areas for the watering of livestock. With regard to the water supplied for commercial and manufacturing purposes it can be abstracted on a 'take and return' basis, thereby providing an environmental benefit not applicable to main water supply. Many agreements are historic and the costs are minimal. The value of this provisioning service is greater than the current charges.

In 2015, a total of 15 agreements for water supply are in place with a total income of approximately €40,000. The two key customers use between them an average of 240,000m³ of water annually. The cost of supply per m³ varies by recipient.

It is assumed that much of the water is supplied in open channels and therefore there is no treatment cost to the organisation for these abstractions thereby reducing the need for pumping around the network and lower infrastructure costs. It is further assumed that there is no trade-off between water abstraction and other uses of the waterways, for instance navigation or recreation – therefore it is assumed that there are no significant dis-benefits associated with this abstraction. Dis-benefits could include reduced flows, resulting in reduced ability for navigation, reduced recreational enjoyment and wider environmental and biodiversity impacts.

It is likely that supplies of water will become more valuable over the coming decades. A moderate climate change scenario could reduce water available for immediate abstraction by 10% by 2060.⁴² Investment costs in securing water supplies could be higher if climate change impact is greater and the growth in water demand is unconstrained. There is scope for further research into the total value of water supply for various purposes facilitated by the inland waterways.



⁴². UK National Ecosystem Assessment Working Paper, Economic Assessment Freshwater, Wetland and Floodplain Ecosystem Services, Freshwaters: Morris and Camino 2011

2.7 THE ROLE OF INLAND WATERWAYS IN RENEWABLE ENERGY SUPPLY AND GENERATING CARBON SAVINGS

Waterways support and carbon reduction / climate change adaptation initiatives by:

- assisting in the mitigation of flood risk;
- playing a role in urban cooling;
- providing sustainable transport routes;
- supporting biodiversity and forming ecological corridors; and
- Contributing to regional and local renewable energy targets through providing a resource for onshore hydro-electric power and the use of canal and dock water for heating and cooling buildings.

With the publication of the Climate Action and Low Carbon Development Act 2015, and the issue of a draft National Adaptation Framework by the Dept. of the Environment, Community and Local Government in March 2016, Waterways Ireland are in a position to demonstrate the role that they can play in helping to increase the resilience of the state to the effects of climate change. The cost of not adapting to climate change is put at €100bn a year by 2020 across the EU. This includes economic losses caused by extreme weather events, and health impacts.

Renewable energy supply and generating carbon savings: enabling the transition to a low carbon society			
<i>Carbon sequestration/ climate regulation</i>	<i>Urban cooling – canals and docks Hydro power</i>	<i>Urban heating – canals and docks</i>	<i>Hydro power</i>
Key sources		Indicative values	
<i>Town and Country Planning Association Policy Advice Note: Inland Waterways, July 2009</i>		<i>100 tonnes of carbon dioxide (CO2) are saved per 1km of towpath upgraded.</i>	
		<i>Further opportunities exist for Waterways Ireland's in house environmental team to prepare response to the National Climate Adaptation Framework</i>	



Renewable energy

Carbon saving benefits from renewable energy could be provided by any waterway used for energy generation (or in fact any ecosystem) and so are not specific to navigable waterways. That said, navigable waterways may provide particular opportunities for the generation of renewable energy, for instance hydropower developments in association with existing weirs.

In hindsight, the removal of Dublin trams and the broad rail network from the 1950s and 60s were overly hasty, and represented the loss of valuable infrastructure - deterioration of the navigable waterways would be a similar oversight.



Heat exchange for air conditioning

The inland waterways in Ireland are already used for a number of heat exchange systems and opportunity exists to expand in this area. A scheme recently announced by GlaxoSmithKline (GSK) on London's Grand Union Canal uses 'heat exchange technology' where water from the canals is used to air condition its offices, reducing carbon dioxide emissions. GSK expects to save £100,000 in energy bills a year and cut carbon emissions by almost 1,000 tonnes. British Waterways estimates a further 1,000 businesses alongside its urban waterways could also harness the opportunity, primarily large offices that use considerable amounts of energy cooling their buildings as a result of the large amounts of heat generated by computers and lighting. British Waterways (2008) notes that there is the potential to generate 5 MW of energy through heat exchange technologies. They estimate this could save around 4,600 tonnes of CO². This suggests that each mega watt of energy could save 920t CO² annually.

Sustainable freight transport

While the Irish navigable waterways are not currently used for transport of freight, the need to find sustainable solutions for transit of goods, waste and construction materials shines a new light on the original purpose of the navigable waterways. There are many examples around the world of countries returning to the original purpose of inland waterways as sustainable freight transport, the latest being Paris which bans to ban diesel vehicles from 2020. In this city, "micro ports" are being developed alongside recreational infrastructure for to allow for transport of construction material and to enable supermarkets to utilise the waterways for deliveries. Franprix supplies 135 of its 350 shops via the Seine, taking 2,600 trucks off the city's roads each year and saving the equivalent of 300,000km of road transit.

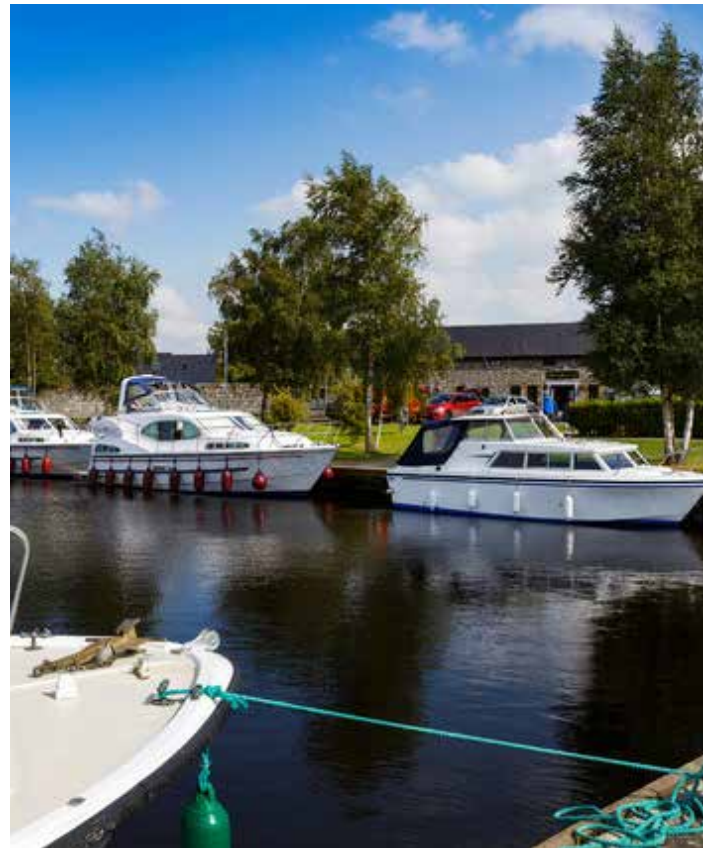
2.8 THE ROLE OF INLAND WATERWAYS IN UTILITIES AND TELECOMMUNICATIONS FACILITATION

Providing a continuous linear public land holding for facilitation of planning and implementation of power distribution and connectivity

In addition to licence agreements relating to telecommunications installations, other third parties and utility companies have been granted licences to facilitate the installation of cables and pipes on Waterways Ireland property e.g. electricity, gas etc. These are undertaken in an ad-hoc basis as applications are received by Waterways Ireland – 23 agreements were in place in 2015. Waterways Ireland is presently negotiating with two companies with regard to further telecommunication installations along the Grand and Barrow Canals in order to further increase connectivity.

Further research in this area would enable values to be ascertained for the benefits of linear public land holdings in terms of:

- contribution to grid,
- contribution to rural connectivity, and
- contribution to renewables transition



A CASE STUDY

Waterway Ireland towpaths currently facilitate two lengths of telecommunication installations:

Royal Canal:

Shaws Bridge, Kilcock to Pakenham Bridge, Dublin 17.4km

Shaws Bridge, Kilcock to 600 metres west of Allen Bridge, Kilcock 1.3km

Grand Canal:

Sallins to the 12th Lock 17.2km

12th Lock to 3rd Lock, Inchicore 8.4km

Total Distance: 44.3km

The revenue to WI for the telecommunications installation is approximately **€75K per annum.**

Other agreements for the use of sub-ducts generated revenue of approximately **€150,000.**

2.9 THE ROLE OF INLAND WATERWAYS IN MAINTAINING WATER QUALITY AND ECOSYSTEM HEALTH

through regulating, testing, reporting and water filtration and supporting ecological biodiversity

Water Quality and recreation

Waterways Ireland reports at national level on water quality as part of Ireland's compliance with the Water Framework Directive. Establishing the link between improved water quality status and enhanced recreational experiences is an important consideration for Waterways Ireland. In the first instance it is important to have a meaningful water quality indicator recognisable and understood by recreational users - such as the Blue Flag for beaches. Objective measures used to date for measuring water quality, have included levels of suspended solids, levels of harmful bacteria and water clarity. Subjective measures have also included water clarity as well as Likert scales. While water clarity may be a useful indicator of water quality for activities such as swimming and boating, it may be less useful for anglers who are more interested in fish stocks and catch rates. Fish catch rates are a commonly used quality indicator within angling recreational demand models, but catch rates also depend on angler skill and fishing pressure. In addition, while water clarity may be a useful quality indicator for game species, such as trout and salmon that need high quality water habitat, coarse species can thrive in more eutrophic murky waters. A more complex indicator of water quality, such as ecological status, may more useful in recreational angling demand models.

Water quality and ecosystem health; contributing to Irelands' green and blue infrastructure			
<i>Soil formation</i>	<i>Ecological biodiversity</i>	Regulating Monitoring and reporting of environmental data (National/EU scale)	Scientific research sites
Pest and disease control	Waste decomposition and detoxification	Nutrient recycling	Water filtration
Key sources		Indicative values	
<i>Ireland's National Biodiversity Plan (2011-2016)</i>		The value of national ecosystem services, in terms of their productive output and human utility is over €2.6 billion per year <i>Further work is required to understand the contribution of Waterways Ireland's lands and waters to this figure</i>	
<i>Water Quality and Recreational Angling Demand in Ireland, ESRI, 2015</i>		The additional benefit of angling in waters with high versus low ecological status was the highest for game anglers at a mean of €122 per day. With surveyed anglers fishing on average 10 days per annum the total loss to recreational anglers associated with poor water quality is potentially very large. On average, across the different target species surveyed, anglers have a willingness to pay of €371 for a day's fishing.	
<i>Ecovalue, Valuing the ecosystem services of Irish Forests, Teagasc, 2015</i>		The annual value of forest biodiversity in Ireland is estimated to be €68 million.	
<i>European Commission (2012). The Multifunctionality of Green Infrastructure. Science for Environment Policy. In-depth Reports, European Commission's Directorate-General Environment.</i>		<i>Report data can be analysed in conjunction with Waterways Ireland in-house environmental team datasets</i>	
<i>Vandermeulen, V., A. Verspecht, et al. (2011). "The use of economic valuation to create public support for green infrastructure investments in urban areas." Landscape and Urban Planning 103: 198-206.</i>		<i>Report data can be analysed in conjunction with Waterways Ireland in house environmental team datasets</i>	
<i>Bullock, C., Kretsch, C., & Candon, E. (2008). The Economic and Social Aspects of Biodiversity: Benefits and costs of biodiversity in Ireland.</i>		<i>Report data can be analysed in conjunction with Waterways Ireland in house environmental team datasets</i>	
<i>The economic cost of invasive and non native species in Ireland and Northern Ireland, John Kelly, Dave Tosh, Kathy Dale and Anthony Jackson, for The Northern Ireland Environment Agency and the National Parks and Wildlife Service, 2013</i>		The estimated annual cost of invasive species to the economies of Ireland and Northern Ireland is £161,027,307 (€202,894,406) and £46,526,218 (€58,623,034) respectively. The combined estimated annual cost of invasive species on both economies is £207,553,528 (€261,517,445). Correcting the estimate for GB for inflation, the current estimate of the annual cost of invasive species to the UK economy is £1.8 billion (€2.3 billion). The current estimate of the annual combined UK and Ireland cost is £2 billion (€2.5 billion).	

Ecosystems Services Overview

In a broader sense, Waterways Ireland has a valuable role to play in the ecosystems approach to valuing natural capital already well established in many countries, but only emerging as a mechanism for valuing the services provided free by nature here in Ireland. The ecosystem services approach is fully adopted at UK level through the Environment White Paper, Biodiversity and Ecosystem Services Strategy and programmes including Valuing Nature Network, Natural Capital Committee and Biodiversity and Ecosystem Service Sustainably Programme.

Within the EU (Maes et al., 2013) and UN (UN et al., 2014) there is a move towards the use of the Common International Classification of Ecosystem Services (CICES) framework (Haines-Young and Potschin, 2010). Originally envisaged as a method to facilitate the construction of ecosystem accounts, the hierarchical and flexible structure built on the three main ecosystem service types (provisioning, regulating and cultural) makes it an ideal framework for valuing ecosystem services for the following reasons:

- Conventional economic valuation presumes that people have well-formed preferences and enough information about trade-offs that they can adequately judge their 'willingness-to-pay.' However these assumptions do not hold for many ecosystem services.
- The conventional economic approach to 'benefits' tends to limit benefits only to those that people both perceive and are 'willing to pay' for in some real or contingent sense. But the general population's information about ecosystem services is extremely limited and many ecosystem services go almost unnoticed by the vast majority of people, especially when they are public, non-excludable services that never enter the private, excludable market.
- The benefits one receives from functioning ecosystems do not necessarily depend on one's ability to pay for them in monetary units. For example, indigenous populations with no money economy at all derive most of the essentials for life from ecosystem services but have zero ability to pay for them in monetary terms. To understand the value of these ecosystem services we need to understand the trade-offs involved, and these may be best expressed in units of time, energy, land or other units, not necessarily money.
- Since many people understand monetary units as an index of value, it is often helpful to express trade-offs in those units. But this does not imply that monetary units are the only or the best way to express the trade-offs.

- It is necessary to not confuse expressing values in monetary units with treating ecosystem services as tradable private commodities. Most ecosystem services are public goods that should not be privatized or traded. This does not mean they should not be valued.



These ecosystem services can be broken down into three main groupings.

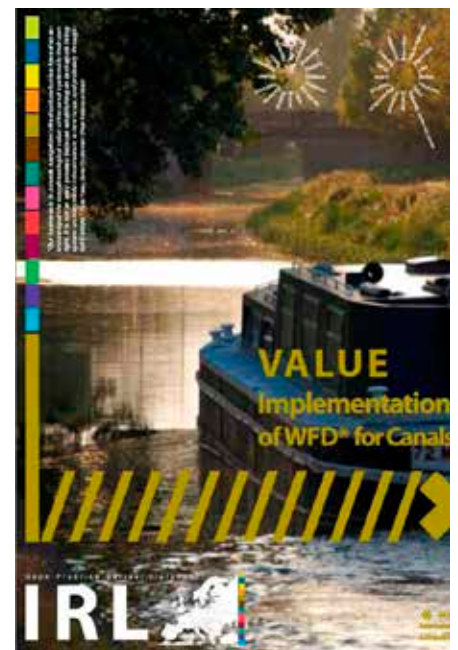
- **Provisioning services** – These ecosystem services are tangible goods and there is often a direct connection between the ecosystem and the provision of these ecosystem services. Examples of the provisioning ecosystem services generated by Irish waterway ecosystems are the fish harvested and also the aquaculture resources.
- **Regulating and supporting services** – These ecosystem services regulate the world around us and often are consumed indirectly or happen in the background. Examples of these ecosystem services include carbon sequestration which helps to mitigate climate change, treatment of our wastewater and its return to the hydrological cycle and flood and storm protection by wetlands and riverbanks which lessens the damage done by winter storms.
- **Cultural services** – The cultural ecosystem services refer to the physical, psychological and spiritual benefits that humans obtain from contact with nature. Examples of the cultural ecosystem services in the Irish waterways include recreational activities such as walking, water activities and also the added value that having a canal or river view from your house or area has on your well-being.



CO2 yielding a value of €22.9 million. The annual value of forest biodiversity is estimated to be €68 million.

EPA funded Research is underway in 2016 by the Socio-Economic Marine Research Unit into the value of ecosystem services provided by coastal and marine areas in Ireland, *VIBES: Valuing the significant ecosystem services provided by Irish coastal, marine and estuarine habitats*. This project aims to map and value the ecosystem services generated in the coastal and marine zones around Ireland.

A comprehensive appraisal of inland waterway ecosystem services could be carried out in conjunction with research institutes. Without incorporating ecosystem values into the decision making processes, these benefits may be ignored or underestimated and changes within inland waterways may incur a net loss to Irish society.



Ecosystems Services valuation in Ireland

Research has been carried out by Teagasc in relation to the value of ecosystem services provided by the forest estate in Ireland⁴³ - the first study in Ireland to place a value on the national forest estate. The Forest research concluded, for example, that the volume of carbon sequestered by Irish forests (including those planted prior to 1990) in 2013 was 3,946.9kt

⁴³. Ecovalue, Valuing the ecosystem services of Irish Forests, Teagasc, 2015

A story in Ireland of Good Practice: EC1

The Water Framework Directive was set up in 2000 to establish a framework for the protection of all waters and to achieve to achieve Good Ecological Potential (GEP) by 2015. This includes canals which are classified as Artificial Water Bodies (AWBs) under the Directive.

"But establishing the ecological value for canals is not straightforward because unlike rivers that have pristine conditions this is man made infrastructure that has to be managed."

This project was started in 2005 to both implement a monitoring programme and to develop a canal classification tool so that the canals could be assessed and GEPs achieved.

The current canal monitoring programme consists of 40 monitoring sites throughout the canals in Ireland across four River Basin Districts. It includes seasonal sampling of ecological quality elements including:

- General physio-chemical parameters (quarterly).
- Benthic invertebrate fauna (every 3 years).
- Macrophytes (annually)
- Hydromorphology.

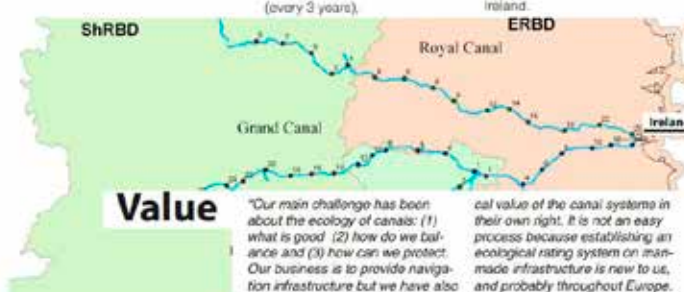
Baseline data from this programme and historic water quality data from the Canals enabled the initial classification of the Ecological Potential of the canals. This facilitated the completion of the draft River Basin Management Plans.

Classifications from the WFD Compliant Canal Classification Tool will be used to support operational and surveillance monitoring for canals in Britain and Ireland.

"Our main challenge has been about the ecology of canals: (1) what is good (2) how do we balance and (3) how can we protect. Our business is to provide navigation infrastructure but we have also acknowledged the overall ecological value of the canal systems in their own right. It is not an easy process because establishing an ecological rating system on man-made infrastructure is new to us, and probably throughout Europe. Additionally we are working on a

"We are monitoring over time and will select the areas that need to be addressed immediately. Part of process is trying to establish what constitutes good ecology of canals in the first place."

Source: Paula Treacy Senior Environment Officer Waterways Ireland



Value

Our main challenge has been about the ecology of canals: (1) what is good (2) how do we balance and (3) how can we protect. Our business is to provide navigation infrastructure but we have also acknowledged the overall ecological value of the canal systems in their own right. It is not an easy process because establishing an ecological rating system on man-made infrastructure is new to us, and probably throughout Europe. Additionally we are working on a


sniffer project with other European countries to establish a combined partnership tool for rating the ecology of canals in different countries. There has been tremendous learning in this process because we are dealing with unlimited variables."

Objectives	Bodies Involved	Success Factors	Cost
<ul style="list-style-type: none"> • Development of WFD Monitoring Programme for Canals • Classification of Ecological Potential • Research the development of WFD Classification Tool for Canals • Development of management strategies and mitigation measures to ensure the Canals meet Good Ecological Potential (GEP) • Using ecological information to improve maintenance practices 	<ul style="list-style-type: none"> • Bodies and Stakeholders Involved: <ul style="list-style-type: none"> • Waterways Ireland • Inland Fisheries Ireland • Environmental Protection Agency • Scottish and Northern Ireland Forum for Environmental Research • Scottish Environmental Protection Agency • UK Technical Advisory Group • Environment Agency UK • British Waterways • Northern Ireland Environment Agency 	<ul style="list-style-type: none"> • The monitoring programme allows for the Ecological Potential of each canal to be assessed on a continual basis • It also provides data that, in conjunction with results of the classification tool, will be used to target specific changes in management practices where required, to ensure compliance with WFD objectives • Waterways Ireland has implemented a comprehensive environmental monitoring programme for the canals. 	<ul style="list-style-type: none"> • The scheduled WFD monitoring work for the canals in 2011, which is funded by Waterways Ireland, amounts to €135,700. • Waterways Ireland contributed approximately €5000 to the SNIFFER project.




Lessons Learnt

Establishing the ecological value of canals. Cooperation by government agencies is essential in implementation of EU Water Framework Directive, and cooperative research is necessary to solve common problems.

Roles & Responsibilities	Partnership	Results	Timescale
<ul style="list-style-type: none"> • WFI has jurisdiction over the greatest length of canal network on the island of Ireland, thus it is responsible for ensuring that these canals are WFD compliant, and for reporting on their ecological status to the Environmental Protection Agency which reports to the EU. 	<ul style="list-style-type: none"> • To complete the initial classification of The Ecological Potential of the Canals, WFI worked in partnership with Inland Fisheries Ireland & the Environmental Protection Agency. • It cooperates on an ongoing basis with these state bodies in implementing the monitoring programme & disseminating environmental data from it to the public. 	<ul style="list-style-type: none"> • The majority of WFI's canals have been determined to be at Good Ecological Potential. • The overall water quality in the canals in Ireland is commensurate with their use as multi-purpose amenity resources 	<ul style="list-style-type: none"> • Time scale of Waterways Ireland's comprehensive environmental monitoring programme for canals: <ul style="list-style-type: none"> • Start date: 2005 • End Date: Ongoing • Development of a WFD Compliant Canal Classification Tool was completed in December 2010



www.waterwaysireland.org

Invasive species

Waterways Ireland have a vital role to play in preventing invasive species entering and moving around the system, so need to have adequate resources to carry out this role. Managing species once in the system is complex and expensive, and a huge focus needs to be on early identification. For example, work undertaken by Waterways Ireland and Inland Fisheries Ireland to attempt to eliminate *Crassula helmsii* from approximately 2.2km of the Grand Canal during winter/spring 2011-12 cost approximately €230,000 using a variety of control measures. Waterways Ireland have also been involved in a programme to control invasive weed growth in Upper Lough Erne for several years. In 2010 *Elodea nuttallii* was removed from the navigation channel in Upper Lough Erne at a cost of approximately €91,000.⁴⁴

Waterways Ireland are active in promoting and sharing information in relation to the monitoring it carries out in relation to biodiversity and water quality under its role in implementing the Water Framework Directive.

⁴⁴. The economic cost of invasive and non native species in Ireland and Northern Ireland, John Kelly, Dave Tosh, Kathy Dale and Anthony Jackson, for The Northern Ireland Environment Agency and the National Parks and Wildlife Service, 2013

KEY SOURCES

Water Quality and Recreational Angling Demand in Ireland, ESRI, 2015

ABSTRACT: Using on-site survey data from sea, coarse and game angling sites in Ireland, this paper estimates count data models of recreational angling demand. The models are used to investigate the extent to which anglers are responsive to differences in water quality, with the water quality metric defined by the EU's Water Framework Directive. The analysis shows that angling demand is greater where water quality has a higher ecological status, particularly for anglers targeting game species. However, for coarse anglers the reverse is found, angling demand is greater in waters with lower ecological status. For game fisheries improvements in water quality have the potential to increase angling demand and associated benefits, especially if improvements in fish stocks and catch rates are associated with water quality improvements. For coarse fisheries the policy implications are more subtle. The evidence is that coarse anglers currently spend on average 0.7 days less per trip fishing in high versus low ecological status waters.

VALUES: Anglers, particularly game and 'combination' anglers, benefit from higher status water quality. The additional benefit of angling in waters with high versus low ecological status was the highest for game anglers at a mean of €122 per day.

With surveyed anglers fishing on average 10 days per annum the total loss to recreational anglers associated with poor water quality is potentially very large. On average, across the different target species surveyed, anglers have a willingness to pay of €371 for a day's fishing.

Water UK National Ecosystem Assessment, Working Paper, Economic Assessment of Freshwater, Wetland and Floodplain (FWF) Ecosystem Services (2011)

ABSTRACT: This working paper reports on the valuation of ecosystem services from wetlands, freshwaters (rivers and lakes) and floodplains.

VALUES: A moderate climate change scenario could reduce water available for immediate abstraction by 10% by 2060. Water quality, defined mainly in terms of chemical, biological and hydro-morphological characteristics, is a major determinant of the capacity of the freshwater ecosystems to provide a range of

market and non-market services. It is important here to distinguish between the total value of water quality and the marginal value of a change in quality. Clearly a major deterioration in water quality could result in complete loss of ecosystem services and final goods, such as water for drinking, irrigation, bathing and fishing, or require major expenditure to mitigate the consequences of loss of quality. Rivers and lakes act as conduits and receptors for waste, discharged from point and diffuse sources. The value of the waste assimilation service provided by freshwaters can be assessed in terms of the cost of alternative disposal, by implication a more expensive option.

Spectacular birds and the potential for economic benefits

Dickie et al. (2006) assessed the economic impacts of bird watching in the UK associated with ten spectacular bird species. For example, the admission charge to the RSPB centre to view capercaillie was £3.00 in 2006. Expenditure attributed to Rutland Osprey Project Wild Life Trust Reserve per person for day trippers / holiday makers was £7.86 and £52.95, respectively. Visitor expenditure to the Isle of Mull specifically attributed to sea eagles was estimated at £1.4m - £1-6m per annum. This is based on recorded average expenditures of £119.55 per day for holiday visitors and £55.78 per trip for day visitors and attributing 75% of expenditure to those who indicated sea eagles were 'main reason' for visit and 20% for those who said 'one of the reasons'. Using a multiplier of 1FTE per £38,650 tourist spend, Dickie et al. estimate that 320 FTE are supported by the presence of sea eagles. An average expenditure figure of £7.17 per person per day for bird watching is estimated. It should be noted that this study relates to 'spectacular' bird species which are likely to command higher tourism value.



2.10 THE ROLE OF INLAND WATERWAYS IN DRAINAGE AND FLOOD MANAGEMENT

receiving, storing and transporting waters, managing flow rates

At present the availability of value evidence is very limited largely because for most of the benefits which the waterways provide, values are not available and even where they are available it is often difficult to attribute them specifically to waterways which fall under the remit of the organisation or indeed to the latter's specific role. **What is abundantly clear however is that without the continual and largely invisible role which the organisation plays in underpinning, maintaining and managing the waterways infrastructure to prevent major failures in the system of water management – such as for example flooding caused by extreme weather conditions – the cost, as yet unquantified, in terms of benefit foregone by the public across a range of services ordinarily enabled by the waterway infrastructure could be hugely significant.** Yet it is only in times of crisis, when system failure occurs, that the real value of the maintenance and management role which the organisation provides and the enabling role its infrastructure plays becomes much more apparent.

Flood Alleviation and Land Drainage

Water has to be managed through the canal system to keep all levels at their optimum depth and sluices in the gates are used to carefully monitor the amount of water flowing from one level to the next. During periods of intense or prolonged heavy rainfall the volume of water running into the canal can exceed the volume of water which can be racked off using the overflows, the land tunnels and the gate sluices. This excess water overtops the banks and can cause flooding of surrounding areas if it cannot be discharged through the drainage network. The primary risk to the canal system of water entering at a rate which cannot be discharged or managed is that the canal water levels rise and will overtop. In embanked areas there is then a risk of failure particularly due to the erosion of the top bank level.

Overtopping from a long level to a shorter level can result in the shorter level being unable to discharge the volume of water and resultant flooding of the surrounding areas. Any failure of the lock-gates or interference with the sluices whether deliberate or accidental can result in such overtopping.

THE EDENDERRY FAILURE

The most recent failure was on the 15th January 1989 when a large breach opened on the north bank of the Grand Canal about 950m west of the Blundell Aqueduct near the town of Edenderry, Co. Offaly. This was a 10m high peat filled embanked section of the canal, 135m wide, resting on a deep bog and the breached area extended over a length of approximately 400m with the opposite bank and the bed of the canal damaged due to water drawdown. The locks on this stretch of the canal are 30km apart, and an estimated 135million litres of water escaped with approximately 200,000 m³ of material displaced. About 13ha of land was covered with silt and large blocks of peat with an additional 15ha subjected to short term flooding. The water released flowed into the nearby tributaries of the River Boyne. An early inspection following the breach indicated that the whole northern embankment between Blundell Aqueduct and Downshire Bridge was in poor structural condition and seriously at risk. There was clear evidence that the current breach had occurred immediately west of a previous (1916) breach. The restoration work included the reshaping and lining of this section together with the 600m of bog section of the Edenderry Branch. Approximately 28,000 tonnes of sod turf, 47,000 tonnes of loose peat and 52,000 tonnes of clay were used on the project at a total cost of £1.8million. The section of the canal was formally re-opened in March 1990.



Man-made canals, in particular the bog embankments described above, are more vulnerable to abrupt changes in navigation water levels due to high precipitation and to increased run-off into the waterways from cut-a-way bogs adjoining them. The Grand Canal, for example, runs through a considerable distance of bog area through the Midlands of Ireland (75km) and Waterways Ireland has had to install telemetry, water level recorders and other systems of monitoring to improve data collection and management of information obtained. It also undertakes regular visual embankment inspections combined with risk based assessments to monitor any changes.

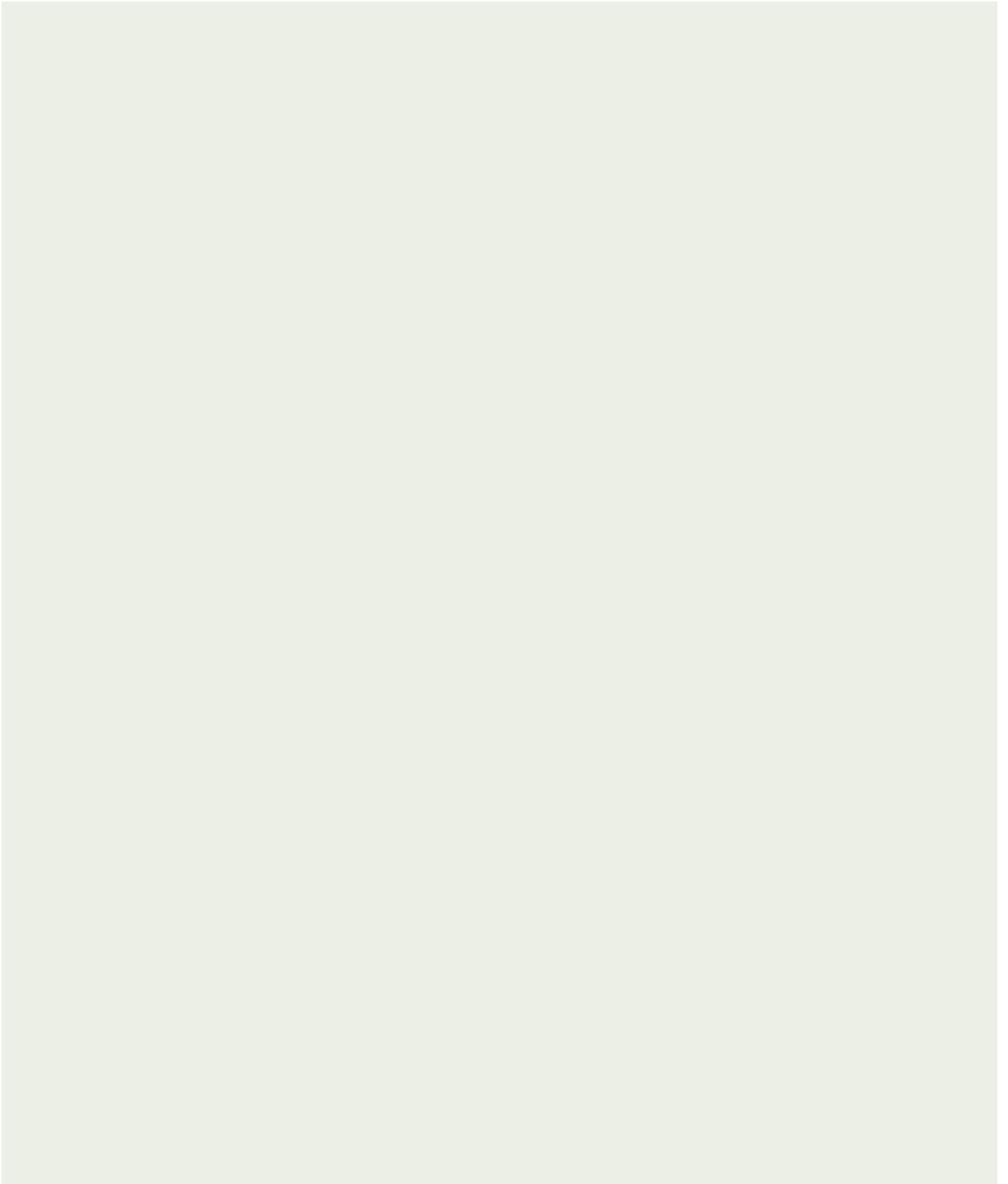
Other breaches and their consequences:

- There have been critical failures on the Royal canal as well at Ballymaglavy Bog, Co. Westmeath, Cloonbreany bog, Co. Longford and Boolykeogh Embankment, Longwood, Co. Meath.
- The breach on the Lough Allen Canal occurred in late 2015. Over €100k was expended from WI capital over an 8 week period to restore the integrity of the canal, re-opening it to navigation and restoring the Blueway.

THE EFFECTS OF FLOODING

The water levels in the 30km 'long level' of the Grand Canal rose abruptly due to intense rainfall in August 2008. There are two major outfalls from the Bord na Mona Bogs, to the north of the canal, namely the Ballylennon and Ballymullen Supplies which enter the canal through culverts of approximately 1m diameter. Water backed up in these supplies as the water level in the canal was 300mm above normal navigation level. Catchment water then took the path of least resistance, across the cut-a-way bog and entered the Grand Canal across a public road, which acted like a decanting weir.





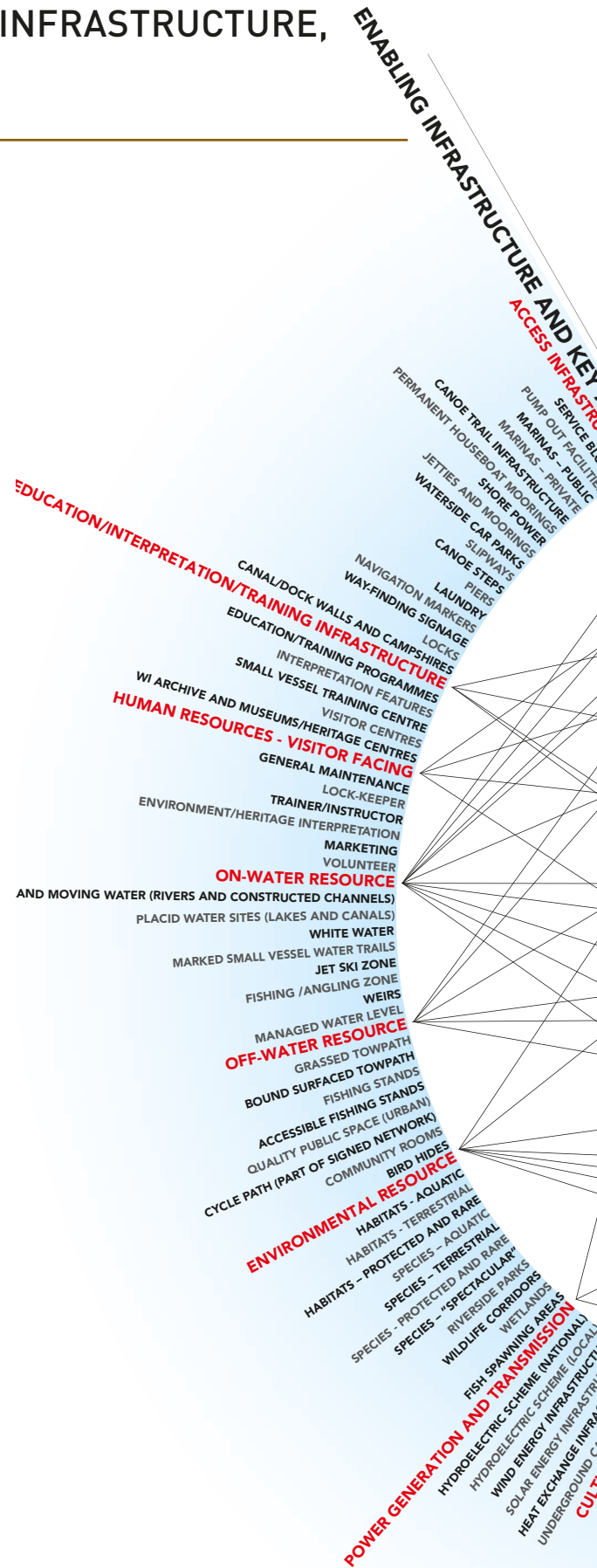
3

THE CONNECTIONS BETWEEN INFRASTRUCTURE, MAINTENANCE AND BENEFITS

A whole system view of the links between the assets, their services and benefits and the ultimate values will allow Waterways Ireland to:

- Identify critical relationships
- Demonstrate the existing situation
- Show future scenarios, and
- Devise a working tool for internal & external stakeholders

This can be considered a “live” document. It can be updated as necessary and form the basis of discussions about the relationship between assets, investment, maintenance, services and values. **When a piece of the enabling infrastructure becomes critically endangered, the connected uses and values are compromised.**



Some implications of not carrying out maintenance:

- In the short term the navigational and recreational asset becomes visually run down, falls into disrepair and less attractive as a public utility or space. The public realm assets (street furniture, lighting, information boards etc) car parking areas and grassed areas may not be maintained at a level which protects those assets and their utility.
- The cyclical on-water maintenance programme of navigational infrastructure would be severely curtailed thus having a significant impact on the assets themselves and also on the enjoyment of the waterways.
- The long-term picture of the absence of maintenance is what we see when looking at abandoned waterways – masonry structures being damaged by the growth of vegetation on and through key structures such as locks, weirs, bridges etc. Channels choked. Water inaccessible and navigation closed with associated revenue consequences for Irish economy. Angling product inferior.
- The fragmentation of waterways into stretches that might be navigable until an obstruction is met e.g. fallen timbers, bank collapse, lock gates falling off, or silted up channel.
- The loss of bank-side amenities – car parks, on-shore facilities, recreational trails (overgrown, fences down, livestock damage, pot-holes)
- The loss of good environmental status - no habitat management – water quality issues
- Fishery impacts where the waterway is owned and managed by WI – e.g. Shannon – Erne Waterway
- Loss of access points to the water due to loss of slip-ways, canoe access points etc
- Loss of interpretative information
- Loss of confidence and pride felt in waterway communities
- Impact on waterway infrastructure provided by private sector – marinas, chandlery, training schools, clubs
- Major impact on ability to organise water-based festivals and activities
- Loss of important heritage product across the island.
- Tourism, recreational, community impacts
- Loss of jobs – direct labour force, water-based businesses, tour operators, transport providers.

THE COST OF MANAGING WATERWAYS INFRASTRUCTURE:

REPLACEMENT VALUE OF THE ASSET

Bridges: €139,291,389
 Docks: €54,438,568
 Locks & Lock Gates: €263,667,299
 Lock Houses: €9,716,328
 Weirs: €14,722,441
 Construction: €72,909,174
TOTAL: €554,745,199

CAPITAL SPEND: 2011 - 2015

Lower Bann: €1,265,476
 Shannon: €7,057,378
 Shannon Erne: €1,213,391
 Erne: €1,071,826
 Royal Canal: €7,353,303
 Grand Canal: €8,279,619
 Barrow: €1,885,123
 Grand Barrow: €479,002
TOTAL: €28,605,118

MAINTENANCE SPEND: 2011 – 2015 – see below

Lower Bann: €2,067,316
 Shannon: €17,860,527
 Shannon Erne €5,708,406
 Erne: €1,644,908
 Royal Canal: €12,955,172
 Grand Canal: €14,965,556
 Barrow: €4,069,091
 Grand Barrow: €3,433,883
TOTAL: € 62,704,859

4

TOWARDS A FULL VALUATION OF THE BENEFITS AND SERVICES OF THE INLAND WATERWAYS

4.1 BUILDING A ROBUST EVIDENCE BASE - STRATEGIC COLLABORATIONS

Over the course of this scoping project, a number of potentially productive strategic alliances were identified both with Research Institutes and with potential Research Partners. Collaboration could be as simple as adding a question to a research project already underway by others, or a more in depth co-commissioning or sharing of research. For example, in The Healthy Ireland strategy, Action 5.1 describes the development of a Healthy Ireland Research Plan, which will *develop specific measurement strategies to address knowledge gaps and capture data across the life course and identify actions for improved knowledge dissemination and implementation.*

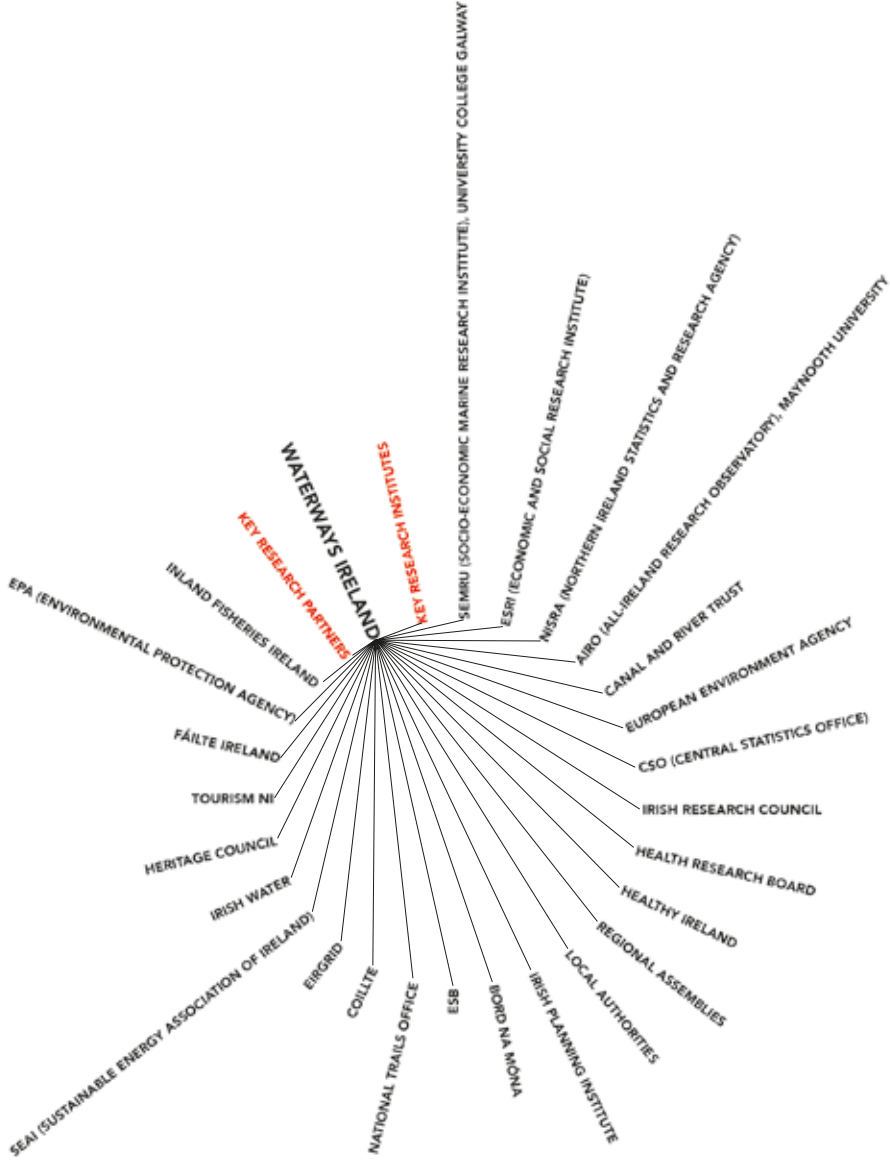
4.2 AN INTERNAL DATA MANAGEMENT, KNOWLEDGE SHARING AND ACCESS SYSTEM

Processes supporting knowledge transfer and sharing within the organisation will become more important as rich cross-disciplinary information becomes available from this work and future research initiatives. This could include Knowledge Management Systems and communities of practice with cross-organisational interactions.

4.3 BUILDING AN IMPACT MODEL AND SCENARIO TESTING

When more survey information and data become available to inform monetary values for the range of benefits and services, it will be possible to prepare an impact model for scenario testing. This will allow the potential impacts of policy decisions to be determined – for example the impacts of increased or decreased funding for maintenance or investments. While a minimum of funding is required to maintain the waterways to a level for the maintenance of the integrity of structure and address Health and Safety concerns⁴⁵, decreased funding would result in the eventual degradation of the navigation function of the waterways along with access restrictions to towpaths. Increases in funding would result in increased use and a greater value placed on visits⁴⁶.

Building on this scoping work and value framework, a number of case studies can be established and the impact of increased or decreased funding can be analysed over time, analysing use and non-use values.



POTENTIAL STRATEGIC RESEARCH ALLIANCES

⁴⁵. Capital Funding Requirements for Waterways Ireland Critical Works 2016 – 2019, Departmental Guidance, Draft, Waterways Ireland, 2016. ⁴⁶. See emerging Fáilte Ireland research on the impact of the investments into Blueway infrastructure along the Shannon. ⁴⁷. DEFRA Research into the value of inland waterways, Summary of Phase 3, December 2011

For example, a scenario comparison exercise was carried out for British Waterways in 2010, which found that restricting funding to minimal health and safety maintenance works resulted in a reduction of benefits that greatly outweighed the savings generated from lower spending on waterways maintenance⁴⁷. The loss of benefit was greater for canals than rivers. Interestingly in that exercise, over 80% of the loss or gain in benefits came through use values associated with visits to the waterway towpaths.

4.4 CASE STUDIES AND PRIMARY RESEARCH PROJECTS

These will be targeted, collaborative and integrated. Research institutes are under pressure to demonstrate the quick “exploitation” of their research output and are therefore keen to explore partnerships with public agencies who will put the research to timely use.

4.5 KEY SOCIO-ECONOMIC RESEARCH PRIORITIES – FILLING THE GAPS

Some research / data collection priorities emerging out of this piece of work include:

Visitor information

Establishing a baseline figure for towpath visitors by km by day by waterway in order to be able to aggregate benefits. These figures will represent urban and rural areas. Further surveys are taking place within areas being developed as Blueways over 2016 – there is an opportunity here for including questions to the surveys which can monitor and provide evidence for starting to apply monetary values to the effect of Waterways Ireland on supporting social capacity building & resilience.

While automatic counters provide raw data, more information is required on, for example, type of journey, types of visitor, their levels of activity past and present, for example, to determine values.

Waterways Users Survey, Waterways Ireland, 2010 and 2014

Percentages of types of use available – but needs to be cross-referenced with comprehensive visitor count data. Due to the small survey base and 2010 and 2014 surveys carried out a different times, some data not comparable between years

Community economic and health baseline information

Collaborative work with AIRO, Maynooth University and the

Health Research Board would enable a better understanding of the socio-economic baseline along waterways in order to determine benefits and values.

Heritage research

The Heritage Council has embarked on a study of the value of number of case studies - Waterways Ireland can liaise with the Heritage Council to include a waterways site in the case studies.

Boating data

Lock passage counts by type of boat required

Fishing

Further analysis of Waterways Ireland monitoring points within IFI study required

Events

Further details required on nature of events, implications for organisations and members

Public Realm and open space

Further information on number of public spaces managed by Waterways Ireland would be required to complete calculations on values associated with contributing to the public space network.

Utilities and telecommunications facilitation

Further research in this area would enable values to be ascertained for the benefits of linear public land holdings in terms of:

- contribution to grid,
- contribution to rural connectivity, and
- contribution to renewables transition

Physical and community regeneration

While much UK data is available for benefit transfer, Irish research is required to provide more relevant data in terms of values derived from physical and community regeneration

Sustainable transport

Further data on the number of users of urban canals would be required to complete the generation of values for contribution of inland waterways to sustainable transport.

⁴⁷. DEFRA Research into the value of inland waterways, Summary of Phase 3, December 2011

APPENDIX A

Characterisation of the resource – the enabling infrastructure and key assets

A comprehensive understanding of the enabling infrastructure and assets under Waterways Ireland management forms the basis of ascertaining the range of services, benefits and values.

The following tables contain the current understanding of the range of assets under Waterways Ireland remit according to available information to date.

<p>Access infrastructure Service blocks Pump out facilities Marinas – public Marinas – private Canoe trail infrastructure Permanent houseboat moorings Shore power Jetties and moorings Waterside car parks Slipways Canoe steps Piers Laundry Navigation markers Way-finding signage Locks Canal/dock walls and campshires</p>	<p>Education/Interpretation/Training infrastructure Education/training programmes Interpretation features Small vessel training centre Visitor centres Waterways Ireland archive and Museums/ Heritage Centres</p>
<p>Human resources - visitor facing General Lock-keeper Trainer/Instructor Environment/Heritage Interpretation Marketing Volunteer</p>	<p>On-water resource Inland moving water (rivers and constructed channels) Placid water sites (lakes and canals) White water Marked small vessel water trails Jet ski zone Fishing /angling zone Weirs Managed water level</p>
<p>Off-water resource Grassed towpath Bound surfaced towpath Fishing stands Accessible fishing stands Quality public space (urban) Cycle path (part of signed network) Community rooms Bird hides</p>	<p>Environmental resource Habitats - aquatic Habitats - terrestrial Habitats – protected and rare Species – aquatic Species – terrestrial Species - protected and rare Species – “spectacular” Riverside parks Wildlife corridors Wetlands Fish spawning areas</p>
<p>Power generation and transmission Hydroelectric scheme (national) <i>Hydroelectric scheme (local)</i> <i>Wind energy infrastructure*</i> <i>Solar energy infrastructure*</i> <i>Heat exchange infrastructure</i> <i>Underground cable chambers</i></p> <p>*potential</p>	<p>Cultural heritage National heritage Industrial heritage Transport heritage Military heritage Religious heritage Archaeological heritage Oral heritage Literary Heritage Musical Heritage</p>

APPENDIX B

Actual values and the associated services provided by Inland Waterways

ACTUAL VALUE - Direct Use - Consumptive

<p>Water supply Abstraction for agricultural needs Abstraction for manufacturing (e.g. Diageo) Abstraction for utility providers (e.g. Inchicore Rail Works) Abstraction for drinking water (e.g. Dublin Water Supply Project)</p>	<p>Renewable energy supply Urban cooling – canals and docks Urban heating – canals and docks Hydro power</p>
<p>Utility facilitation Facilitating telecommunications (ducting routes for cables) Facilitating utility wayleaves</p>	<p>Aquaculture and Fisheries</p>

ACTUAL VALUE - Direct Use - Non-consumptive

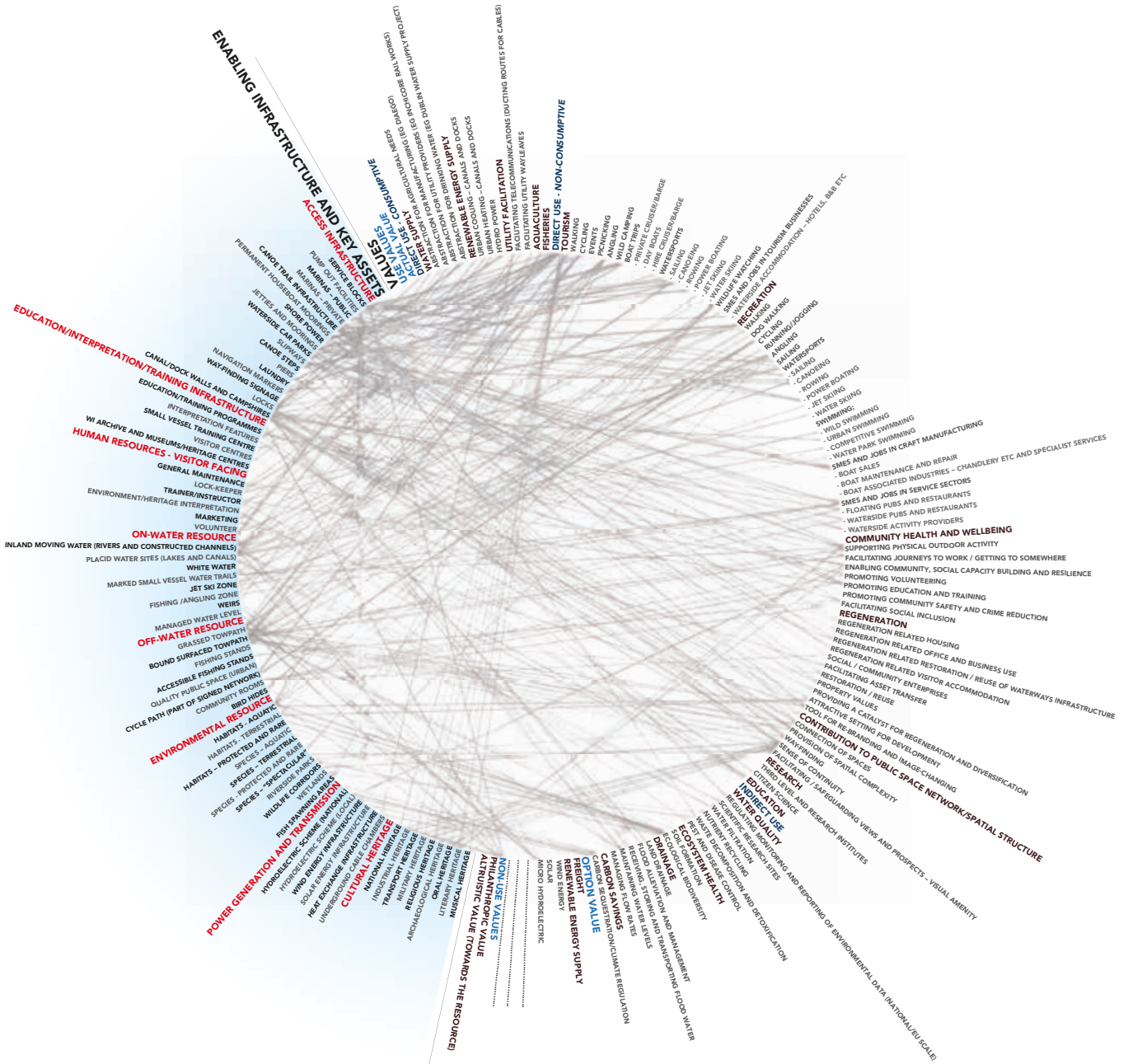
<p>Tourism Walking Cycling Events Picnicking Angling Wild camping Boat Trips - Private Cruiser/Barge - Day Boats - Hire Cruiser/Barge Watersports - Sailing - Canoeing - Rowing - Power Boating - Jet Skiing - Water Skiing Wildlife watching SMEs and jobs in tourism businesses - Waterside accommodation – hotels, B&B etc</p>	<p>Recreation Walking Dog walking Cycling Running/Jogging Angling Sailing Watersports - Sailing - Canoeing - Canoe polo - Rowing - Power Boating - Jet Skiing - Water Skiing - Triathlon - Wakeboarding - Windsurfing Swimming; - wild swimming - urban swimming - competitive swimming - water park swimming SMEs and jobs in craft manufacturing - Boat sales - Boat maintenance and repair - Boat associated industries – chandlery etc and specialist services SMEs and jobs in service sectors - Floating pubs and restaurants - Waterside pubs and restaurants - Waterside activity providers</p>
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<p>Community health and wellbeing Supporting physical outdoor activity Enabling community and social capacity building and resilience Promoting volunteering Promoting education and training Promoting community safety and crime reduction Facilitating social inclusion</p>	<p>Regeneration Regeneration related housing Regeneration related office and business use Regeneration related restoration / reuse of waterways infrastructure Regeneration related visitor accommodation Social / community enterprises Facilitating asset transfer Restoration / reuse Property values Providing a catalyst for regeneration and diversification Attractive setting for development Tool for re-branding and image-changing</p>
<p>Contribution to public space network/spatial structure Connection of spaces Facilitating journeys to work / getting to somewhere Provision of spatial complexity Way-finding Sense of continuity Facilitating / safeguarding views and prospects – visual amenity</p>	<p>Research Third level and Research institutes Citizen science</p>
<p>Education</p>	<p>Volunteering</p>

ACTUAL VALUE - Indirect Use

<p>Water Quality Regulating Monitoring and reporting of environmental data (National/EU scale) Scientific research sites Water filtration Nutrient recycling Waste decomposition and detoxification Pest and disease control</p>	<p>Ecosystem health Soil formation Ecological biodiversity</p>
<p>Drainage Land drainage Flood alleviation and management Receiving, storing and transporting flood water Maintaining water levels Managing flow rates</p>	<p>Carbon savings Carbon sequestration/climate regulation</p>

Fine grain connections between assets and values



APPENDIX D

Contributors

The primary research involved a qualitative appraisal of the asset, benefits and services through a series of key conversations with:

- Stakeholders, internal & external
- Critical Friends

Internal consultation

The consultation with Waterways Ireland officers was aimed at providing a comprehensive review of the conditions under which 'value evidence' is currently gathered; how it is currently used or potentially could be used; existing sources known to the consultee and an indication of their key requirements in terms of research needs. 'Value evidence' refers to the matrix of use and non-use values which have been established for the four key benefit areas for which evidence is being compiled, Cultural, Regulating and maintenance and Provisioning.

Interviews explored in some detail the nature of value evidence currently available and its use from the particular perspective of the interviewee.

The overall objective was to;

- Validate the initial range of use values
- Reveal additional and relevant sources of value evidence
- Establish current use of value evidence
- Assess potential for making greater use of value evidence in the future
- Identify the barriers to increasing the use of value evidence
- Identify key requirements in terms of future research

Internal consultees to date have included:

Dawn Livingstone	CEO
Sharon Lavin	Head of Marketing & Communications
Katrina McGirr	Marketing & Communications Division
John Boyle	Director of Business Development
Eanna Rowe	Regional Manager West
Charles Lawn	Inspector of Navigation
David Wilson	Manager / Warden Lough Erne
Lt Cdr. Shane Anderson	Assistant Inspector of Navigation (Rtd)
Dr Paula Treacy	Head of Environment
Ray Smith	Project Accountant
Sinead Mallon	Heritage/Property
Sinead Fay	Legal
Rosanna Nolan	Manager Barrow Navigation
John McKeown	Regional Manager East
Joe Gillespie	Regional Manager Northern Region
Stephen Forrest	Acting Director Of Technical Services

Expert panel consultation

In order to validate the methodology as it evolved to meet Waterways Ireland's specific requirements, an expert panel was consulted at key stages of the project. These included:

Craig Bullock	Optimize (Public Goods Economist)
Dr John Curtis	Associate Research Professor, Economic and Social Research Institute
Dr Stephen Hynes	SEMURU (Socio-Economic Marine Research Unit), NUIG

External stakeholder consultation

A number of key external agencies were also consulted, where their remit overlaps with that of Waterways Ireland:

Alison Harvey and Beatrice Kelly	Heritage Council
Suzanne Campion	Inland Fisheries Ireland
Chris Scott	Outdoor Recreation NI
Mary Stack	Fáilte Ireland
Paddy Matthews	Fáilte Ireland