

A STRATEGIC APPROACH TO PROTECTING THE SUSTAINABILITY OF A NATURAL HERITAGE AND TOURISM RESOURCE: THE RIVER MOY, IRELAND

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Abstract

This paper discusses the natural heritage of the River Moy salmon fishery in western Ireland and methods of protecting the resource from negative innovations. The latter are associated, mainly, with changes in agricultural practices, land use and largescale construction projects. The paper uses concepts developed in the context of integrated rural tourism and recommends the adoption of a strategic approach to promote holistic sustainability. A strategic approach should include methods of using the resource that support the strategy and include local and extra-local networking. This framework was applied to analyse tensions between heritage protection and negative innovation on the River Moy, based on interviews with management and extensive documentary materials. The evidence reveals that many aspects of a strategic approach are followed and that ongoing networking is required.

Keywords

holistic sustainability, salmon fishery, River Moy, Ireland, strategic approach

Résumé

Cette contribution discute le patrimoine naturel des pêcheries de saumons sur la rivière Moy dans l'ouest de l'Irlande, ainsi que les méthodes de protection des ressources contre les innovations négatives. Ces dernières sont principalement associées aux changements dans les pratiques agricoles, la répartition des terres et les grands projets de construction. L'article utilise des concepts développés à partir d'un modèle de tourisme rural intégré et conseille l'adoption d'une approche stratégique de la promotion de la durabilité holistique. Cette approche doit comprendre des méthodes d'utilisation des ressources qui encouragent la stratégie et doit s'ancrer tant dans des réseaux locaux et extra-locaux. Cette structure a été appliquée pour analyser les tensions entre la protection du patrimoine et l'innovation négative dans le cadre de la rivière Moy. Elle est fondée sur les analyses d'entretiens et d'une large gamme de matériels documentaires. Les résultats indiquent que les méthodes de gestion suivent beaucoup d'aspects d'une approche stratégique intégrée et qu'il est nécessaire de poursuivre la mise en réseau.

Mots clés

durabilité holistique, pêcherie de saumon, rivière Moy, Irlande, approche stratégique

I. INTRODUCTION

The concept of balancing heritage and innovation is attracting growing attention internationally, in contexts that range from protecting built heritage from modern additions to protecting landscapes from wind farm developments (Cowell, 2010; Meskell, 2014). This paper concerns the natural heritage of the River Moy salmon fishery, in western Ireland, and methods of protecting the resource from a range of past and current practices that may be described as negative 'innovations'. It is recognised also that certain innovative practices and methods can protect a heritage resource. The main innovations

which pose threats to the River Moy and its salmon stocks are: (i) dredging of the river in the 1960s to improve land drainage which reduced the spawning areas for the fish and requires continued remediation to ensure the sustainability of the stocks; (ii) new agricultural practices, during the 1980s and the 1990s, which contributed to water pollution; (iii) pollution from public sewage treatment plants which were inadequate to handle increased load associated with late 1990s population growth; (iv) clear-felling of mature coniferous State forests during the last decade, which releases potentially harmful phosphates and nitrates into the soil and water from the decomposition of leaf fall; (v) lar-

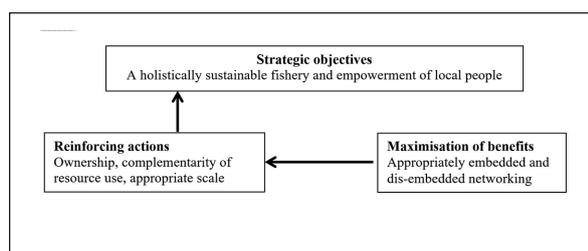
gescale public construction projects which pose potential threats to streams and rivers in their environs. The sustainability of the natural heritage resources (the river and the fish stocks) depend on effective responses to these various threats and are ongoing concerns of Inland Fisheries Ireland (IFI), which works under the aegis of the State Department of Communications, Energy and Natural Resources.

The River Moy is an ecological resource of national importance, has a tourism function as a salmon angling destination and forms part of ‘countryside capital’ (Garrod *et al.*, 2006). IFI has a legal remit to protect and manage the resource and prevent or offset potentially damaging innovations, as understood in this paper. The paper suggests that an integrated approach is most appropriate to protect the natural heritage base, drawing on a model from integrated rural tourism which has seven features (Saxena *et al.*, 2007, 351):

- holistic sustainability;
- empowerment of local people;
- local ownership;
- complementarity and absence of conflict;
- appropriate scale;
- networking, which is;
- embedded locally and dis-embedded to extra-local levels as necessary.

An integrated approach should: promote the sustainability of the natural resource base, economy, society and culture; provide local people with engagement and employment in the activity; involve ownership which is conducive to retaining control and profits locally; be free of conflict from other uses; involve scales of activity that do not pose threats to the resource; be accompanied by networking between pertinent local and external bodies. These forms of local and extra-local networking are usually described as ‘embeddedness’ and ‘dis-embeddedness’ in social structures (Saxena

Figure 1. A strategic approach to integrated resource use



Source: Cawley and Gillmor, 2008.

et al., 2007). Ideally, an integrated approach to sustainability should be pursued in a strategic way where the activities undertaken reinforce each other (Cawley & Gillmor, 2008) (Figure 1).

First, a clearly defined strategy should promote holistic sustainability and empower local people. In the case of the River Moy, this involves the conservation of salmon stocks as a public good, the maintenance of a productive fishery as a recreational resource, contributing to IFI income, and to the local economy, society and culture (Figure 1). Second, actions by management and other individuals and organisations that impinge on the river basin should support the attainment of sustainability. These involve the modes of ownership, complementarity/lack of conflict between maintaining salmon stocks and the other resource uses, and appropriate scale of use. Third, networking by the fisheries management with individuals and organisations should be embedded in local and regional structures and dis-embedded to national and international structures to maximise the protection of the natural resource (Cawley *et al.*, 2007). This framework was applied to analyse relationships between heritage protection and innovation in the River Moy as a resource for salmon angling and the ways in which they are being addressed.

II. SOURCES AND METHODS

The research is based, first, on extended interviews with senior IFI staff in the town of Ballina, County Mayo (Figure 2), who are responsible for the River Moy and other river systems in the Ballina-Western Region Fisheries Basin. This paper relates to the River Moy. Analysis was also conducted on more than one hundred official documents and academic publications relating to the conservation of salmon stocks and the development of salmon fisheries in Ireland. A range of web sites was also analysed: that of IFI and those of the main private fisheries on the River Moy, three angling club fisheries and three qualified fishery guides. Observation was undertaken in the towns of Ballina, Foxford and Swinford, the three main salmon angling locations on the River Moy. The analysis involved critical qualitative assessment of the various sources against the principles associated with the promotion of holistic sustainability through a strategic approach.

III. SALMON ANGLING AND THE RIVER MOY

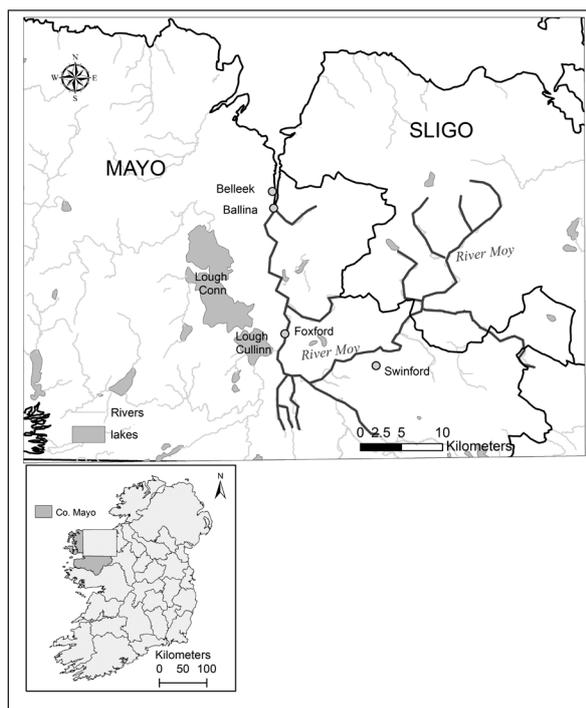
A salmon river is an appropriate context in which to explore issues that are conducive to the holistic sustainability of natural heritage resources against threats from a range of external innovations. The lifecycle of the salmon is dependent on the ecology of the river where it is born, develops and returns to spawn after one, two or more years at sea. Any activity that interferes with the river bed or the quality of the water can have serious implications for salmon stocks. Salmon stocks are also dependent on broader processes of climate and environmental change that affect the feeding grounds at sea, largescale trawling for other fish at sea and aquaculture developments which are not dealt with here (Kildarestreet.com, 2014).

Salmon angling is a relatively expensive leisure pursuit which makes important localised economic contributions and is closely regulated (Mordue, 2016). In Ireland, salmon angling is regulated through specific measures designed to prevent the depletion of stocks, including a closed season which varies between rivers (from 1 February to 30 September on the Moy) (IFI, 2016a). A game angling licence must be held (which includes sea trout and

salmon) and can be purchased for periods from one day to one year. A permit is also required, which relates to a stretch of water (known as a ‘beat’) in a fishery, and prices can be as high as €120 per day in the high season. There is a limit on the number of salmon that may be removed from the water on a daily (three between 12th May and the 31st August and one during the early and later parts of the season) and a seasonal basis (ten salmon). Once that limit is reached, angling may continue on the Moy but the fish must be released back into the river. A requirement exists to place a plastic tag in the gills of fish removed from the water and enter in a log book the details of those caught and released and the log book must be returned to IFI at the end of the season. The sale of salmon caught by rod and line is prohibited on the Moy currently in order protect the fish stocks by making sales of salmon illegal. Patrolling takes place to prevent poaching (illegal fishing with nets) and State fisheries officers have powers of search, to impose on-the-spot fines for minor misdemeanours and to prosecute in the case of serious breaches of fisheries regulations (fisheries manager, interview #1).

The River Moy is Ireland’s most prolific salmon rod angling destination, accounting for 20 percent of all catches by rod and line in 2014 (IFI, 2015a). It flows through the centre of Ballina town and drains a catchment area of just over 2000 km² in counties Mayo and Sligo (Figure 2). The fishing rights on the former Moy Fishery in Ballina, one of the most productive parts of the river, were purchased in 1987, by the Irish State from a private company which had extracted salmon commercially with traps and nets (Cooke, 2011). Dwindling numbers and adverse public opinion resulted in the cessation of all trapping and netting on the river in 1998. (Salmon netting at sea was removed in 2006 and those formerly involved received compensatory payments) Since 1998, the former Moy Fishery has been managed exclusively as a recreational fishery on behalf of the State. The wider fisheries basin, in which the Moy is the main salmon river, attracts many thousands of anglers of more than 30 different nationalities annually: 5087 licences were sold in 2014 (IFI, 2015a). The main stretch of the Moy in Ballina consists of seven separate ‘beats’, with advance booking usually being required for six of them. The seventh beat, the Point, is available to local members of the Ballina Salmon Anglers Association for a seasonal permit of €25 (a river bank is also leased from a private

Figure 2. The River Moy catchment area



owner). An eighth beat further downstream, the Community beat, is reserved for local members of the Ballina Traditional Angling Club, which leases it from IFI at a nominal fee (€5 annually). The mid-stretches of the River Moy, between Ballina and Swinford, include seventeen fisheries, owned and managed by IFI (one), privately (seven) and angling associations and clubs in association with IFI (four) or a private individual/s (five) (fisheries manager, interview #2). As part of the management function, a member of IFI staff visits each fishery weekly during the angling season to collect details of the numbers and weights of salmon caught.

IV. INTEGRATED RESOURCE USE AND THE RIVER MOY

The concepts of strategy, reinforcing actions and appropriate networking to offset negative innovations, as part of an integrated approach to natural resource management, are now discussed in the context of the River Moy (Saxena *et al.*, 2007; Cawley & Gillmor, 2008).

A. Strategy: the holistic sustainability of a natural heritage resource

Inland Fisheries Ireland's principal functions, as set out in Section 7(2) of the Inland Fisheries Act of 2010, relate to the conservation and protection of stocks, management, development and improvement, and business development of inland fisheries, including sea angling (IFI, 2015b, 5) (Table 1). The protection and conservation of the salmon stocks depend on the quality of the river water and the gravel beds in which salmon spawn and fry develop. Combined with other research data, maintaining counts of fish going up river informs the allowable catches that are advised annually by an independent Standing Scientific Committee on Salmon. A new weir and counting mechanism was installed in Ballina in 2011, being an example of an innovation that is supportive of conservation. The management function, in the words of the fisheries manager (interview #2), "probably comes down to how many permits we issue, where we issue permits, what we charge for permits... that is a way of regulating the amount of pressure that comes on the resource". Management also includes monitoring of catches, surveillance and imposition of sanctions, including legal prosecution, for breaches of regulations.

Development and improvement include reinstatement of gravel beds, removed by dredging to improve land drainage between 1961 and 1970. These works are conducted in collaboration with the Office of Public Works: "They go in and put in some gravel for us, put in weirs, boulders, bank protection... improve the habitat more generally. They have manpower and machinery to manage rivers in terms of flood management, flood relief..." (fisheries manager, interview #1). Another positive innovation is a Salmon Conservation Fund, introduced in 2006 which provides grants, of up to €15,000 for small scale improvements (e.g., weed removal), to private fisheries and angling clubs which remit the fees that they collect from sales of angling licences (IFI, 2015b, 15). Since 2016, a capital works grant is also available to improve access to fisheries waters. Business development relates to the promotion of salmon angling nationally and internationally in association with *Fáilte Ireland* (the National Tourism Development Authority) and the regional tourism organisation.

Salmon angling contributes to the State and local incomes and employment. Since 1998, the State no longer gains financially from sales of salmon from the Moy but receives income from sales of licences and permits (IFI, 2015b). Based on figures relating to the number of anglers purchasing different types of licences, it is estimated that some €252,000 was collected in licence fees in the wider regional fisheries basin, in 2014 (IFI, 2015a, Table 19). This money is remitted to IFI centrally but some returns as grants for fisheries improvement through the Salmon Conservation Fund. Income from sales of permits is not published by IFI and many permits relate to private and angling club fisheries, so it is difficult to obtain a figure in that regard. A national survey of anglers in 2014/15 estimated average net annual expenditure (excluding travel costs, leakage, and including a multiplier) by Irish and overseas salmon and sea trout anglers (some fish for both species) as being €1628 per person (IFI, 2015c, Table 14) which gives an estimated total contribution of about €8.28m to the Western Regional Fisheries Basin (based 5087 licences being sold). (Some anglers may buy more than one one-day licence but this may be offset by the fact that some anglers spend more than the average, because of the popularity of the Moy) Recent survey material provides a guideline to daily expenditure associated with salmon angling on the Moy and suggests that,

Table 1. Statutory functions of IFI as they apply to the River Moy catchment

Function and Actions
Conservation and protection of stocks <ul style="list-style-type: none"> • Long-term sustainable management of the resource • Implementation of the Fisheries Acts and the Water Pollution Acts, 1977 and 1990
Management <ul style="list-style-type: none"> • Issuing of angling licences and permits to control the pressure that comes on the resource • Surveillance and protection of fish stocks and imposition of sanctions
Development and improvement <ul style="list-style-type: none"> • Work to protect habitat for fish • Improving physical access to the river for anglers
Business development <ul style="list-style-type: none"> • Developing tourism potential by promoting salmon angling through local, national and international media and networking

Sources: Discussion with fisheries staff and IFI literature.

on average (including overnight as well as day trips but excluding travel costs), a domestic (non-local) angler spends €351 per day and an overseas angler €397 per day (Hynes, 2017). Many domestic anglers make multiple trips to fish, consisting of one or more days, and overseas anglers usually spend several days when they visit (TDI, 2013).

The businesses and their employees who benefit most from salmon and sea trout angling are accommodation providers (including some private fisheries), restaurants, public houses and tackle shops in Ballina, Foxford and Swinford. Direct full-time employment in salmon fisheries on the Moy is limited and much employment is of a seasonal nature. IFI employs three full-time, two part-time and two seasonal staff (as of February 2017). The largest private fishery and one angling club each employ a full-time manager. The smaller private fisheries and angling clubs employ a seasonal manager on a basic salary supplemented by a percentage of the fishing permits sold. Additional seasonal employment (usually for about two people) is provided for water keepers (who patrol to prevent poaching) and for local angling guides (gillies) who provide advice on the best places to fish. Three professional angling guides host anglers throughout the year for coarse (pike, perch and other species) as well as game angling in season.

The cultural identity of Ballina is closely associated with salmon angling and anglers are constantly present from early April to early September. *Fáilte Ireland* awarded Ballina the title of ‘Salmon Capital

of Ireland’ in 2008 and a logo was adopted which includes a salmon, the spire of St Muredach’s Cathedral, a local landmark for which a beat on the river is named, and icons that represent the surrounding countryside. The River Moy and angling are further celebrated in the annual Ballina Salmon Festival, held in mid-July. Prizes are awarded for the heaviest salmon caught during the festival period by a local and by a visiting angler. IFI contributes to this cultural celebration of salmon by registering the weight of the salmon caught and making the Cathedral beat available free on one half-day for lessons in fly-casting for anglers under 18 years of age, provided by two officially-qualified fishing guides.

Figure 3. Ballina salmon capital of Ireland



B. Reinforcing actions to support the strategy

In a strategic approach to integrated resource management, features of ownership of the resource and the type and scale of other activities that impinge on the resource should support its sustainability (Saxena *et al.*, 2007; Cawley and Gillmor, 2008) (Figure 1). These are areas where innovations pose threats and where attaining balance requires ongoing attention and action by management. Positive and supportive innovations can also take place.

1. Ownership and use of local resources

The River Moy is owned by the State, private individuals hold fishing rights and local angling clubs lease fishing rights from IFI and private owners. Private owners and angling clubs benefit from the research and remedial works (innovations) undertaken by IFI. These include applied fisheries management conducted to measure the attainment of salmon conservation limits and control invasive aquatic species and remedial work on spawning grounds referred to above (IFI, 2016b). Private owners and clubs who remit licence fees are also eligible to apply for the Salmon Conservation Fund grants to conduct improvement works on the stretches of river that they own or lease (IFI, 2014). The new funding to improve access for anglers is open to all stakeholders involved in providing access.

Poaching was widespread in Irish salmon fisheries, in the past, when ownership of fishing rights by private landowners, as was often the case, was resented. It was hoped that illegal angling would decline in Ballina when the State acquired the former Moy Fishery and declining salmon stocks made it necessary to remove the traps and nets in 1998. Affording preferential access for two local angling clubs to two beats on the river was designed to encourage a sense of local ownership and responsibility. Also, “during Ireland’s period of high economic growth and high employment, between 1998 and 2008, illegal fishing was less attractive as a supplementary source of income. However, because of the suspension of the commercial fishery on the Moy, there is a low availability of wild salmon in shops” (fisheries manager, interview #1). Some consumers are willing to pay high prices for wild salmon which is an incentive to poach during recent years of high unemployment, although there

are fewer people involved than in the past. IFI has adopted technical innovations, such as night vision scopes and thermal imaging equipment for surveillance, kayaks for patrol and a confidential telephone line to encourage reporting of poaching (Kidarestreet.com, 2014). Successful legal actions taken against offenders are publicised widely as a method of dissuasion. In the words of a national fishery staff member to a parliamentary committee, in 2014: “Catching a poacher takes him out of the equation and he is unlikely to be caught again” (*ibid.*, unpaginated).

2. Complementarity between other resource uses and salmon fisheries and issues of scale

The conservation of wild salmon stocks is critically dependent on a high quality environment, notably an absence of polluting substances in the water. Conflicts arise from uses of water or land that release either solid or liquid substances that cause damage to the quality of the water and the ecosystem (EPA, 2013). Fish kills can arise in cases of severe pollution and stimulation of weed growth from nutrients interferes with the food supply of the young fish. In the late 1990s, particular threats came from runoff from certain agricultural practices, including from silage storage pits. The fisheries manager reported improvements in this regard (interview #1): “Big bale silage has replaced pits and eliminated pollution for the most part... rare enough now to have pollution from silage. Main concern now is slurry being spread on wet ground and runoff into streams and rivers”. Occasional leakage of pollutants from industrial workings also occurs. Inadequately treated sewage associated with the town of Castlebar was a source of phosphorous enrichment further downstream in the past (IFI, 2001).

The physical scale of some road, quay and bridge construction projects can interfere with the movement of fish in rivers and streams and add to the sediment load in the water. These threats are addressed in Environmental Impact Assessments associated with such projects which take the concerns of IFI into account (e.g., Roughan & O’Donovan, 2016). Clear felling of mature coniferous forests, owned by *Coillte* the State forestry company, releases phosphates and nitrates into the soil from leaf fall, which can then escape into streams and rivers and result in acidification of the water, which poses

threats to young salmon and stimulates weed growth (fisheries manager, interview #2).

Whilst negative innovations threaten the environment in which the salmon live and the stocks of fish, policy innovations have served to offset these threats in recent decades, notably EU wildlife and environmental directives. The Moy catchment is part of the European Natura 2000 network (NPWS, 2016). The catchment as a whole is designated as a Special Area of Conservation, under the EU Habitats Directive (the salmon is recognised as an Annex II species worthy of protection), and the estuary and the river as far as the village of Belleek are also designated as a Special Protected Area, under the EU Birds Directive, as are two of its lakes- Lough Conn and Lough Cuillin (EC, 2016a) (Figure 2). The National Parks and Wildlife Service, which is responsible for the protection of Natura 2000 habitats in Ireland, monitors all activities that might have implications for the designated species (National Parks and Wildlife Service manager, interview #3). The EU Nitrates Directive of 1991 (part of the wider Water Framework Directive) promotes good farming practices to prevent nitrates from polluting ground and surface waters (EC, 2016b). Monitoring of water quality is conducted by a special unit of the Department of Agriculture and the county councils (on behalf of the national Environmental Protection Agency), under this Directive. Agricultural policies designed to reduce densities of grazing livestock and application of fertilizers have also helped to reduce pollution: “Cross-compliance criteria also allow for reduction or withdrawal of payments to farmers when environmental regulations are breached. Rather than prosecute, IFI can now invoke these sanctions when breaches of the Fisheries Acts occur” (fisheries manager, interview #2).

C. Maximising on the resource

In order to maximise on the pursuit of appropriate measures to attain holistic sustainability, local and extra-local networking with pertinent stakeholders is required (Saxena *et al.*, 2007; Cawley & Gillmor, 2008). Some of the principal forms of networking engaged in by IFI are listed according to their main functions in Table 2.

Maintenance of water quality, in order to conserve and protect the stocks of fish, involves liaison with the county councils which monitor water quality

locally, on behalf of the Environment Protection Agency, with a special unit in the Department of Agriculture nationally and with the National Parks and Wildlife Service regionally. It is worth noting that some relationships with the councils are marked by tension, where proposed council works pose threats to the fish stocks. (IFI has also opposed the State Marine Institute’s support for aquaculture, in proximity to another river estuary, based on established research that points to potential threats to wild salmon from sea lice among other concerns [fisheries manager, interview #2]). Legal action in cases of pollution may be pursued with the Environmental Protection Agency and the National Parks and Wildlife Service. Farmers are informed about avoidance of pollution of rivers and streams in association with *Teagasc* (the Agriculture and Food Development Authority). Reports from the public relating to incidences of pollution or inappropriate developments are also investigated (fisheries manager, interview #1).

Largescale road building projects involve contact with the National Roads Authority nationally and the county councils locally to protect fish stocks and water quality. In the case of runoff from the clear-felling of coniferous State forests, “Multi-lateral networking takes place between IFI, *Coillte*, the Environmental Protection Agency and the county councils” (fisheries manager, interview #2). International networking for accessing and sharing scientific information takes place with the North Atlantic Salmon Conservation Organisation.

In fulfilling its management function, IFI has extensive contact with anglers, locally, nationally and internationally in issuing licences and permits. A member of staff also visits each private and angling club fishery weekly during the season to collect information on catches and licences issued.

The development and improvement of the habitat for fish involves networking with the Office of Public Works, locally and nationally, in the context of reinstating gravel beds for salmon spawning. In administering the Salmon Conservation Grant scheme, contact takes place with private fisheries and angling clubs. Research information is obtained from a university and research institution regionally. Improving access to river banks for anglers, under the 2016 funding scheme, involves liaison with a wide range of stakeholders.

Table 2. Networking by IFI staff in Ballina by function and geographical level

Local, county and region	National and international
<i>Conservation and protection of stocks</i>	
<ul style="list-style-type: none"> • Mayo and Sligo county councils • National Parks and Wildlife Service • Teagasc • Coillte 	<ul style="list-style-type: none"> • Standing Scientific Committee on Salmon • Environmental Protection Agency • Department of Agriculture • National Roads Authority • North Atlantic Salmon Conservation Organisation
<i>Management</i>	
<ul style="list-style-type: none"> • Anglers • Private fisheries and angling clubs 	<ul style="list-style-type: none"> • Anglers • IFI national level
<i>Development and improvement</i>	
<ul style="list-style-type: none"> • Office of Public Works • Research institutions • Private fisheries, local angling clubs 	<ul style="list-style-type: none"> • Office of Public Works • IFI national level
<i>Business development</i>	
<ul style="list-style-type: none"> • Anglers • A private residential fishery • Regional Tourism Organisation • Ballina Salmon Festival Committee 	<ul style="list-style-type: none"> • Anglers nationally and internationally • National and international tourism promotion agencies

Sources: Discussion with fisheries staff and analysis of documentary and on-line sources.

In business development and the marketing of salmon angling as a tourist activity, IFI networks with anglers at various geographical scales through a wide range of media, including social media and a web cam on the Ridge Pool in Ballina (the most productive beat). Marketing activities locally and regionally include collaboration with one private residential fishery and with the regional tourism organisation and the Ballina festival committee. Networking takes place with *Fáilte Ireland*, through a specialist IFI marketing officer nationally, for international promotion to tour operators and agents.

V. DISCUSSION

This paper focused on balancing innovation and heritage in the context of the River Moy salmon fishery, taking positive as well as negative innovations into account. It was suggested that a strategic integrated approach, drawing on a model from integrated rural tourism, offers a method of attaining this balance (Saxena *et al.*, 2007; Cawley & Gillmor, 2008). The approach is based on having a clearly defined strategy that is supported by appropriate actions and maximised on through local and extra-local networking with pertinent stakeholders. The research revealed that a well-defined strategy

is in place with particular emphasis on the sustainability of the salmon stocks in the River Moy as a public good and recreational resource which has wider implications for local economy, society and culture. Implementation of the, research-informed, angling regulations is central to protecting the resource. Innovative methods and technologies are used to prevent illegal angling, as are legal prosecutions for serious cases of poaching. Preferential access is provided to areas of the river for members of two local angling clubs in Ballina, as a method of encouraging a sense of ownership and responsibility and reducing poaching. Declining salmon numbers in the North Atlantic, which have been associated with climate change, increased acidification of the oceans and declining food supplies, require action internationally.

The strategy is supported by the actions of IFI through remediation of spawning gravel beds, in collaboration with the Office of Public Works, and weed control through the Salmon Conservation Grant programme from which private fisheries and angling clubs benefit. Threats posed to the quality of the water and the fish stocks associated with agricultural and land use practices and overloaded sewage plants have been ameliorated to a large

extent as a result of the impact of innovative EU environmental legislation and improved monitoring by the Environmental Protection Agency and the National Parks and Wildlife Service in particular. Large-scale construction projects and clear-felling of coniferous forests present current challenges, as do occasional cases of farm pollution, and require ongoing monitoring by IFI.

In fulfilling their legal remit to protect the River Moy and its salmon stocks, IFI staff engage in extensive networking with other state and private stakeholders at local, regional, national and international levels. In some of these instances the actions of other public entities may conflict with the legal responsibilities of IFI, resulting in unavoidable tension. IFI also liaises with regional and national tourism agencies and with anglers in promoting salmon angling nationally and internationally.

VI. CONCLUSION

This paper addressed the concept of balancing conservation and innovation in heritage protection (Cowell, 2011; Meskell, 2014), in the context of a natural heritage resource that is used for tourism purposes. The evidence illustrates that innovation is not always negative, and that positive innovations can contribute to heritage protection. The example of the River Moy also reveals that an integrated approach to management (Saxena *et al.*, 2007), pursued in a strategic way (Cawley & Gillmor, 2008), provides one pathway to finding the balance that is desired. Ongoing monitoring and networking, as conducted by IFI, is necessary in order to support holistic sustainability. Research with other stakeholders will help to inform the evaluation further and is planned.

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