Isle of Man Government

Reiltys Ellan Vannin

DEPARTMENT OF ENVIRONMENT, FOOD AND AGRICULTURE

Rheynn Chymmyltaght, Bee as Eirinys

NATIVE FRESHWATER FISHERIES STRATEGY 2015 - 2020

Foreword from Minister Ronan

My time as Minister for the Department of Environment, Food and Agriculture has increased my appreciation of the role the Island's landscape has in promoting a healthy lifestyle for our community and the significant contribution it makes to the visitor economy.

Our rivers and streams are socially and culturally significant features of this landscape, the beauty of which is a major attraction for visitors. They also support a wealth of wildlife, including populations of several internationally significant fish species, the health of which indicates and can be used to promote the Island's environmental quality.

Recent visitor surveys have also highlighted the importance of angling to the visitor economy. By raising awareness of the excellent and affordable fishing opportunities our rivers and streams offer, I believe there is much scope for increasing the contribution they make to the attractiveness of the overall angling experience available here.

We are currently seeking UNESCO Biosphere accreditation to reflect the way our community, ecology, heritage and environment co-exist so well. Through a process of engagement with other Departments and external stakeholders, we must ensure that how we utilise our rivers and their wildlife remains sustainable in order both to fulfil our responsibilities as custodians of the environment and so that future generations can continue to enjoy the recreational opportunities they provide.

I continue to be impressed with the dedication and expertise of the Fisheries team. I fully endorse the aims and objectives of this five-year strategy for our native freshwater fisheries and am confident that DEFA has the ability to drive forward its recommendations to provide wide-ranging social, ecological and economic benefits for our Island.

Signed

Richard Ronan, MHK, Minister for Environment, Food and Agriculture

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1. INTRODUCTION

The Fisheries Directorate within DEFA has responsibility for the improvement and protection of all freshwater fisheries, the regulation of fishing and the prevention of illegal exploitation. The Directorate also has powers to help ensure the unobstructed migration of salmon, sea trout and eels from the sea to their spawning grounds, to control the movement and introductions of freshwater fish species and to monitor fishing and fish stocks.

The Isle of Man's rivers and stream are iconic, culturally significant features of its landscape. Their fish populations are a valuable asset both as a recreational resource, and as indicators and promoters of the Island's environmental quality. As such, the conservation and promotion of the Island's native freshwater fisheries has a significant contribution to make towards the Government's key priorities laid out within its *Agenda for Change*, especially 'stimulating economic growth' and 'protecting the vulnerable'.

The purpose of this document is to establish a five-year strategy for effective yet affordable management and development of the Island's native freshwater fisheries in line with the aims and objectives of the DEFA *Department Plan 2014-2017*, which identifies how the Department will contribute to the Government's key priorities and underlying key policy areas contained within *Agenda for Change*.

The development of this strategy is a commitment within the *Department Plan*, related to its stated objective to 'encourage sustainable economic activity in harmony with our natural resources'. This in turn relates to the *Agenda for Change* key priority of 'protecting the vulnerable' via its commitment to 'use our natural resources sustainably'.

The strategy also has direct relevance to one of the key themes identified in *Vision 2020*, namely that of 'Destination Island' via the contribution which freshwater fisheries have to make towards promoting the Island as a tourist destination.

1.1 Summary of Relevant Legislation

Fisheries Act 2012
Under the Fisheries Act 2012, the Department of Environment, Food and Agriculture (DEFA) within the Isle of Man Government has a statutory duty for the "supervision and protection of inland and sea fisheries" and for "fostering the establishment and development of such fisheries."

This provides protection for all native freshwater fish species and their habitats from damage and detrimental disturbance, and safeguards a free river passage for fish. Protection of diadromous fish (those that migrate between the sea and freshwater) during the marine phase of their life cycle includes a complete ban on taking of salmon and sea trout at sea, from the foreshore or in harbours, and restrictions on recreational netting within specified zones.

Wildlife Act 1990
This places restrictions on importation of new and spread of established non-native species some of which may be detrimental to native fisheries.

Tree Preservation Act 1993
With few exceptions, this requires a licence to be obtained from DEFA to fell any live tree with a main stem of >8cm diameter at 1.52m above ground. Many river bank trees are registered under this Act and therefore require a licence for felling or pruning whatever their size. River bank trees and shrubs provide cover for fish and the invertebrate life they support can be an important terrestrial food source.

Water Pollution Act 1993
Under this Act it is an offence to discharge poisonous, noxious or polluting matter into 'controlled' waters' (rivers, streams, ponds, lakes and the sea). Any discharge of trade or treated sewage effluent must be licensed by the Environmental Protection Unit, DEFA.

Flood Risk Management Act 2013
Under this Act, a watercourse is a river, stream, brook, ditch, cut, culvert, dyke, sluice or a land drain or passage through which water flows (a primary watercourse), and a lake, pond or other area of water flowing into a primary watercourse. Watercourses do not include sewers or highway drains.

Landowners have a duty to maintain all watercourses on their land such as not to compromise flood protection functions and, with the exception of routine management, written consent from Manx Utilities must be obtained prior to conducting any works in or adjacent to any watercourse, including bank repairs or erection of structures such as cross-channel barriers, culverts or bridges.

Watercourses designated under this Act as a 'Designated Watercourse' are maintained in terms of flood risk management by the Flood Risk Management Team of Manx Utilities. Within a 'Designated Watercourse' corridor, which legally extends 9.1m either side of each bank, consent is also required for planting of trees and shrubs or erection of any structure.

Convention on Biological Diversity
This convention is an international agreement to conserve and manage biodiversity, first signed in 1992 by 168 countries, including the UK. Following a request from the Isle of Man Government, it was extended to the Island in 2012. The Department is in the process of producing an *Isle of Man Biodiversity Strategy* as part of fulfilling the Island's obligations under the Convention.

1.2 Overview of Manx Rivers

1.2.1 Physical Characteristics
The majority of Manx rivers are steeply graded and fast flowing. The upper reaches of these rivers tend to be largely semi-natural in terms of habitat, however lower down there has been significant modification over the years in order to support now defunct local mining and milling industries.

The largest river is the Sulby, which drains the northern slopes of Snaefell and runs into the sea at Ramsey on the East coast. The other major rivers are the Neb on the western side of the Island and the Douglas River (including its tributaries, the Dhoo and Glass) in the South East. In addition there are numerous short streams that run straight off the uplands into the sea, many passing through steep glens. In the low-lying northern area of the Island the watercourses are mainly slow-flowing and straight, mostly consisting of a network of trenches created for the draining of what was once an extensive area of wetland for the purposes of agriculture.
Several of the major rivers on the Island have been impounded in their upper catchment to provide reservoirs for drinking water supply. This has had the effect of attenuating discharges to these rivers along with a variety of other physical and hydrological impacts. Many watercourses also display the legacy of other anthropogenic modifications e.g. straightening and widening of channels, armouring of banks, and incorporation of weirs.

Currently there is no legislation in place specifically to regulate and control the abstraction of water from any river except in terms of water in a reservoir catchment. However, although there are currently no consents or licences required of landowners specifically for the abstraction of water from their land, under the Water Act 1991, diverting water supplying or flowing through any Manx Utilities reservoir or raw water catchment, or doing anything which would affect the quality or quantity of the water without immediately restoring the water to its original state is an offence. Owners of land adjoining a watercourse have rights and responsibilities under common law and under the Flood Risk Management Act 2013.

1.2.2 Chemical Quality

The water quality of Manx rivers has improved greatly from the conditions experienced in the 1800's when the mining industry was at a peak.

In February 2005 the Water Pollution Act 1993 became fully implemented, which allows for licences to be set for all discharges of sewage and trade effluent to watercourses and significant penalties imposed for non-compliance. In recent years, many domestic and other small-scale sewage treatment systems have been renovated under licences issued under this Act with positive implications for water quality.

The Environmental Protection Unit of DEFA collects river water samples each summer from 86 sites on the Island for chemical analysis by the Government Laboratory. At 26 of these sites, additional water chemistry, as well as biological monitoring via sampling of the aquatic macro-invertebrate community, is conducted each spring and autumn.

Although the past decade witnessed a gradual increase in chemical water quality, a slight overall decline has been detected in very recent years, indicating that river quality is under continuing pressure. The latest monitoring shows that 89% of Manx rivers are of 'Good' or better chemical water quality and 96% are 'Fair' or better (sites of 'Good' classification are of a quality suitable for salmonid fish such as brown trout, while those that are 'Fair' are subject to some stress due to pollution or disturbance and, while suitable for some fish, are deemed unsuitable for salmonids).

While there have been recent increases in the percentage of 'Very Good' river sites, the overall percentage of sites that are rated as 'Good' or better has decreased. This probably reflects both continuing stresses and pollution pressures on a number of rivers, as well as extremes in weather events such as very dry and very wet summers, the former reducing dilution of pollutants in some sites and the latter increasing leaching and run-off of land-borne pollution in others, highlighting the need for continued pollution mitigation, enforcement and water quality monitoring[1].

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The main types of pollutants affecting the Island's watercourses are farm waste, sewage, oil and suspended solids. Occasionally, incidents relating to industrial effluent and chemical pollutions are reported. A small number of streams are limited in their ability to support salmonids due to the continuing effect of some historical mine-workings on dissolved metal concentrations and acidity levels[2].

Work is ongoing by the Manx Utilities Authority on a regional Sewage Treatment Strategy (RSTS) for the Island. This has already reduced the number of sewage treatment plants discharging effluent to rivers throughout the Island thereby improving their quality and reducing the risk of major pollution incidents.

1.3 Freshwater Fish Species on the Isle of Man

Species regarded as native to the Island include Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*) and their anadromous form, the sea trout, European eel (*Anguilla anguilla*), brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*), minnow (*Phoxinus phoxinus*), three-spined stickleback (*Gasterosteus aculeatus*) and nine-spined stickleback (*Pungitius pungitius*). Of these, brown trout, sea trout and salmon are of recreational importance.

1.3.1 Atlantic Salmon

Adult salmon spawn in rivers and streams, laying their eggs in redds excavated in well-oxygenated stony areas of the channel. After two or more winters in freshwater, the juveniles undergo a process of physiological and morphological transformation known as smoltification, and migrate to sea in springtime to take advantage of the higher abundance of food available in the ocean before returning to freshwaters to mate and spawn after one or more winters at sea, the vast majority of survivors (approx. 96%) returning to their natal river.

In the Isle of Man, most juvenile salmon smolt after two winters in freshwater and return in the late summer/autumn of the following year as grilse, having spent only one winter at sea. However, larger, multi-sea winter salmon are commonly reported, their frequency most likely related to abundance and timing of rainfall.

Stocks of Atlantic salmon have suffered throughout their range in recent years. Overall, the numbers of salmon estimated as returning to rivers in England and Wales during the last three years have been among the lowest on record[3]. Marine mortality appears to be the major cause of the decline, the percentage of salmon surviving the marine phase of their life cycle having declined drastically to approximately 10% from around 40% in the 1970s[4].

The rivers in which salmon are most common on the Island are the Sulby, Neb, and Douglas (and its tributaries the Glass and Dhoo). However, they also inhabit several

other rivers accessible from the sea, including the Santon Burn, which was historically listed with the above as one of the main salmon rivers of the Isle of Man[5]. Densities of juvenile fish appear to be stable and, in some cases, possibly improving at some of the Island sites monitored since early this century[6]. However, data on numbers of adult salmon returning to Manx rivers are even more limited in quantity and quality, and there is anecdotal evidence that the Island has, like elsewhere, experienced a decline in recent years. It is therefore all the more important to conserve and improve the physical and chemical quality of rivers and streams in order to maximise the number of smolts produced.

1.3.2 Brown/sea trout

Brown and sea trout are the same species and indistinguishable as juveniles. Brown trout remain in freshwater their entire lives, while the sea-going form migrates between fresh and saltwater in a life cycle very similar to salmon, although it is far more common for them to return to spawn more than once. Sea trout do not migrate as far out to sea as salmon and some, known as whitling, will migrate between sea and freshwater several times before reaching maturity. They also tend to enter Manx rivers earlier in the year and, as is the case elsewhere in their geographical range, they will often spawn in much smaller streams and tributaries.

What determines whether or not a juvenile fish becomes a sea trout is not yet fully understood but is likely to result from a combination of genetic and environmental factors. The size and naturally low productivity of Manx rivers probably provides a strong environmental incentive for female trout especially to spend periods feeding at sea, and sea trout are common throughout the Island. As sea trout are the much larger, and therefore, more fecund, of the two forms, there is likely to be a strong genetic tendency for smoltification within those rivers and streams accessible from the sea.

With the decline in stocks of Atlantic salmon, sea trout fisheries are becoming increasingly important and valuable. However, as with salmon, sea trout populations in the British Isles have declined in many areas in recent years, sometimes but not in all cases, associated with the proliferation of commercial salmon farming[4].

Brown trout are widespread throughout the Isle of Man and populations appear stable and healthy in many, though not all, of its watercourses[6]. However, the limited historical data combined with the absence of monitoring cameras on the Island's rivers provides little indication of whether or not the sea trout population is stable.

Between 2010 and 2013, the Isle of Man Government participated as an associate partner in the Celtic Sea Trout Project, a multi-agency partnership investigation into sea trout stocks and fisheries of rivers entering the Irish Sea. Funded by the European Union Interreg 4A Ireland Wales Programme with additional support from government agencies, voluntary bodies and private fishery interests, this project seeks to inform management recommendations for sea trout fisheries and explore the use of sea trout as a bio-indicator for climate change impacts[7]. The final project report is due for publication in June 2015 but some information on the Manx fishery has already been received. This includes an estimated annual return of sea trout to the Island of between 4,154 and 8,308 and the finding that sea trout in the Isle of Man display the highest annual survival rate of the river networks studied (pers. comm. – Dr Nigel Milner, Associate Senior Fisheries Biologist, APEM Ltd)

1.3.3 European eel

European eels spawn in the Sargasso Sea area of the mid-North Atlantic Ocean. After hatching, their larvae drift towards the coasts of Europe where they metamorphose into transparent 'glass eels' and, upon entering freshwater, develop into elvers as they migrate upstream. They remain in freshwaters for up to 20+yrs before heading back to the Sargasso Sea to spawn and die.

On a global scale, eels have suffered a massive decline in abundance in recent decades and are currently listed as Critically Endangered by the International Union for Nature Conservation (IUCN). Returns of glass eels have improved in many areas of Europe during the last three years indicating that the decline may have halted and populations may at last be improving. However the International Council for the Exploration of the Sea (ICES) still considers the status of the species to be critical and recommends that anthropogenic impact on stocks is minimised[8].

Eels are widespread in running and stillwaters on the Isle of Man but data on Manx populations are limited. Two studies conducted by MSc students in recent years indicate that the Isle of Man may have relatively healthy populations, probably due to the lack of commercial exploitation, but also that the recruitment to some rivers may not be sustainable[9, 10]. It is hoped that the leap in recruitment seen in general throughout Europe will also benefit Manx stocks.

1.3.4 Lampreys

Lampreys are evolutionarily ancient forms of fish, which possess a circular, toothed sucking disc rather than a jaw. All three British species have similar life cycles whereby nests are excavated in gravels on the riverbed and, after hatching, the young bury themselves in silty areas, feeding on organic matter and detritus for several years. Once mature, brook lampreys (*Lampetra planeri*) cease to feed and die after spawning. Mature river (*L. fluviatilis*) and sea lampreys (*Petromyzon marinus*), however, migrate to sea to parasitise other fish for several years before returning to freshwater to spawn then die.

Sea lampreys have been observed on basking sharks in Manx waters but there is no evidence of them entering the Island's rivers. However, since 2007, observations by Fisheries Officers and studies conducted in 2011[11] and 2012[12], have indicated that brook, and possibly river, lampreys are widespread on the Island but data are too scarce to determine population trends. As with salmonids, they are very sensitive to pollution so their presence reflects well on water quality.

1.3.5 Minnows and sticklebacks

These are most common within the Island's stillwaters and sluggish streams. While occasionally encountered during salmonid surveys, little is known of their distribution or abundance.

1.3.6 Non-native Species

Rainbow trout (*Onchorynchus mykiss*) are present in a number of private stillwaters. They are also reared on the Island by a private company, primarily for the production of eggs for global export, and also for stocking six of the Manx Utilities reservoirs for recreational purposes as part of the agreement governing its lease of the DEFA-owned hatchery at Maughold.

Several non-native species of coarse fish are recognised as being established, and, in the case of some species, widespread on the Island. Their presence has implications for the conservation of native species and for recreational fisheries so it is vital that DEFA's policy regarding coarse fish and fisheries takes this into account. The Department's coarse fish policy was reviewed and revised in 2015 and is available on the Freshwater Fishing page of the IoM Government website www.gov.im

European eel

Adult male salmon

Brown trout

Spawning brook lamprey

River lamprey

Adult male sea trout

2. STRATEGY

The strategy detailed in the following sections sets out the approach the Department will take over the next five years in order to conserve and improve Manx native freshwater fish populations. Failure to adopt a proactive approach now may result in long term damage to this resource, the conservation of which has implications for the Isle of Man Government's environmental objectives but also its aims and objectives regarding growth of the local and visitor economy.

While the strategy focuses on salmon and brown/sea trout, many of its recommendations have potential to convey benefits for all of the Island's native freshwater fish.

2.1 Monitoring

Fish populations display natural fluctuations in abundance over time. Long term monitoring is therefore essential in order to determine genuine trends in population sizes, and thereby to gauge the impact of anthropogenic influences, e.g. climate change, pollution, and management techniques such as habitat improvements and stocking.

2.1.1 Aim

To determine fish population trends in rivers across the Island with particular regard for the conservation of salmonid stocks and the effectiveness of related management strategies, e.g. enforcement of legislation and stocking of hatchery-reared salmon fry.

2.1.2 Objectives

- To continue the programme of monitoring trout and juvenile salmon instigated in 2003.

- To gain a greater insight into the numbers of adult salmon and sea trout returning to Manx rivers.

2.1.3 Methods

Various techniques are available for monitoring the different life stages of freshwater fish populations including electric fishing surveys, trapping, anglers' rod-catch returns and fish counters. However, the feasibility of employing each of these techniques depends upon the availability of the necessary financial and human resources.

Electric-fishing surveys

Electric fishing gives the best value for money when monitoring populations of juvenile salmonids. Although surveys require a minimum of 3, mostly 4 staff, it is possible to use some volunteer and student assistance in order to reduce the level of paid manpower required, and this tactic is already employed by the Fisheries Directorate whenever possible. The results obtained from electric fishing surveys provide a measure of the extent to which spawning and nursery habitats are being utilised, and can identify adverse environmental impacts and in extreme cases, recruitment failure. The technique can also be used to assess the success of restocking programmes, and improvements in habitat and fish passage in improving resident trout populations and juvenile populations of anadromous (migratory) salmonids.

A comprehensive electric-fishing monitoring programme was established in 2003 and is subject to regular review and, where appropriate, adjustment, in order to guide and measure the effectiveness of the salmon stocking programme and other management initiatives. While quantitative data is gathered only for salmonids, the presence and approximate abundance of other species, such as eel and lamprey, is recorded.

Upstream Counters and Traps

Determining and monitoring fluctuations in the numbers of adult salmon and sea trout is as important as monitoring juvenile numbers because obtaining data on both life stages gives a more accurate indication of both the quality and sustainability of a fishery than can be deduced from juvenile surveys alone. However, the most effective techniques available in terms of the quality of data obtained tend to be labour-intensive and/or prohibitively expensive given current financial resources.

For instance, trapping salmon and sea trout as they migrate upstream to spawning grounds is labour-intensive and the capital costs of installing the necessary structures are high. In addition, there is the likelihood of substantial on-going costs in terms of structural maintenance. Traps can also incur handling stress in fish and unless traps covering the whole width of the channel are used, even more labour-intensive mark-release-recapture techniques are necessary to estimate population size.

Similarly, smolt traps are useful for measuring the productiveness of the freshwater stage by enabling the monitoring of the length, weight, age and general condition of salmon and sea trout smolts as they leave rivers to begin the marine stage of their life cycle. Smolt traps can also provide the opportunity to microtag wild fish thus assisting in other more specific investigations such as the impact of climate change on the timing of the smolt run and the age, size, condition and subsequent marine mortality of fish at this transitional stage. However, unless they are designed to capture all smolts, they can only provide an approximate estimate of a river's smolt production, and their effectiveness can also fluctuate according to river flow. As with upstream traps, they are expensive to install and maintain, may increase mortality of fish, and their operation is very labour-intensive.

In the UK, there has been increasing use of electronic fish counters in recent years, which provide valuable data on the number of mature adults returning to rivers to spawn, particularly when used in conjunction with video cameras, which enable

species to be identified and measured. Counters can provide information on the size and timing of runs of migratory fish, and with video cameras, additional biological information on species and gender. While the range of types of data that can be collected is less for counters/cameras than it is for traps, they have the advantage of being non-invasive and therefore do not pose a physical risk to fish. However, while it may be feasible to employ trained volunteers to aid in the interpretation and recording of the data obtained, the substantial capital costs of installing the equipment and necessary infrastructure are prohibitive given the current available finances. There may nonetheless be scope to incorporate such devices into the infrastructure of any future developments such as construction of marinas and harbour alterations as a mitigation requirement for consent, especially where such developments necessitate provision of fish passes as required under the Fisheries Act 2012.

Redd Counting

This technique provides some information on the extent of spawning activity and the location of spawning grounds, However, it is labour-intensive, time consuming, requires staff with a high level of training and experience and, as it provides only a very subjective assessment, is of limited value.

Given this and the level of enforcement duties required of the Inland Fisheries Section at the same time of year, redd counting is not considered an appropriate monitoring technique at the present time.

Rod Catch statistics

Angler rod catch returns can provide a cost-effective means by which to monitor the quality of a fishery, although it is recognised that returns can be variable, being subject to a wide range of factors such as the level and quality of fishing effort, environmental variables, accuracy of reporting and the proportion of anglers submitting information. Rod catch statistics have been collected from all migratory salmonid rivers in England and Wales for many years providing considerable historical data and enabling fishery managers to detect trends in the abundance of mature fish, including salmon and sea trout returning to rivers, and inform conservation and fisheries management initiatives.

Given that current logistical and financial constraints prevent widespread deployment of cameras/counters and traps, collection of viable angling data is, for the foreseeable future, the only realistic option for gauging and monitoring the size of and trends in the migratory salmonid run in Manx rivers.

The Department introduced a voluntary catch return scheme for migratory salmonid anglers in 2003, which was subsequently revised in 2010 to include brown trout. However, the proportion of anglers submitting returns has remained low, often <10% of Other Waters licence holders[6]. In 2005, a combination of media coverage and individual reminders was used to encourage returns but resulted in only a 29% submission rate, and this approach to increasing the quantity of data received was consequently judged not to be cost-effective.

Making submission of a catch return mandatory for Other Waters licence holders as a condition of fishing licence renewal would almost certainly lead to an increase in catch return submission but the associated costs of administering and enforcing such legislation are prohibitive. Offering financial incentives such as a discount on

subsequent licences or entry into a prize draw might also have a positive effect on the number of submissions. However, there is an inherent danger in both of these tactics that they could have a detrimental impact on the quality of the data received, as there would be no way of verifying their validity.

An alternative approach would be to focus on improving the quality and quantity of data received from those anglers already keen to assist in freshwater fisheries conservation by instituting a voluntary logbook system. Under such a scheme, participating anglers would provide more detailed information than is required under the existing catch return system, enabling more meaningful assessment of brown trout populations and abundance of mature salmon and sea trout. For instance, meaningful estimates of catch per unit effort could be made, allowing long term trends to be detected and providing a better means of comparison between rivers on the Island and allowing comparison with similar rivers elsewhere.

2.1.4 Recommendations:

- **Monitoring is essential in order to provide a scientifically focussed basis to enable the effective management and protection of fish stocks.**

- **The programme of monitoring trout and juvenile salmon populations instigated in 2003 will be continued and regularly reviewed with a focus on determining the impact of management initiatives such as the salmon stocking programme, and assessing population trends in rivers of particular recreational interest.**

- **The catch return scheme will be revised to improve user-friendliness and the quality and quantity of data provided in order to improve the Department's knowledge of abundance and trends in populations of mature salmonids.**

- **The Fisheries Directorate will seek to take advantage of any opportunities for the installation of underwater camera/counter technology presented by structural developments in harbours and marinas.**

- **Taking account of available resources, the Fisheries Directorate will explore and seek to enable externally-led research on freshwater fish populations in Manx rivers.**

Electric-fishing survey

2.2 Enforcement & Regulation

The Fisheries Act 2012 provides the primary legislation for the protection of Manx freshwater fish stocks, including migratory salmonids in coastal waters.

Commercial fishing and angling activities involve the exploitation of fish stocks and can pose a wide range of potential impacts on both the density and composition of fish populations. Legislation regulates the ways in which both commercial fishing and recreational angling can be pursued and how fisheries can be managed legitimately.

Other activity, such as flood management and commercial and non-commercial developments, may also exert a short or long term influence via temporary or permanent impacts on water quality, habitat quality and the ability of fish to migrate within rivers. The Fisheries Act 2012 introduced a number of legislative safeguards additional to those included in previous fisheries legislation. For instance, the requirement for the Department's consent to be sought prior to extracting material from the bed of any watercourse has already succeeded in protecting areas of spawning habitat in some drainage ditches from the adverse impact that can result from maintenance being conducted during inappropriate periods.

In order to ensure the successful protection of freshwater fish populations, there must be effective regulation and enforcement of the appropriate legislation. On the Isle of Man, fisheries enforcement activities are carried out on both coastal and inland waters. The work can be labour-intensive and costly, and therefore must be carefully prioritised and planned to ensure a high degree of effectiveness.

2.2.1 Aim

Through the effective enforcement of the Fisheries Act 2012 and related secondary legislation, conserve the freshwater fish populations of the Isle of Man.

2.2.2 Objectives

- To promote and enforce the Fisheries Act 2012 and associated Regulations and Bye-Laws as necessary, in order to ensure the sustainability of the freshwater fishery and discourage illegal and damaging activities.

- To provide an effective, affordable surveillance service on rivers and coasts for the protection of migratory salmonids.

- To review and update the legislation as necessary to provide continuing effective protection to freshwater fish stocks.

- To encourage other Government and external organisations to contribute towards the safeguarding of freshwater fish stocks on the Island.

2.2.3 Methods

During the angling season, Fisheries Officers and volunteer Fishery Watchers will undertake the regulation of fishing activities on the rivers, while outside of the season, regular patrols will be conducted to detect and deter illegal fishing. The level and distribution of enforcement presence will be adjusted according to river conditions, season, timing and abundance of migratory fish runs, availability of resources and the competing demands of other priorities. Through maintaining records and regular review of performance, the regulatory work carried out by the team will become more focussed and targeted towards the more problematic areas.

Fisheries Officers will continue to liaise closely with the Wildlife Crime Liaison Officers of the IoM Constabulary to enable regular exchange of potentially relevant information, effective targeting of poaching 'hot-spots', and awareness of fisheries legislation and conservation issues among the wider police force.

Fisheries Officers, with guidance and assistance from IoM Constabulary Wildlife Crime Liaison Officers, will explore options for employing technological surveillance techniques in order to increase the effectiveness of available resources.

Enforcement patrols on rivers and coasts will be organised and planned in advance at the most appropriate times (including out of hours), taking into consideration health and safety, the workload and priorities of the Directorate at the time, and with due regard to the available resources in terms of manpower and costs. Priority will be given to protecting rivers popular with anglers and those where management initiatives such as stocking are attempting to boost depleted populations, especially where reconnaissance observations or information received by the Department or the IoM Constabulary indicate illegal activity may be taking place.

An enforcement strategy will be developed by the Directorate, which will encompass both commercial and recreational fishing activity, to ensure the most efficient and effective deployment of resources.

All staff (DEFA and voluntary) involved in enforcement activities will receive comprehensive training, including refresher training, to ensure a thorough knowledge and understanding of all relevant legislation before becoming warranted officers.

Through an organised programme of training and shadowing of full time Officers, the Department will seek to increase the number of volunteer Fishery Watchers.

Reports will be prepared following each patrol, reviewed, and summarised on an annual basis. This assessment will highlight the need for any changes and will contribute towards an improved and more effective delivery of enforcement initiatives in the areas in most need of them.

Minimising demand for illegally-sourced fish reduces incentive for illegal fishing activity on coasts and rivers. Fisheries Officers will liaise with Environmental Health Officers such that inspections regarding food regulations encourage catering establishments to ensure that all fish are purchased from legitimate suppliers.

Through appropriately timed news releases, use of social media, and close liaison with other Government departments, the IoM Constabulary, Anglers Forum, NGOs,

landowners, farmers and developers, the protection of native freshwater fish populations will be widely promoted.

Fisheries legislation will be reviewed, and amended as appropriate, on a periodic basis to ensure the correct level of regulation is in place to ensure optimum survival of our native stocks.

2.2.4 Recommendations:

- **Effective and integrated enforcement is necessary to protect and conserve native freshwater fish stocks of the Isle of Man.**

- **DEFA will continue to seek to prosecute anybody engaged in illegal fishing activity.**

- **Priority will be given to rivers with established runs of migratory fish, especially those popular with anglers and/or where management initiatives such as stocking are attempting to boost depleted populations.**

- **Regulation of freshwater fishing and enforcement patrols will be undertaken at the appropriate times, with due regard to resources, to prevent damage to the fishery.**

- **Fisheries Officers will continue to liaise closely with the IoM Constabulary to maximise the efficiency and benefits of surveillance operations.**

- **Demand for illegally-sourced fish will be minimised via collaboration with Environmental Health Officers, and via the use of conventional and social media to promote the enforcement activities of the Directorate and the impact of illegal fishing.**

- **Legislation designed to ensure that land management and industrial/residential development does not detrimentally impact on freshwater fish populations will be promoted, and pragmatically and effectively enforced.**

- **Legislation will be reviewed and amended as appropriate to provide a high level of protection for native freshwater fish stocks.**

Illegally netted sea trout

2.3 Habitat Conservation and Enhancement

In their natural state, rivers are heterogeneous habitats that provide for the differing needs of the various species and ages of native fish. For instance, young salmon prefer to occupy areas of shallow fast flowing water, with a moderately coarse substrate, while deep or slow moving water, particularly when associated with a sandy or silty substrate will not support juveniles. Also necessary for a healthy juvenile population are such features as surface turbulence, loose substrate, large rocks, undercut banks and overhanging and aquatic vegetation, which offer protection from predation and enable demarcation of territories. Such features also afford protection for mature resident and migratory fish. Adult salmon and sea trout also require deep, holding pools in which to rest on their upstream migration, especially immediately downstream from their spawning gravels.

Activities such as damming, dredging, riverbank engineering and channelisation can reduce the variety of physical habitat and, in some cases, result in sections of watercourses failing to cater for certain life stages of fish with consequential impact on the population as a whole. Obstacles to upstream migration, e.g. weirs, can cause under-utilisation of rivers and streams, and in some cases, extinction of diadromous fish within substantial stretches of suitable habitat. River habitat management aims to maintain appropriate natural variations in depth and river bed type (riffle, pool and glide), together with adequate cover and food production areas, and ensure that anthropogenic features have minimum impact on the ability of both resident and diadromous fish to migrate throughout the river network.

2.3.1 Aim

To conserve, enhance and improve accessibility of freshwater habitat in order to promote self-sustaining stocks of native freshwater fish on the Isle of Man.

2.3.2 Objectives

- To ensure that anthropogenic activity, e.g. dredging, riverbank engineering and land management/development has minimal detrimental and, where possible, a positive impact on the quality of freshwater fish habitat.
- To improve accessibility of river habitat for salmon and sea trout.
- To promote and provide advice on good management practice to Government Departments, landowners, farmers, contractors and developers
- To explore scope for increasing NGO involvement in river habitat management.

2.3.3 Methods

Habitat protection
Through dissemination of information via e.g. press articles, distribution of information leaflets and direct liaison, the Department has, in recent years, built up a

productive working relationship with several of the Island's groundwork contractors, consulting engineers and architects. As a result, Fisheries Officers are often invited to discuss development proposals prior to planning consent being sought, with mutual benefits, including for the freshwater habitat. Officers will continue to inform and foster good relations with the construction industry and to monitor, advise and comment on planning applications, where there is potential for the proposed development to have a temporary or permanent detrimental impact on river habitat and/or freshwater fish.

Fisheries Officers will continue to work closely with the Flood Risk Management Team at Manx Utilities to ensure that river engineering works have minimal detrimental impact on fish populations and, where possible, incorporate features that enhance habitat quality.

Fisheries Officers will continue to promote and provide advice on good practice as regards river and riparian habitat management to other Government Directorates and Departments.

The Fisheries Act 2012 introduced a new requirement for consent to be sought from DEFA prior to removing material from the bed of any river. Fisheries Officers will continue to promote and enforce this legislation such as to prevent unnecessary dredging taking place and to minimise the impact on fish and their habitat of dredging, which the Department recognises as necessary for land management purposes.

Fisheries Officers will continue to promote the value of and need to conserve freshwater fish and their habitat to the wider public via distribution of information leaflets, e.g. *Manx Watercourse Management Guide*, and regular communication through conventional and social media.

Fish passage improvements

Manx Utilities has a responsibility to maintain weirs on designated watercourses, where their integrity is deemed necessary for flood management. However, there is no obligation on the Authority to repair/renovate weirs purely for the purpose of providing or improving fish passage. Despite this, the Flood Risk Management Team has always considered fish passage issues whenever there has been cause to repair weirs. Officers take the time to liaise closely with Fisheries staff, and have delivered some substantial improvements to the accessibility for migratory fish of various river stretches in recent years. For instance, the replacement of the Raggatt weir with a rock ramp in 2009 has not only improved passage for all freshwater fish species in the River Neb but has also provided excellent fish nursery ground as evidenced by increases in juvenile salmonid densities at the fish survey site a little way downstream[6].

However, some rivers still suffer from barriers to migration caused by weirs, which seem unlikely to meet the criteria whereby Manx Utilities would be obliged to conduct engineering works on them in the near future, and there is no allocation specifically for improving fish passage within the Fisheries Directorate budget. For instance, Great Meadow and Lady Young's Weirs on the Silver Burn present major obstacles to fish. Both have suffered structural damage in recent years and, whilst retaining functionality with regards to impoundment, they have become even more difficult for fish to ascend to access the several miles of excellent spawning and

nursery habitat upstream. Laxey Glen weir has also been assessed by external consultants as being passable only under a limited range of flow conditions.

Fisheries Officers, through collaboration with Manx Utilities and engagement with relevant NGOs will determine the most appropriate means of, and explore all possible sources of funding for resolving the fish passage issues at Laxey Glen Weir and the Great Meadow and Lady Young's Weirs on the Silver Burn.

Habitat Enhancement
In the UK and Europe there has been considerable investment in recent years in large scale river restoration and habitat enhancement projects. However, there is no allocation specifically for river habitat enhancement works within the Fisheries budget, and, given the current economic climate, it is highly unlikely that substantial beneficial changes to river habitat via e.g. re-meandering, re-connection to floodplains will be feasible options for Manx rivers within the foreseeable future. Given the limited staff resource and that availability of good quality habitat could be increased by improving access to such areas that already exist, it is proposed that the Fisheries Directorate focus over the next five years on resolving the aforementioned fish passage issues.

Nonetheless, although there is no NGO currently on the Island whose main focus is conservation and enhancement of river habitat, there may be scope for enabling small-scale habitat improvements by encouraging greater involvement of the voluntary sector in riparian management e.g. tree thinning in heavily-shaded reaches and control of invasive non-native species. The information provided by the salmonid monitoring programme together with data from other relevant sources e.g. River Corridor Surveys, Government Laboratory river quality data, will be used to produce a Habitat Action Plan for Manx rivers together with any appropriate Species Action Plans for individual fish species in line with the requirements of the Biodiversity Strategy, which will include options for engaging financial and practical assistance from the voluntary sector.

2.3.4 Recommendations:

- **Conserving and ensuring availability of good quality habitat is essential for conserving freshwater fish populations.**

- **Fisheries Officers will continue to promote and provide advice on Fisheries legislation and sound environmental practice to other Government Directorates and Departments, landowners, farmers and to relevant parties within the construction industry.**

- **Fisheries Officers will continue to work closely with the Flood Risk Management Team at Manx Utilities to ensure that river engineering works have minimal detrimental impact on fish populations and, where possible, incorporate features that enhance habitat quality.**

- **Fisheries Officers will continue to advise and comment on planning applications, where there is potential for the proposed development to have a temporary or permanent detrimental impact on river habitat and/or freshwater fish.**

- **Fisheries Officers will continue to promote the value of and need to conserve freshwater fish and their habitat to the wider public via distribution of information and advisory literature and regular communication through conventional and social media.**

- **Fisheries Officers, through collaboration with Manx Utilities and engagement with relevant NGOs will determine the most appropriate means of, and explore all possible sources of funding for resolving the fish passage issues at Laxey Glen Weir and the Great Meadow and Lady Young's Weirs on the Silver Burn.**

- **Habitat and appropriate Species Action Plans will be produced in line with the requirements of the Biodiversity Strategy.**

- **Fisheries Officers will seek to increase interest and assistance in river habitat conservation from the voluntary sector.**

Great Meadow weir, Silver Burn

Lady Young's weir, Silver Burn

2.4 Stocking of Hatchery-Reared Salmon

The stocking of hatchery reared fish has been used for over a century in the Isle of Man and elsewhere as a management tool designed to enhance fish stocks and improve angling opportunities. However, there are risks associated with stocking operations and a number of factors must be taken into consideration before any stocking is undertaken. Enhancement stocking, which aims to boost adult returns for anglers by boosting the juvenile population to above the natural carrying capacity, while effective in some ranching programmes, is now generally regarded as ineffective and potentially counter-productive as a means of conserving a natural fishery, especially if the broodstock are sourced from a different river. This practice, once common in the British Isles, ceased in the Isle of Man a number of years ago. However, as recognised by the Atlantic Salmon Trust, there are circumstances where stocking can be beneficial[4].

Stocking is no longer carried out at sites where monitoring has shown that juvenile salmon are already abundant but only for the purposes of mitigation or restoration. For instance, sites may be stocked to boost recovery following major pollution incidents or improvements to habitat or in order to overcome 'bottlenecks' in natural recruitment such as where access for spawning adults to good nursery habitat is limited.

Limitations to natural recruitment may be of a permanent nature, such as when impoundment of a river's headwaters results in loss of spawning and nursery areas within the flooded sections and access for salmon to such areas upstream of the reservoir. Recruitment downstream of impoundments may also be affected by the consequent impacts on hydrology and sediment transferral, such as reduced input of gravels and the impact of flow regulation on cues to fish migration. For instance, within the residual flow section upstream of the hydroelectric power plant (HEP) outlet in Sulby Glen, average winter flows in the river are much lower since Sulby Reservoir was constructed as, with the exception of a fixed compensation flow to the river, water from the main headwater tributaries is held back in the reservoir with excess water being piped downstream to the HEP plant[13]. Below the HEP outlet, flows are much greater during turbine operation but do not mimic a natural flow regime.

Fish surveys conducted in recent years have revealed no evidence of salmon spawning above the HEP outlet in Sulby Glen and limited spawning in the Glen downstream despite improvements in water quality in recent years and the availability of excellent nursery habitat. A study conducted in 2012 suggests that this may be due in part to the strength and turbulence of the flow in the river at the HEP outlet when the turbines are running creating a barrier to migration upstream of that point[14]. Most salmon running Manx rivers do so in the autumn and would therefore be likely to encounter this stretch of the river during turbine operation. However, salmon fry bred in the hatchery from adults caught lower down the river and stocked in the upper portion of the glen, including above the HEP outlet, appear to have survived well, thereby providing some mitigation for bottlenecks in recruitment.

A common limitation to natural recruitment is the presence of weirs, which can act as major barriers to upstream migration. Even when not completely impassable, fish may become weakened by their attempts to ascend and use up valuable energy

while waiting for suitable flow conditions, during which time they are also increasingly vulnerable to poachers. Although most of the Island's weirs no longer serve their original purpose, as previously discussed, removal is often not an option because of issues such as flood management, and with the lack of any specific budget for fish passage improvement either within DEFA or Manx Utilities, the cost of easement works and/or fish passes is often prohibitive. Fish surveys have indicated that juvenile salmon stocked in the upper reaches of Silverdale Glen (bred from fish caught low down on the river) in 2013 substantially boosted juvenile populations in these areas thus providing some mitigation for obstacles to migration lower down on the Silver Burn.

Where it is possible to provide fish passes, returns of spawning adults may be so depleted that stocking of upstream waters may be advantageous in maximising the recruitment from the few adults still available, providing a cue to encourage wild-reared salmon to migrate further upstream, and, as mature salmon will tend to seek out the particular region of a river from which they hatched, encourage future generations to utilise the newly-available habitat. Since the construction in 2009 of a fish pass at the weir near Fairy Bridge on the Santon Burn, surveys have failed to confirm commencement of natural recruitment of salmon upstream. The recording of sea trout above the pass and the substantial increase in juvenile trout numbers in the upper waters since 2010, which is likely to be a consequence of the return of larger and therefore more fecund spawners, indicates that this is not due to malfunctioning of the fish pass. It appears more likely a result of the salmon population having become severely depleted, for which there is evidence in the results of juvenile and broodstock surveys downstream. Good densities of juvenile salmon have however been found in the upper waters, the age categories of which coincide with stocking of hatchery-reared fry in spring 2011 and 2013[6].

Monitoring has thus so far indicated that stocking has been successful in substantially boosting juvenile recruitment in several locations, in some cases appearing to have restored juvenile populations to areas, which have been devoid of salmon for a substantial length of time. Long term monitoring together with collection of better quality data on trends within adult fish returns will be necessary to establish whether this is effective in sustaining and/or enhancing populations as a whole as well as determining whether and when restoration stocking is no longer required at any given location.

2.4.1 Aim

To increase the abundance of salmon in selected rivers, where natural recruitment has been and/or continues to be hampered by anthropogenic impacts.

2.4.2 Objectives

- To restore, where habitat/access improvements provide the opportunity to do so, sustainable populations of salmon in waters where stocks have become severely depleted.

- To maximise utilisation of nursery habitat in rivers where natural recruitment is limited by anthropogenic impacts, which cannot realistically be otherwise mitigated.

2.4.3 Methods

The Laxey Salmon Hatchery adjacent to Laxey Flour Mills operates on a policy of 'supportive breeding' as per the best practice guidelines of the Atlantic Salmon Trust. Broodstock are collected from the river that is to be stocked, and newly-hatched fish are reared in incubators specially designed to mimic the physical conditions of a natural redd (spawning nest), being allowed to reach the swim-up stage and emerge in their own time the following spring. Soon after emergence the fry are released in suitable nursery habitat along the appropriate sections of the river. Such early release minimises the potential for domestication to influence behaviour in ways which could decrease fitness for surviving in the wild. Natural selection is able to act upon the juvenile population, increasing individual fish's chances of surviving to go out to sea and return to the same river. The method also allows for large numbers of fry to be raised with a minimum of staffing input and material costs.

Information from the salmonid monitoring programme is used to determine areas where mitigation or restoration stocking may be beneficial. As it is not possible to tag very young salmon fry and resources do not allow for the expensive genetic testing programmes, which in theory could be used to positively identify hatchery-reared fish post-release, stocking of any one particular area is subjected to gap-years in order to provide a comparison with natural recruitment. Stocking is also avoided during years when the progeny of hatchery-reared fish may be expected in order to assess its impact on the adult population.

2.4.4 Recommendations

- **Stocking will be carefully targeted to areas, where (a) annual monitoring has indicated that natural recruitment is severely hampered by anthropogenic impacts, which cannot otherwise be sufficiently mitigated or (b) monitoring indicates that stocks have become so depleted that maximising the output of fry from the remaining available adults may benefit restoration of the population following mitigation of anthropogenic impacts.**

- **Stocking will only be carried out for the purposes of mitigation and restoration. It will not be carried out at sites where populations are already abundant or where salmon are absent due to natural barriers to migration.**

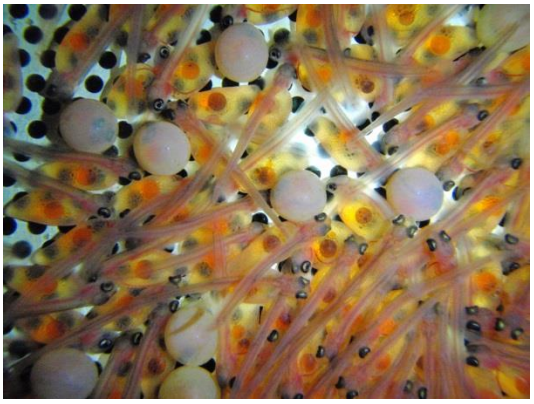
- **Broodstock will be sourced from the river to be stocked in order to conserve the genetic integrity of the indigenous salmon and maximise the likelihood of mature fish returning to their natal river to spawn. Should extinction of a river's population make this not possible, broodstock will be sourced from the nearest similar river providing surveys have indicated that the source population is unlikely to be significantly affected.**

- **Fry will be stocked out soon after emergence primarily to maximise their fitness in the wild but with the added benefit of minimising hatchery running costs.**

- **Gap years will be employed in order to provide a comparison with natural recruitment, and stocking will be avoided during years when the progeny of hatchery-reared fish may be expected in order to assess impact on the adult population.**

- **Via the salmonid monitoring programme the impact of the stocking programme will be continually assessed and revised where necessary in order to maximise environmental gain.**

Adding milt to fertilise eggs



Alevins hatching

Fry ready for release

2.5 Angling

Anglers play an important role in the conservation of fish populations. Not only can they assist in the management of stocks by providing valuable information by way of catch returns, they also act as on the ground reporters for such incidents as fish mortalities, pollutions and illegal fishing activities. Six anglers are warranted under Section 6 of the Fisheries Act 2012 as voluntary Fishery Watchers, aiding the Department by conducting licence checks and assisting on enforcement patrols. Several anglers also regularly assist on juvenile fish surveys and collection of broodstock for the salmon hatchery at Laxey. Freshwater anglers are also represented on the Manx Recreational Anglers Forum, set up by DEFA in 2008, which meets twice yearly to discuss all angling issues.

Conversely, there are potential risks associated with angling, namely the pressure exerted on recruitment via the removal of broodstock and the possibility of diseases and non-native invasive species being imported to the Island. There is therefore much to be gained from encouraging angling on the Island but it is vital to ensure that the appropriate regulations are in place to avoid over-exploitation of stocks and that anglers are sufficiently well-informed regarding bio-security measures.

Although the majority of anglers on the Island prefer to fish for rainbow trout stocked into the reservoirs, approximately 18% of annual fishing licence sales are for fishing 'other waters'. Other Water licences are valid for river fishing, and can be used to fish for salmon, sea trout, brown trout and eels throughout the Island, within the angling season. There are statutory bag limits and minimum landing sizes for salmonids, and eels can only be fished for on a catch and release basis. Access to watercourses is at the discretion of the landowner but licensed anglers can assume permission to access several miles of Government-owned/managed watercourses for no additional charge.

Fishing licence duties are reviewed annually, and all proposals for change are submitted to Treasury for approval prior to passing through Tynwald. The revenue generated from the sale of fishing licences contributes towards anti-poaching operations, habitat conservation, monitoring, catch statistics, rearing and stocking programmes, and environment protection.

A survey conducted in 2014 for the Tourism Section of the Department for Economic Development highlighted the popularity of recreational angling among visitors and showed that around 20% of those who go fishing do so as part of a dedicated angling holiday to the Isle of Man. Extrapolation from the results of the UK Department for Environment, Food & Rural Affairs' publication *Sea Angling 2012 – a survey of recreational sea angling activity and economic value in England* indicates that angling as a whole may already be worth several million per annum to the Manx economy. While the reservoir and sea angling available on the Island may offer the greatest potential for increasing visits from off-Island anglers, there is scope for improved promotion of river angling to raise its popularity as well as contributing to the attractiveness of the overall angling experience that the Isle of Man offers.

Sales of Other Waters licences have been in decline since the imposition of 10% licence fee increases in 2012 and 2013. A freeze on all licence fees in 2014 together with promotional initiatives is thought to have been instrumental in halting, and in some cases, reversing the similar trend witnessed in the sale of the various reservoir

angling licences available but has not as yet succeeded in having such an impact on Other Waters sales. However, river angling on the Island is currently dominated by fishing for sea trout and salmon, and the actual and perceived quality of the migratory fish run is heavily dependent on inter-annual variations in amount and timing of rainfall. The late summer/autumn salmon run of 2014 was reported as poor throughout the vast majority of the British Isles seemingly as a consequence of the long, dry summer.

While the size of Manx Rivers and the naturally low species diversity imposes limitations on river fishing relative to some other areas of the British Isles, there is excellent and very affordable fishing to be had here for brown trout, sea trout and salmon, and there appears to be a lower than desirable awareness of what is available. Fisheries Officers conducting juvenile fish surveys and broodstock collection regularly come across landowners, who are pleasantly surprised to discover the size and abundance of fish in their own watercourses. Comments regarding fish populations in Manx rivers range from erroneous insistence that certain rivers contain no fish to compliments on the quality of fishing to be had in the rivers and streams and expressions of surprise at how few anglers fish them.

2.5.1 Aim

To encourage participation in river angling on the Isle of Man, without compromising the sustainability of the native fish populations.

2.5.2 Objectives

- To increase participation in river angling on the Isle of Man.
- To increase and improve the input of rod catch data from the angling community to aid monitoring and management of the fisheries.
- To encourage the practice of 'catch and release' for salmon and native trout.
- To ensure that regulations relating to river angling, e.g. bag limits and minimum landing sizes do not compromise the sustainability of native freshwater fish populations.
- To reduce the risk of anglers importing fish diseases and/or non-native invasive species to the Island.

2.5.3 Methods

In 2013, DED, in conjunction with the DEFA Fisheries Directorate, produced the *Isle of Man Angling Guide*, available in hard copy and as a download on Fisheries/Tourism websites, as part of the DED series of Active Guides to the Island. Following a joint workshop held in January 2015 regarding issues of common interest, Inland Fisheries and DED's Tourism section are committed to working more closely together to build on this initiative by increasing and improving promotion of

the Island's angling opportunities. This will include measures, such as increased signage at appropriate locations, to reduce the risk of anglers importing fish diseases and/or non-native invasive species to the Island, which could be highly damaging to the fishery and/or freshwater ecology in general.

In 2003, a catch return scheme was introduced, whereby anglers fishing watercourses for salmon and sea trout were asked to complete and return a catch form at the end of the season. It was widened in 2010 to include data on catches of non-migratory trout. While this has provided very useful information, e.g. it has indicated an increase in the practice of 'catch and release'[6], the value of the data is compromised by a number of factors.

For instance, the proportion of licence holders submitting a return is consistently low. Previous attempts to increase submission rates via news releases and even individual reminders sent to all Other Waters licence holders have not succeeded in achieving more than a 29% return. The option of making it a compulsory requirement for Other Waters licence holders has been discounted because the enforcement implications could be complex and costly, and it may compromise the quality of the data received as there would be no way of checking their accuracy, merely whether a return had been submitted. This would also be a concern if a financial incentive was offered.

In addition, the level of detail currently requested regarding catches limits the data's usefulness. Amendment of the catch return system to a more detailed log book system could enable more accurate estimates of catch per unit effort, which would aid determination of trends in populations and may better facilitate comparison with similar rivers elsewhere in the British Isles. There may also be scope to make better use of technology e.g. appropriate smart-phone apps to make the process easier for the angler.

The practice of 'catch and release' will be encouraged among salmon and native trout anglers and, via the salmonid monitoring programme and enforcement of the legislation, the distribution and abundance of salmonids will continue to be assessed and further legislation introduced as necessary to conserve stocks as a whole and/or within particular watercourses.

2.5.4 Recommendations

- **The Fisheries Directorate will work closely with the Tourism Section of DED to increase and improve promotion of angling opportunities on the Island to visitors and residents, while minimising the risk of raised interest in angling increasing the potential for introduction of diseases and non-native species that could threaten the fishery.**

- **The Fisheries Directorate will seek to improve the quality and quantity of anglers' catch return data by amending the current catch return system, increasing promotion of the scheme via conventional and social media, and exploring the potential for smart-phone technology to aid recording and submission of data.**

- **The distribution and abundance of native salmonids will continue to be assessed and further legislation will be introduced as necessary to conserve stocks as a whole and/or within particular watercourses.**

- **The practice of catch and release will be encouraged among salmon and native trout anglers via conventional and social media.**

River Neb

Cock salmon

Landing a sea trout

Brown trout

2.6 Reporting

Reporting on the Fisheries Directorate's work regarding native freshwater fisheries can be used as a means of promoting and highlighting fisheries management issues and encouraging an increase in the active participation of the angling community and relevant NGOs. It also facilitates intra and inter-Departmental debate and decision-making regarding policy and resource allocation.

In 2013 the operation of the salmon hatchery at Laxey was subject to a High Level Options Review. The Business Change Steering Group approved the Department's recommendation for the continued use of the hatchery subject to a benefits review being conducted in the run up to the expiry of the current lease in 2021.

2.6.1 Recommendations

- **A report on the salmonid monitoring programme, including analysis of both juvenile survey data and anglers' catch returns, will be prepared on an annual basis and made accessible to the public on the Government website. Its availability will be promoted via conventional and social media.**

- **A benefits review of the salmon rearing/stocking programme will be produced in 2020 to inform debate and decisions regarding whether the lease of the hatchery building should be renewed in 2021.**

2.7 Resources

The Inland Fisheries Section of the Fisheries Directorate consists of a part-time (22 hrs/week) Inland Fisheries Manager, a part-time (15 hrs/week) Executive Officer and three full-time manual workers, two of whom regularly assist with sea-fisheries enforcement duties on the Department's Fisheries Patrol Vessel Barrule, and occasionally assist with duties within the Forestry, Amenity and Lands Directorate. There are also six voluntary Fishery Watchers.

Additional resource to Inland Fisheries is provided by reciprocal assistance from Sea Fisheries and Forestry staff and occasional assistance from volunteers and students on short-term work experience placements.

The annual budget for the Inland Fisheries Section is in the region of £189,000 of which 87% is allocated to salaries, wages and on-costs. The remainder of the budget is allocated approximately as follows:

Infrastructure expenses, e.g. property maintenance	5%
Equipment	4%
Other, e.g. printing and materials	4%

The Section is required to recover a proportion of its revenue costs from the sale of recreational fishing licences. This generates an income of approximately 40% of the total annual budget.

There is no allocated budget for research, although there may be occasional opportunities for low or zero-cost contribution to externally-funded research projects conducive to the aims of this strategy. For instance, between 2010 and 2013, Inland Fisheries staff and volunteer anglers collected data for the multi-agency funded Celtic Sea Trout Project[7], in which the Isle of Man Government participated as an associate partner.

It is essential to ensure that the limited funds available to the Inland Fisheries Section are allocated wisely and that every possible effort is made to explore opportunities for intra and inter-departmental collaboration and increased use of the voluntary sector in order to implement the recommendations set out in this strategy.

2.7.1 Recommendations

- **In order to aid conservation of freshwater fish populations, the Directorate will continue to explore and utilise opportunities for**
    - **intra and inter-departmental collaboration**
    - **increased contribution from the voluntary sector**
    - **encouraging and enabling externally-funded research into the Isle of Man's native freshwater fish populations**

3. CONCLUSION

The Isle of Man's rivers and streams are iconic, culturally significant features of its landscape. Their fish populations are a valuable asset both as a recreational resource, and as indicators and promoters of the Island's environmental quality. As such, the conservation and promotion of the Island's native freshwater fisheries has a significant contribution to make towards achieving the aims of overall Government strategy concerning the local and visitor economy.

It is envisaged that the strategy laid out in this document will enable the most effective use of the limited resources available in order to increase the contribution of native freshwater fisheries to the aims and objectives outlined in the IoM Government's *Agenda for Change* and *Vision 2020*.

4. SUMMARY OF RECOMMENDATIONS

4.1 Monitoring

Monitoring is essential in order to provide a scientifically focussed basis to enable the effective management and protection of fish stocks.

The programme of monitoring trout and juvenile salmon populations instigated in 2003 will be continued and regularly reviewed with a focus on determining the impact of management initiatives such as the salmon stocking programme, and assessing population trends in rivers of particular recreational interest.

The catch return scheme will be revised to improve user-friendliness and the quality and quantity of data provided in order to improve the Department's knowledge of abundance and trends in populations of mature salmonids.

The Fisheries Directorate will seek to take advantage of any opportunities for the installation of underwater camera/counter technology presented by structural developments in harbours and marinas.

Taking account of available resources, the Fisheries Directorate will explore and seek to enable externally-led research on freshwater fish populations in Manx rivers.

4.2 Enforcement & Regulation

Effective and integrated enforcement is necessary to protect and conserve native freshwater fish stocks of the Isle of Man.

DEFA will continue to seek to prosecute anybody engaged in illegal fishing activity.

Priority will be given to rivers with established runs of migratory fish, especially those popular with anglers and/or where management initiatives such as stocking are attempting to boost depleted populations.

Regulation of freshwater fishing and enforcement patrols will be undertaken at the appropriate times, with due regard to resources, to prevent damage to the fishery.

Fisheries Officers will continue to liaise closely with the IoM Constabulary to maximise the efficiency and benefits of surveillance operations.

Demand for illegally-sourced fish will be minimised via collaboration with Environmental Health Officers, and via the use of conventional and social media to promote the enforcement activities of the Directorate and the impact of illegal fishing.

Legislation designed to ensure that land management and industrial/residential development does not detrimentally impact on freshwater fish populations will be promoted, and pragmatically and effectively enforced.

Legislation will be reviewed and amended as appropriate to provide a high level of protection to native freshwater fish stocks.

4.3 Habitat Conservation and Enhancement

Conserving and ensuring availability of good quality habitat is essential for conserving freshwater fish populations.

Fisheries Officers will continue to promote and provide advice on Fisheries legislation and sound environmental practice to other Government Directorates and Departments, landowners, farmers and to relevant parties within the construction industry.

Fisheries Officers will continue to work closely with the Flood Risk Management Team at Manx Utilities to ensure that river engineering works have minimal detrimental impact on fish populations and, where possible, incorporate features that enhance habitat quality.

Fisheries Officers will continue to advise and comment on planning applications, where there is potential for the proposed development to have a temporary or permanent detrimental impact on river habitat and/or freshwater fish.

Fisheries Officers will continue to promote the value of and need to conserve freshwater fish and their habitat to the wider public via distribution of information and advisory literature and regular communication through conventional and social media.

Fisheries Officers, through collaboration with Manx Utilities and engagement with relevant NGOs will determine the most appropriate means of, and explore all possible sources of funding for resolving the fish passage issues at Laxey Glen Weir and the Great Meadow and Lady Young's Weirs on the Silver Burn.

Habitat and appropriate Species Action Plans will be produced in line with the requirements of the Biodiversity Strategy.

Fisheries Officers will seek to increase interest and assistance in river habitat conservation from the voluntary sector.

4.4 Stocking of Hatchery-Reared Salmon

Stocking will be carefully targeted to areas, where (a) annual monitoring has indicated that natural recruitment is severely hampered by anthropogenic impacts, which cannot otherwise be sufficiently mitigated or (b) monitoring indicates that stocks have become so depleted that maximising the output of fry from the remaining available adults may benefit restoration of the population following mitigation of anthropogenic impacts.

Stocking will only be carried out for the purposes of mitigation and restoration. It will not be carried out at sites where populations are already abundant or where salmon are absent due to natural barriers to migration.

Broodstock will be sourced from the river to be stocked in order to conserve the genetic integrity of the indigenous salmon and maximise the likelihood of mature fish returning to their natal river to spawn. Should extinction of a river's population make this not possible, broodstock will be sourced from the nearest similar river providing surveys have indicated that the source population is unlikely to be significantly affected.

Fry will be stocked out soon after emergence primarily to maximise their fitness in the wild but with the added benefit of minimising hatchery running costs.

Gap years will be employed in order to provide a comparison with natural recruitment, and stocking will be avoided during years when the progeny of hatchery-reared fish may be expected in order to assess impact on the adult population.

Via the salmonid monitoring programme the impact of the stocking programme will be continually assessed and revised where necessary in order to maximise environmental gain.

4.5 Angling

The Fisheries Directorate will work closely with the Tourism Section of DED to increase and improve promotion of angling opportunities on the Island to visitors and residents, while minimising the risk of raised interest in angling increasing the potential for introduction of diseases and non-native species that could threaten the fishery.

The Fisheries Directorate will seek to improve the quality and quantity of anglers' catch return data by amending the current catch return system, increasing promotion of the scheme via conventional and social media, and exploring the potential for smart-phone technology to aid recording and submission of data.

The distribution and abundance of native salmonids will continue to be assessed and further legislation will be introduced as necessary to conserve stocks as a whole and/or within particular watercourses.

The practice of catch and release will be encouraged among salmon and native trout anglers via conventional and social media.

4.6 Reporting

A report on the salmonid monitoring programme, including analysis of both juvenile survey data and anglers' catch returns, will be prepared on an annual basis and made accessible to the public on the Government website. Its availability will be promoted via conventional and social media.

A benefits review of the salmon rearing/stocking programme will be produced in 2020 to inform debate and decisions regarding whether the lease of the hatchery building should be renewed in 2021.

4.7 Resources

In order to aid conservation of freshwater fish populations, the Directorate will continue to explore and utilise opportunities for

- intra and inter-departmental collaboration
- increased contribution from the voluntary sector
- encouraging and enabling externally-funded research into the Isle of Man's native freshwater fish populations

Dr Karen Galtress
Inland Fisheries Manager
April 2015

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