



Lough Corrib Brown Trout & Pike

Policy Document Submission

IFI National Policy Review

November 28th 2016



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www.oughterardanglers.com

“To defend the preservation and conservation of free fishing grounds”.

Oughterard Anglers And Boatmen Association Constitution

Section 2(c)

Introduction

The contents of this submission to the IFI Policy Review Panel were collated by members of the Oughterard Anglers and Boatmen Association (founded in 1852), Co. Galway under the following backdrop.

- Brown trout angling on Lough Corrib is under threat because of the calls by the Irish 'Pike Lobby' for the cessation of all pike control on our managed trout fishery.
- The Owenriff system a major tributary of Lough Corrib, which is a vital spawning ground for migratory Atlantic salmon, Corrib trout and the Freshwater Pearl Mussel (FPM) is currently being ecologically destroyed due to an illegal introduction of pike.
- A small cohort of fundamentalist pike anglers are having a disproportionate and nefarious influence on shaping game angling policy in Ireland.
- The Lough Corrib trout angling fraternity need to make our voices heard in order to protect our world famous lake and wild salmonoid stock.
- Anecdotal evidence from club members suggests that the pike population on Lough Corrib appears to be growing larger over the last year thus increasing predation pressure on salmonoid stocks.

Lough Corrib which is situated to the north of Galway City in the province of Connacht is considered by many angling aficionados across the globe to be the greatest wild salmonoid (Atlantic Salmon & Brown Trout) fishery in the world. As a consequence, game angling is part of the culture, fabric and DNA of Oughterard. Since the Corrib Fisheries Association was founded in 1898 (Figure 1), it has taken nearly 120 years of hard work by volunteers and professionals alike to produce a wild game fishery of this quality.

It is the civic duty of the Oughterard Anglers and Boatmen Association, our fellow Corrib custodians and riparian stakeholders to prevent our lake being turned in to a mixed fishery dominated by a large pike biomass.

Pike (*Esox lucius*) is a destructive aquatic nuisance species (ANS) and has been prescribed as such by Alaskan state authorities, where it is found outside of its

native range within regions of that state ¹. Pike are also listed as invasive species to Ireland by the Global Invasive Species Database (GISD) that is managed by the IUCN Species Survival Commission ². There has been no categorical or conclusive proof ever produced by fisheries scientists, which proves that pike are native to Lough Corrib and its tributaries. Pike have the potential to interfere with ecosystem function and destroy economically important fisheries as they are voracious predators who prey heavily on juvenile salmonoids (trout & salmon) and other prey fish.

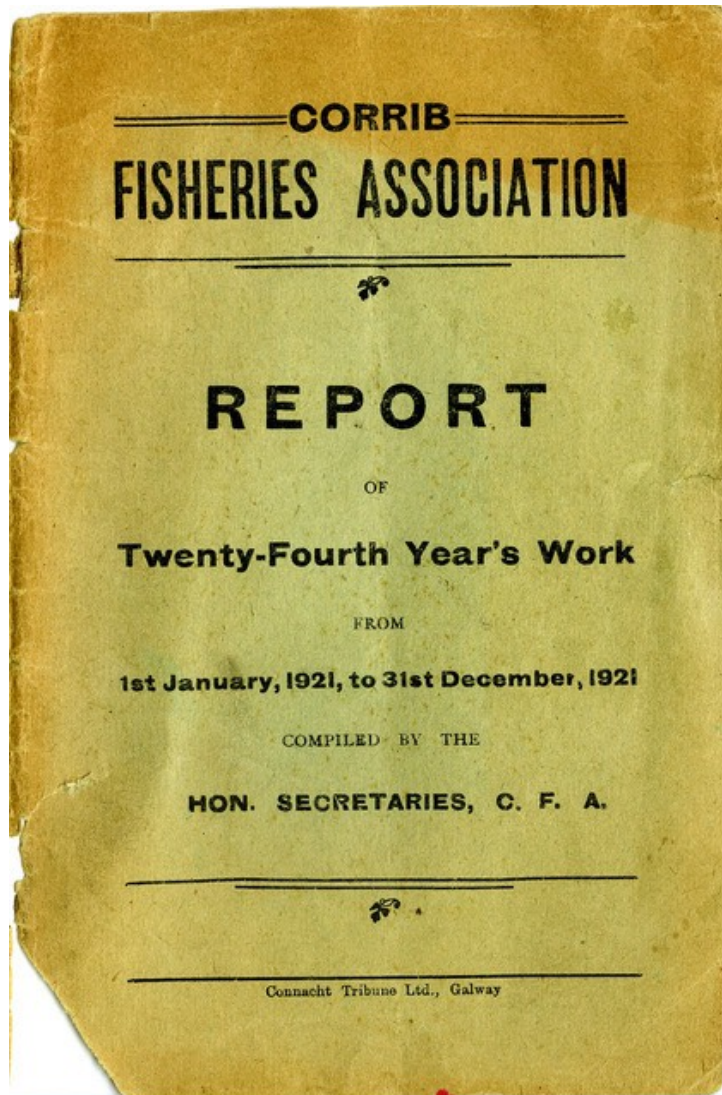


Figure 1. Corrib Fisheries Association, founded 1898 (Oughterard Heritage 2016)

¹ Management Plan for Invasive Northern Pike in Alaska; Southcentral Alaska Northern Pike Control Committee.

² Global Invasive Species Database (2016) Species profile: *Esox lucius*. Downloaded from <http://www.iucngisd.org/gisd/speciesname/Esox+lucius> on 25-11-2016.

Ireland is blessed with having twelve out of the thirteen EU classified ecologically significant brown trout fisheries. Pike control measures are only implemented on seven of these twelve fisheries. Pike control measures have been in place since 1898 on Lough Corrib with the foundation of the Corrib Fisheries Association. Why would anybody want to undo all this nurturing over a century and effectively destroy a worldwide recognised brand in game angling? Lough Corrib is promoted as a prime angling destination by the print media and is currently included in the 'Top Game Fisheries 2017 Guide' by Trout & Salmon Magazine (Figure 2a & 2b).



Figure 2a & 2b. Lough Corrib top game angling destination for 2017 (Bauer Media UK 2016)

Scientific information and historical records collated by club members contained within this submission document will show why pike stocks must be managed in order for Lough Corrib to maintain its status as a world class salmonoid fishery.

Ireland is dominated by mixed fisheries with Lough Derg, Allen and Ree on the Shannon system alone have a total surface area of 258 km², while Lough Corrib and Mask having a similar surface area of 259 km². The mixed fishery or predator

angler whether they be indigenous or otherwise has a huge array of choices in Ireland to pursue trophy pike. Why sacrifice a game angling treasure such as Lough Corrib in order for the lake to potentially produce more trophy pike? Even with the current pike control measures in place on the Corrib, the lake still provides excellent sport for the predator angler.

Nevertheless, salmonoids have a far greater socio-economic and heritage value to Galway City and County than any pike (Figure 3a & 3b). According to a 2015 report by the National Strategy for Angling Development titled 'The Economic Contribution of Brown Trout Angling in Ireland', the angling types of salmon, sea trout and brown trout supports a combined total of 5,088 Irish jobs compared to 1,147 jobs for pike angling.



Figure 3a & 3b. Salmonoid heritage and tourist value to Oughterard (OABA 2016)

Fisheries science across the world shows that you cannot have great salmonoid fishing and great pike fishing in the same water body. Salmonoids will always suffer in the presence of pike due to prodigious pike fecundity and piscivorous feeding habits. The Corrib cannot be all things to all people. Again we ask, why destroy one of the World's last great salmonoid fisheries in order for some anglers to potentially catch trophy pike that Lough Corrib might produce?

Salmonoid (game) anglers both indigenous and tourist have been a vital cog in the west of Ireland economy for over one hundred years. Firstly, it has provided direct employment and income for angling centres, ghillies, fishing guides, fly tiers, mayfly collectors, boat builders and tackle shops (Figures 4 to 9). Secondly, it has provided indirect employment to guesthouse owners, hostel owners, B&Bs, hotels, pubs and restaurants. Finally, game angling and the Wild Atlantic Way have a symbiotic relationship that needs to be protected and nurtured for future generations.



Figure 4. Game angling and Oughterard, an unbreakable bond (OABA 2016)



Figure 5. Anglers with Ferox trout outside The Anglers Hotel 1920 (Oughterard Heritage 2016)



Figure 6. Angling boats prior to a competition at Oughterard pier in the early 20th century (Oughterard Heritage 2016)



LOUGH CORRIB MONSTER.—Mr. Lee, the Oughterard fisherman, with the 18½ lb. trout, the heaviest caught in the Corrib since 1925. The trout was 33 inches long and 19½ inches in girth, and fell to the rod of Mr. T. R. Garton, of Warrington.



Picture left shows the largest trout ever caught with the "Dap" on Lough Corrib in the early 1930's. Weight 13½ lb, length 32 inches.



Bill Donnellan with the largest Salmon caught on Lough Corrib in the late 1930's.

Pictures courtesy Frank O'Meara (Powers Bar, Oughterard)

Figure 7. Trophy Corrib salmonoids from the 1920s & 1930s (Oughterard Heritage 2016)



Figure 8. Fishing competition on the Owenriff River in Oughterard village mid twentieth century (Oughterard Heritage 2016)



Figure 9. The famous angling author and judge T.C. Kingsmill Moore with ghillies Jamesie & Bill Donnellan on Lough Corrib 1931 (Oughterard Heritage 2016)

Lough Corrib Morphology & Species

The Oughterard Anglers & Boatmen Association is situated on the shores of what is generally accepted as the greatest wild brown trout fishery in the world. Lough Corrib or (Loch Coiribe i nGaeilge) is the second largest freshwater lake in Ireland covering an area of 176km² or 17,600ha, having a maximum length of 43.5km and a maximum width running from west to east of 16.1km. In spite of its sheer size the lake has an average depth of only 6.5m or 21' with the deepest part of the lake at 51m or 167' situated between the Glann Shore and Doorus. There is an old saying that says there is an island on the Corrib for every day of the year, however according to a recent hydrographic survey carried out by a local cartographer, Captain Trevor Northage, noted that the number of islands on the lake varies around 1,332 depending on water levels. The majority of the lake is situated in Co. Galway but the northeast corner lies within the boundaries of Co. Mayo.

Lough Corrib was designated a Ramsar site (international wetlands treaty) on June 16th, 1996. It has also been designated a Special Area of Conservation under the EU Habitats Directive.

While brown trout including ferox trout are the dominant species in the lake, it also contains the following fish (IFI Surveys 1996 & 2012):

Salmon, Pike, Perch, Roach, Rudd, Bream, Roach/Bream Hybrid, Rudd/Bream Hybrid and Lamprey. Eels also inhabit Lough Corrib but have not been documented in recent IFI surveys. Regrettably, it seems that charr have become extinct in Lough Corrib with no fish surveyed since the 1980s.

Lough Corrib Angling Seasons

Brown Trout (Salmo trutta)

The season runs from February 15th to September 30th inclusive.

Under current IFI (Inland Fisheries Ireland) regulations, an angler is allowed to kill four trout per day with only one of a specimen weight (≥ 10 lbs.) and a smallest harvestable size of thirty three (33) centimetres that would represent a typical three year old trout.

Pike (Esox lucius)

There is no closed season for pike. Under current IFI (Inland Fisheries Ireland) regulations, an angler may kill one pike per day and the length of the pike is not to exceed fifty (50) centimetres.

Lough Corrib Fishery History

There is an assumption that Lough Corrib was always a productive trout and salmon (salmonoid) fishery since records began. However, this has only been the case when the fishery was managed by the landlords and the riparian stake holders (local population) since 1898 before the Irish Free State was formed in 1922, and then by the IFI (Inland Fisheries Ireland) and its predecessors post Irish independence.

Salmonoids unlike course fish, who generally reside where they spawn, require rivers and streams to lay their eggs and a safe area free from predation for fry to develop.

In a 1834 description written by a man named Belton regarding Lough Corrib, he stated:

“Salmon are taken and some very large trout but the lake being infested with pike no great sport can be expected and few trout are caught except by crosslines”³.

Pike Population History on a National and International Level

Pike or Northern Pike (*Esox lucius* Linnaeus, 1758) is a member of the family Ecocidae, a group of fish thought to have emerged during the Cretaceous period (Wilson *et al.* 1992; Craig). Pike are elongate, moderately compressed fish with forked caudal fins, flattened snouts and large prominent teeth (Mecklenburg *et al.* 2002). They are robust cold water predators with high reproductive capabilities in shallow waters. Spawning habitat consists of marshy areas with shallow water, emergent vegetation and mud bottoms covered with mats of aquatic vegetation (Inskip 1982). Aside from spawning, pike have few habitat requirements other than prey availability (Chapman and Mackay 1984). Fecundity increases with female size, with as few as 2,000 eggs in small fish, and up to 600,000 eggs in females exceeding 30 lbs. (14.5 kg) (Morrow 1980).

Juvenile pike have a rapid growth rate (Scott and Crossman 1973, Morrow 1980), however growth is highly dependent on temperature, availability of food and access to suitable vegetation for cover (Morrow 1980).

Fast growing pike can reach maturity during their second year of life, but most do not mature until age three or four (Morrow 1980). Pike are opportunistic predators. They are primarily piscivorous, but they will prey on amphibians, invertebrates

³ Extract from Maurice Semple's Book - 'Reflections on Lough Corrib' - 1974.

including mice, muskrats and waterfowl (Solman 1945, Scott and Crossman 1973, Morrow 1980, Meckleburg *et al.* 2002, Pierce *et al.* 2003). Pike will cannibalise conspecifics if other prey is not readily available (Morrow 1980, Mann 1982, Rutz 1996). Pike have broad physiochemical tolerances (Scott and Crossman 1973) and can survive in very low dissolved oxygen conditions (Petrosky and Magnuson 1973). Despite its classification as a freshwater fish, pike can survive in salt water. Pike are known to occur in salinities as high as 10 ppt in the Baltic Sea and are able to reproduce in salinities as high as 7 ppt (Scott and Crossman 1973).

Introductions of pike to waters outside of its native range can have significant ecological consequences. Pike are highly predatory and can reduce populations of native species including mammals and waterfowl (Solman 1945). In one extreme example, Lagler (1956) estimated that an average of 1.5 million waterfowl were consumed by pike in a wildlife refuge in Michigan (USA) even though fish had been their primary prey.

Pike are known to consume large portions of stocked and migrating juvenile salmonoids. Petrvovskiy *et al.* (1988) showed that pike account for approximately 35% of stocked Atlantic salmon smolt mortality on the Keret River in Russia and Larson (1985) documented a 50% loss of migrating Baltic salmon from pike predation. In Ireland, Dr O'Grady and Dr Delanty estimated that an uncontrolled pike population in Lough Corrib has the capacity to consume circa 50% of the trout standing crop thereby seriously depressing the quality of this fishery as a trout angling venue ⁴.

In south-central Alaska (USA), juvenile salmon and trout, particularly coho salmon (*Oncorhynchus kisutch*), sockeye salmon (*Oncorhynchus nerka*) and rainbow trout (*Oncorhynchus mykiss*) are preferred prey for pike (Rutz 1996, 1999). In Alaska, authorities have found that fewer salmon from pike predation can lead to increased competition among native predators for prey, loss of nutrient inputs and a reduction in overall ecosystem productivity. In addition to the ecological ramifications, the potential economic impacts of pike invasion are immense and will certainly intensify as pike continue to proliferate in Alaska (Rutz 1999) ⁵.

Pike occur throughout Ireland, however, they were long thought to be non-native until recent genetic studies by Dr Pedreschi published in 2014 suggested that some Irish pike populations may be native. Nevertheless, Dr Pedreschi's conclusions

⁴ The Ecology, Biology and Management of pike in Irish waters with particular reference to wild brown trout lake fisheries - Dr O'Grady & Dr Delanty - CFB 2008.

⁵ Management Plan for Invasive Northern Pike in Alaska; Southcentral Alaska Northern Pike Control Committee.

have been questioned by Dr Dennis Ensing of the Agri-Food & Biosciences Institute of Northern Ireland who postulated that pike in Ireland could have been an exclusive human introduction ⁶.

“Furthermore contrary to quotes by Went (1957), Longfield (1929) actually states that pike were likely to have being introduced by the 14th century, and that by the 16th century they were thoroughly at home in Ireland. At this time pike exports from the south of Ireland to southern English towns (Longfield, 1929) greatly exceeded those of brown trout, in one year alone, 1507, Dartmouth imported 3850 pike from Ireland.

This certainly suggests that they must indeed have been present in decent numbers before this date”⁷.

Pike Control on Lough Corrib

At a public meeting held in Galway during 1898, The Corrib Fisheries Association was formed with the aim of “the improvement and preservation of the angling on Lough Corrib and preservation of spawning beds and tributary streams thereof”. Pike removal was also implemented.

A trout egg incubation hatchery, one of the oldest in the country was proposed on the Owenriff River at Oughterard by Ramsbottom and Ashworth about 1900 and was later managed by the Inland Fisheries Trust, the Fishery Board and latterly the Oughterard Anglers and Boatmen Association ⁸.

In 1965, Eddie Toner, Inspector in the Department of Fisheries wrote the following in an article entitled ‘Golden Days of Trout Fishing’:

“The voices of those who failed to catch fish in satisfying numbers were raised in protest as they have been in more recent years against the methods employed to increase the stocks of trout. Weather and other conditions were left unconsidered and it was demanded that pike removal should be abandoned on the grounds that trout had become "bottom feeders" as a result. This theory, though unproved, won the day and pike netting was stopped until the professionals reported a big increase in their numbers.

⁶ Ensing, D. (2015), Pike (*Esox lucius*) could have been an exclusive human introduction to Ireland after all: a comment on Pedreschi et al. (2014). *J. Biogeogr.*, 42: 604–607. doi:10.1111/jbi.12410.

⁷ Inland Fisheries Ireland Report 2014 - Genetic Structure of Pike & Their History in Ireland.

⁸ Wilkin, Noel P - Ponds passes and Parcs, Aquaculture in Victorian Ireland, page 50.

The Corrib Fisheries Association carried on its work into the early 20's but local opposition killed the organisation that did so much for the lake and prosperity of its people. The real measure of the prosperity of the Corrib's trout stocks is the catch of the individual professional fisherman who fishes long and hard in all weathers. During 1901 to 1913 a total of 50.4 tons of trout was caught at Oughterard alone. This was an average annual individual catch of 217 lbs. taken during the Spring months of each year. Over the years 1937-48 this catch figure fell to 59 lbs. according to the Fish House records at Oughterard. In 1953-4 the Inland Fisheries Trust took over predator control of Corrib and the professional fishermen's reports improved quickly. By 1956, 1957 and 1958, the average annual landing per boat has risen to 179 lbs. and daily individual bags of 14lb. or more were not uncommon”⁹.

It must be noted that at this time a 10 inch limit for trout was the norm and this would represent a 2 year old plus fish.

In 1908, in an extract concerning pike netting on the Corrib - Report of The Corrib Fisheries Association stated:

“It is very seldom that salmon or trout are found in the nets. This year however, an inspector reported that while netting near Doon wood he caught a trout estimated to be at least 30 lbs., which he liberated. The fish appeared to be in good excellent condition. The largest pike caught during this year was 33 lbs. and 45 inches long.”

In 1909, The Corrib Fisheries Association recorded the following:

“Began on the 10th of Feb and ended 25th of April. A total of 706 pike to a weight of 6,632 lbs. or 3 tons were caught. Conclusion for 1909; If pike are allowed to become too numerous the stock of trout rapidly diminishes.

If the pike are culled the lake becomes full of brownies. A comparison with Lough Leven in Scotland is then made;

5¹/₄ sq miles compared to 68 sq miles for Corrib, on Leven they find the proper balance between trout and pike is maintained by the annual destruction of 12 pike per square mile of water. On Lough Corrib for the past four years the figure has been 9 pike per square mile.

The object of Corrib Fisheries Association is not to exterminate but to prevent such increase in the number of pike as would injure trout fishing.”

⁹ Extract from an Article by Eddie Toner Inspector Department of Fisheries, written in 1965 entitled 'Golden Days of Trout Fishing'.

In 1913 The Corrib Fisheries Association stated:

“The professional fishermen stated they never had such good fishing, earning from £3 to £5 per week. They sent 3,763 lbs. of trout to England for the month of February alone”¹⁰.

The Owenriff System

This system is of mixed structure. The first stretches of river up to the waterfall at Oughterard (Canrawer) are of limestone, the river level is of spate in nature, further on its course the river has more glides with multiple lakes between each glide and the water is more acidic.

The fry on the lower stretch would tend to get washed down to the lake. Above this section the fry of juvenile trout and salmon have a longer and more precarious journey from the farther reaches of the system.

Owenriff trout account for approximately 15% of the stock in the Corrib according to a IFI survey undertaken in 2012.

Before the illegal introduction, there was a healthy stock of mountain trout, salmon parr along with minnows (bricín) throughout the entire Owenriff river and lake system.

Pike can now be found in all parts of this system. There has been no references to pike in this system previous to their recent illegal introduction. It is also a major spawning and nursery system for juvenile trout and salmon (parr).

It should be noted again that a pike can produce up to 30,000 eggs per kg and are annual spawners, as opposed to 1,200 to 2,000 eggs per kg for a trout that may not spawn every winter, also pike do not require gravel to make a redd (spawning nest) as trout or salmon do.

The lakes on the system consist of Leadmine, Agraffard, Bofin and Aphreahragan. All the aforementioned lakes are now mostly devoid of trout and the riparian owners no longer fish for migrant Corrib trout or for the resident mountain trout (brownies).

Also it must be noted that other mountain lakes (acidic) in the vicinity of Oughterard have had pike and roach introduced and are now mostly devoid of trout.

¹⁰ Extracts from Maurice Semple's Book - 'Reflections on Lough Corrib' - 1974.

The IFI Position on Pike

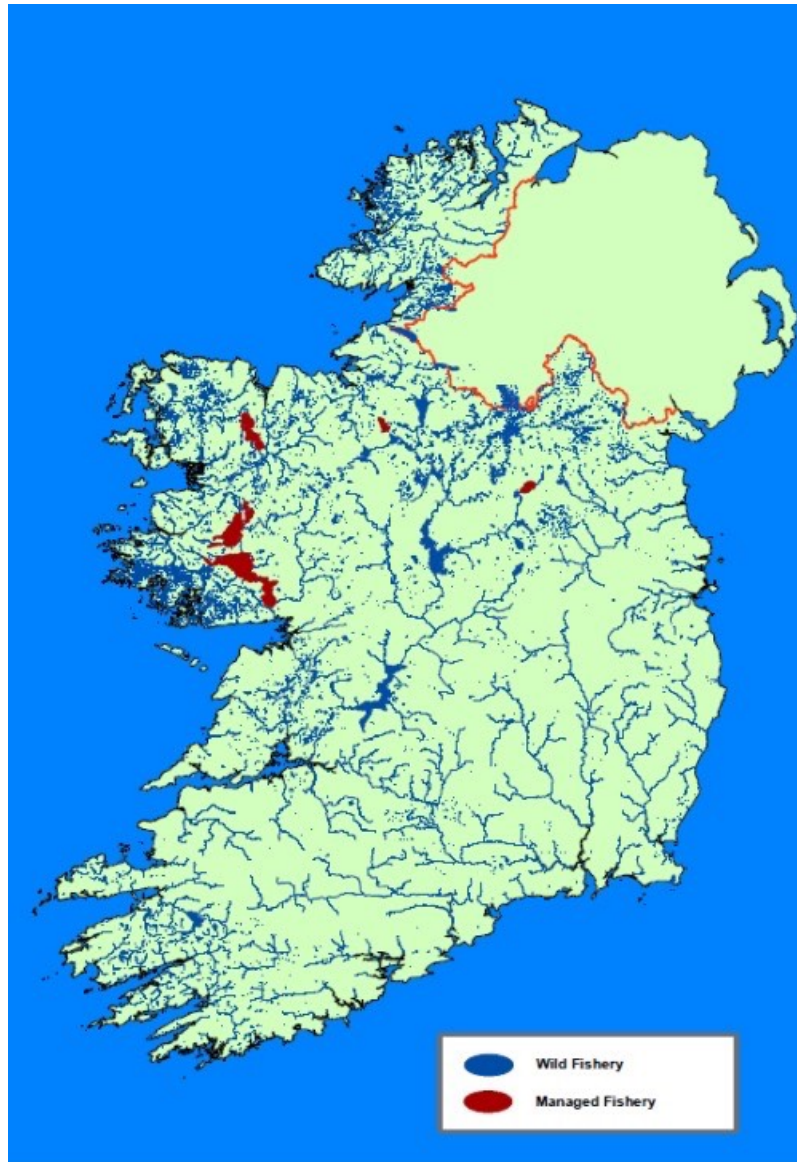


Figure 10. Managed Trout Fisheries (www.fisheriesireland.ie)

Pike management is conducted on seven lakes in Ireland by the IFI (Inland Fisheries Ireland) - (Figure 10). These are:

- Loughs Corrib, Mask and Carra
- Lough Conn and Cullin
- Lough Sheelin
- Lough Arrow

Pike stock management is undertaken and required on certain systems for the conservation of wild brown trout in those waters, which are managed by the IFI as wild brown trout fisheries. Such waters are identified in the IFI's Pike and Trout management policies. These stock management operations are informed by scientific research, are based on best practice and carried out in accordance with the IFI's Pike and Trout management policies under strict standard operating procedures ¹¹.

Different opinions exist in regards to the management of pike in a salmonoid fishery. For example in 'The Ecology, Biology and Management of pike in Irish waters with particular reference to wild brown trout fisheries' by Dr Martin O' Grady and Dr Karen Delanty, it is stated:

- *“small pike < 39.9cm live on invertebrates and fish fry”.*
- *“Adult pike in trout lakes show a clear preference for consuming adult trout even where other fish species are much more abundant than trout (roach/ perch)”.*
- *“Even in large productive water bodies, like lower Corrib the pike stock does not include large numbers of fish >10kgs in weight. There is a misconception among anglers that there is an endless number of 20 to 30lb. fish in such waters, this is simply not the case as few fish live long enough to reach that weight”.*
- *“The population structure will contain a substantial number of young adult fish 50cm to 80cm with a sharp tapering off in numbers above 80cm in length”.*

¹¹ Inland Fisheries Ireland (IFI) Pike and Brown Trout Policy Documents 2014.

Norwegian Pike Studies

Scientists from the Norwegian Institute for Nature Research in Trondheim carried out a study on the impact of introduced pike on allopatric (isolated speciation) brown trout in an inlet stream to a small lake, published in 2015. They noted the following:

“All age groups of brown trout were reduced after the pike introduction, especially older fish of age- \geq 2+, but less so for age-0+ and 1+ fish. We suggest that the decline of older brown trout is mainly due to the high predation pressure from pike when migrating into the adjacent lake to feed. Young stream-dwelling pike of age-0+ and 1+ which ranged between 6 and 27cm in length may also exert a predation pressure on juvenile brown trout that remains in the stream”¹².

Alaskan Pike Studies

Alaskan Scientists studying the spread of invasive pike in to south-central Alaska have noted a universal predation pressure on juvenile salmonoids in various rivers:

*“Northern pike (*Esox lucius*) are opportunistic predators that can switch to alternative prey species after preferred prey have declined. This trophic adaptability allows invasive pike to have negative effects on aquatic food webs. In Southcentral Alaska, invasive pike are a substantial concern because they have spread to important spawning and rearing habitat for salmonids and are hypothesised to be responsible for recent salmonid declines. We described the relative importance of salmonids and other prey species to pike diets in the Deshka River and Alexander Creek in Southcentral Alaska. Salmonids were once abundant in both rivers, but they are now rare in Alexander Creek. In the Deshka River, we found that juvenile Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*O. kisutch*) dominated pike diets and that small pike consumed more of these salmonids than large pike. In Alexander Creek, pike diets reflected the distribution of spawning salmonids, which decrease with distance upstream. Although salmonids dominated pike diets in the lowest reach of the stream, Arctic lamprey (*Lampetra camtschatica*) and slimy sculpin (*Cottus cognatus*) dominated pike diets in the middle and upper reaches. In both rivers, pike density did not influence diet and pike consumed smaller prey items than predicted by their gape-width. Our data suggest that (1) juvenile salmonids are a dominant prey item for pike, (2) small pike are the primary consumers of juvenile salmonids and (3) pike consume other native fish species when juvenile salmonids are less abundant. Implications of this trophic*

¹² Hesthagen, T., Sandlund, O.T., Finstad, A.G. et al. Hydrobiologia (2015) 744: 223. doi:10.1007/s10750-014-2078-z.

adaptability are that invasive pike can continue to increase while driving multiple species to low abundance”¹³.

Corrib Salmonoid & Pike Interactions

Pike and salmonoids in certain circumstances may share the same water body and co-habitat in ‘equilibrium’ such as the cold brackish waters of the Baltic Sea. In these waters, the indigenous sea trout are pelagic and thus avoid pike for the most part. Pike in these waters feed mainly on roach, perch and herring, *Clupea harangues membras* L. (Erm *et al.*, 1970).

This cannot be said for Corrib salmonoids. With the use of hydro-acoustics and structure scan imaging on Lough Corrib, anecdotal evidence suggests that both trout and pike prefer structure (natural reefs of limestone paving and rock strewn lake bed) or to be in the vicinity of structure. When pike and trout inhabit the same structure, then one species will dominate over another, namely the apex predator. This behaviour has been noted by several members within the Oughterard Anglers and Boatmen Association (OABA), who use Lowrance® fish finders when trolling for trout. During the 2016 angling season, members have caught pike of all sizes in well known trout locations, thus reinforcing the belief that the distribution of pike is homogenous throughout trout holding locations and not just confined to certain areas or bays.

Recent hydrographic surveys of Lough Corrib by Captain Trevor Northage have noted that most of lake bed is mud, hence the large number of log-boats and other archaeological artefacts that have been found preserved deep in sediment. As a result fish stocks within the Corrib are generally concentrated to areas where there is subsurface structure whether it be gravel, rock, island shores, reefs, shoals and weeds. OABA members using Lowrance® technology see a direct correlation between lake substrate, fish density and distribution (Figure 11a & 11b). This new insight in to fish behaviour has given credence to belief that there were always bad areas to fish and good areas to fish within the Corrib. However, fish may migrate away from substrate to temporarily feed on mayfly, daphnia (a small planktonic crustacean) or small coarse fish. In general, Lough Corrib trout regardless of size tend to be demersal and not pelagic.

In Alaska, pike are not seen as problematic within their native waters as many of these lakes are deeper than in their non-native areas of that state therefore providing better refuge for prey. Pike tend to remain in shallow vegetated areas.

¹³ Sepulveda, A. J., Rutz, D. S., Ivey, S. S., Dunker, K. J. and Gross, J. A. (2013), Introduced northern pike predation on salmonids in southcentral Alaska. *Ecol Freshw Fish*, 22: 268–279. doi: 10.1111/eff.12024

Smaller prey fish can reside in the deeper, open areas of these lakes and therefore avoid contact with pike. These prey fish species share a common evolutionary history and prey species have adaptations for predator-avoidance in these Alaskan lakes (Oswood *et al.* 2000). This cannot be said for Lough Corrib salmonoids.

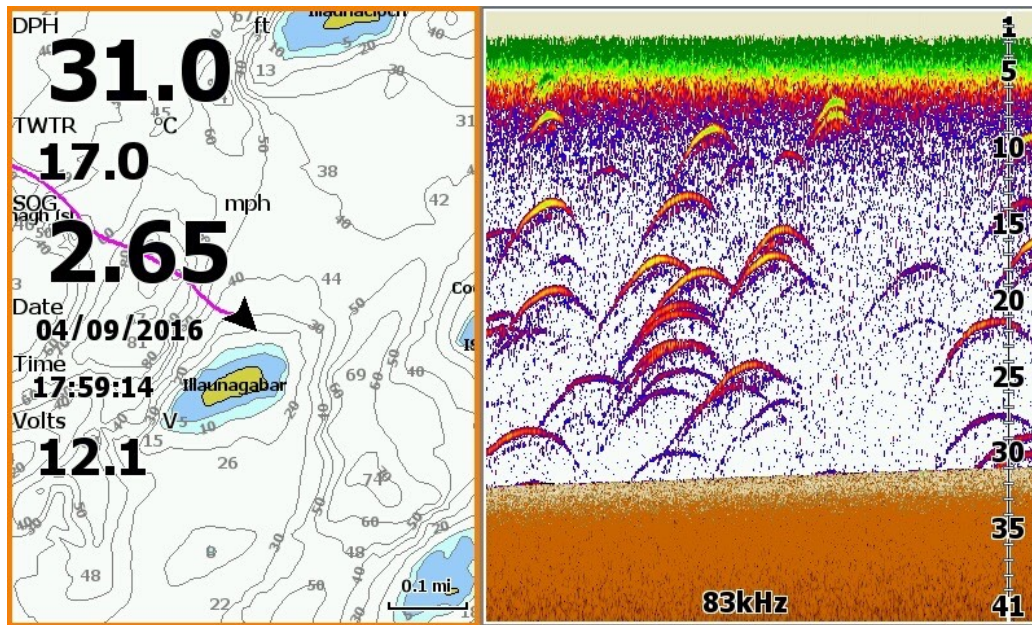


Figure 11a. Lowrance® sonar return of a high density of large fish close to Isle off the Wood, Lough Corrib 04/09/2016

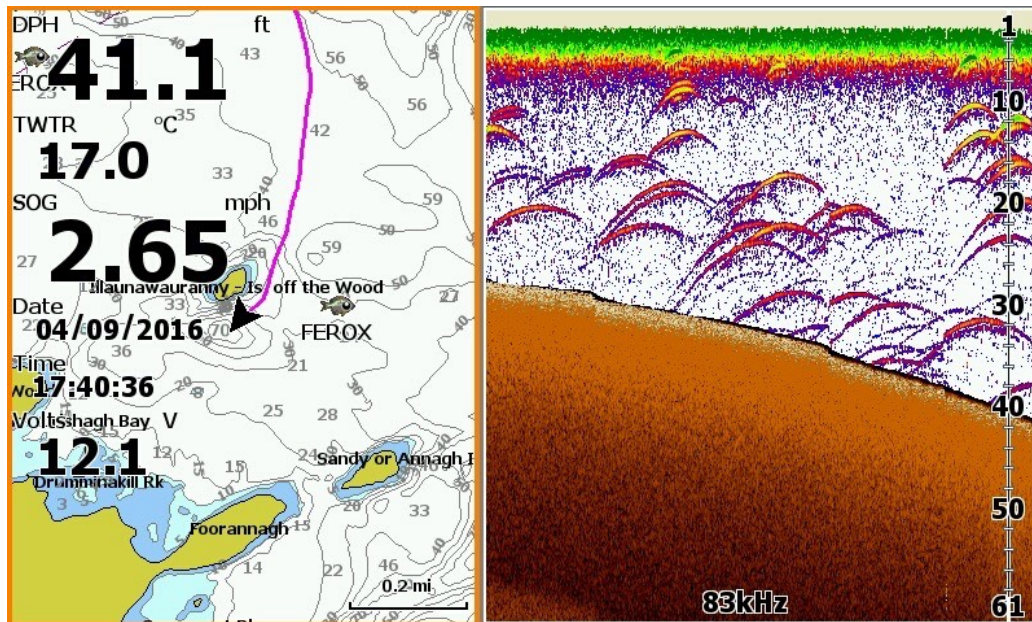


Figure 11b. Lowrance® sonar return of a high density of large fish close to Illaunagabar, Lough Corrib 04/09/2016 (anglingcharts.com)

This sharing of substrate by pike and trout may be seen in Figure 12a, 12b, 13, 14a, 14b & 14c, which shows that the two species have continual interaction with one another in Lough Corrib, with trout always being the prey of the apex predator.



Figure 12a & 12b. Pike attack on a 2 lb. Lough Corrib trout whilst being played on a dapping rod off Lee's Island near Kilbeg, May 24th 2015. Note fresh injuries to both lateral and dorsal aspects (Little 2016)



Figure 13. Oughterard Hatchery trout hen fish netted from Owenriff river showing signs of pike predation, November 12th 2016 (OABA 2016)



Figure 14a, 14b & 14c. 1.75 lbs. Lough Corrib trout caught in Bog Bay near Oughterard showing signs of severe pike predation, July 5th 2014 (OABA 2016)

Pike in The Owenriff System

Oughterard village is situated on the Owenriff River which drains a region of approximately 68km² and which enters the lake close to the 'Boat House' in the village. The river is a major migratory route for spawning Atlantic salmon and indigenous lake trout.

In March 2010, the EPA made the following statement on the Owenriff River system in their Corrib Water Management Unit Action Plan which would be greatest of interest to club members and visiting anglers to Oughterard.

"The Owenriff river catchment includes a significant portion of the Connemara Bog Complex SAC/NHA in its upper catchment and the Lough Corrib SAC in the lower main river channel. The Lough Corrib cSAC in the Owenriff River has been designated for the Freshwater Pearl Mussel (FPM) species protected under Annex II of the EU Habitats Directive"¹⁴.



Figure 15. Owenriff System (Western Region Fisheries Board 2008)

¹⁴ EPA - Corrib Water Management Unit Action Plan - 2010.

Lough Bofin and Agraffard (Figure 15) in the Owenriff system lie above a large waterfall and series of rapids at Canrawer in Oughterard (Figure 16a & 16b). In 2009, concerned OABA members informed Inland Fisheries Ireland (IFI) of the illegal introduction of pike to Loughs Bofin and Agraffard. *“This introduction was a mindless act of environmental vandalism as the Owenriff system is a Special Area of Conservation (SAC) and the most important spawning/nursery catchments for trout and salmon in the whole Corrib system”*¹⁵.

Unfortunately these lakes now have a significant and rapidly expanding pike population, which only have juvenile trout and salmon to feed on for the most part. Pike in this river and lake system are an invasive predatory species, which will have a major impact on stocks of trout and salmon, formerly the dominant species in these waters.

Even though pike inhabit Lough Corrib, there is an impassable waterfall and rapids in the Canrawer townland for pike to navigate through. Pike have never been able physically to navigate this barrier but have used it as an ambush point to target migrating salmonoids. In a 1908 Corrib Fisheries Association report the following statement was made:

“Numerous pike, some up to 20 lbs., and full of spawn were killed in the Oughterard River, at the foot of the falls”.

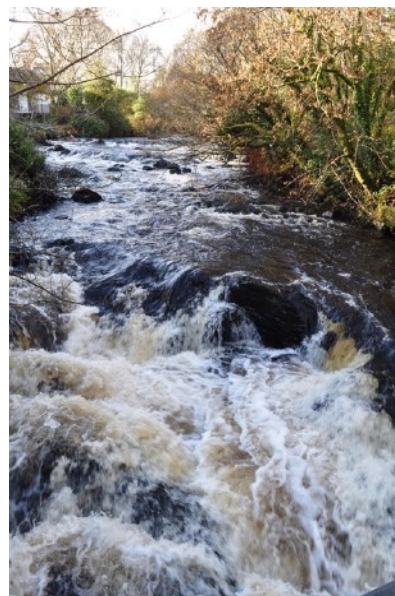


Figure 16a & 16b. Canrawer waterfall and rapids, a natural barrier to Lough Corrib pike migration (OABA 2016)

¹⁵ “Fisheries Board investigates illegal pike breeding scam on Corrib” - Galway Advertiser - 22/10/2009.

In a 2008 stock survey report carried out by the then WRFB (Western Regional Fisheries Board) now IFI on the whole Owenriff system, not one pike was sampled in thirty three survey sites ¹⁶.

Also in the Owenriff system, the WRFB noted in the same 2008 survey report on Lettercraffroe Lake, a once game fishery:

*“The presence and dominance of roach in Lettercraffroe Lake is unacceptable and illustrates the need for improved bio-security planning in order to prevent unauthorised fish introductions, alien species infestations and fish disease transfers. Options should now be considered with regard to methods for the removal of the roach population from Lettercraffroe Lake”*¹⁷.

The roach explosion in Lettercraffroe and the pike introduction in the upper Owenriff system proves how ecologically vulnerable these water bodies are in spite of their SAC status.

Traditionally, the Owenriff River is described as having *“excellent runs of salmon which ascend the river from around the end of May and with each successive flood, more fish run the river”* (Western Regional Fisheries Board Angling guide, 2003) ¹⁸.

During the 1980s a series of fish surveys were undertaken in the Corrib catchment. The survey report for 1980 reads *“The Owenriff appears to be a particularly good salmon river. It maintained high numbers over two years of sampling. The survival rate from 0+ to 1+ is good despite the fact that the salmon are among the smallest recorded in the system. There is not a significant resident trout population in the river”* ¹⁹.

¹⁶ Catchment Wide Fish Survey for the Owenriff River - Page 23 - WRFB - January 2008.

¹⁷ Catchment Wide Fish Survey for the Owenriff River - Page 48 - WRFB - January 2008.

¹⁸ WRFB (2003) The Anglers Guide to Game Fishing in the Western Fisheries Region.

¹⁹ Browne, J. & Gallagher, P., "Population estimates of juvenile salmonids in the corrib system 1980", Fishery Leaflet, Department of Fisheries and Forestry 1981 0332-1789.

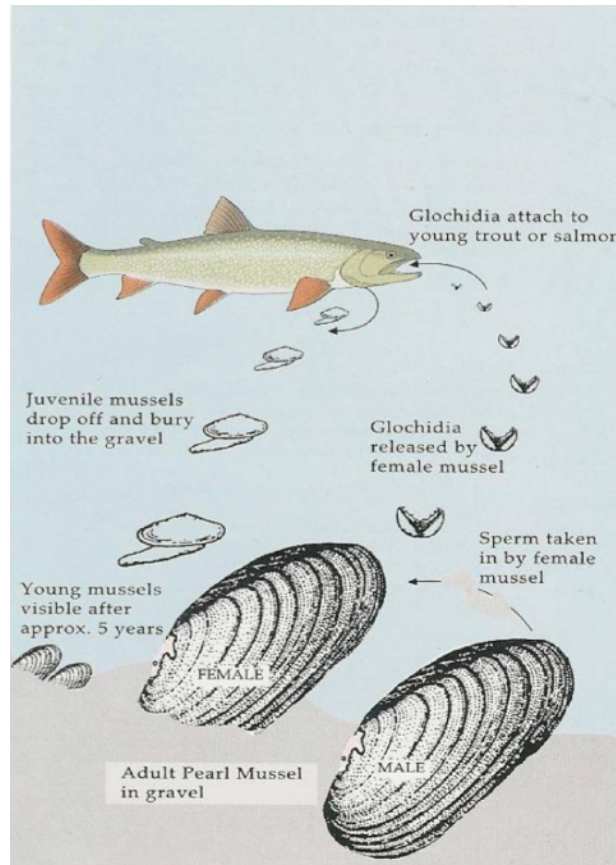


Figure 17. Freshwater Pearl Mussel (Margaritifera) life cycle (Moorkens 1996)

The Freshwater Pearl Mussel (*Margaritifera margaritifera*) is a freshwater bivalve listed under Annex II and V of the EU Habitats Directive. It is legally protected in Ireland under Schedule 1 of the Wildlife Act (1976 (Protection of Wild Animals) (Statutory Instrument No. 112, 1990) and the European Communities (Natural Habitats) Regulations (Statutory Instrument No. 94, 1997). Owing to its complicated life history and environmental sensitivities, it is a key biological indicator species for the habitat quality of river ecosystems. Unfortunately it is in serious decline. The Freshwater Pearl Mussel is one of the longest-lived invertebrates known – indeed it can live for more than 100 years. It was formerly widespread and abundant in Ireland, however it is now on the verge of extinction. Although it is still found in 162 rivers within 104 catchments/sub-catchments across 14 counties in Ireland - where an estimated 46% of all the Freshwater Pearl Mussels in the European Union occur

20.

²⁰ Freshwater Pearl Mussel surveys - ecofact.ie - Dr W O'Connor 2015.

The freshwater pearl mussel has attracted a lot of interest in recent years due to its interesting ecology, life cycle, ability to produce pearls and, most importantly, its decline which has left the species in danger of extinction ²¹.

The mussel itself requires a fish host to sustain its life cycle (Moorkens, 1999) and this is very pertinent to the Owenriff system with respect to the pike introduction and the predation pressure being put on migrating salmon and trout.

Fish hosts vary throughout the range of pearl mussels. In Europe, *M. margaritifera* has been shown to use native brown trout *S. trutta* L. and Atlantic salmon *Salmo salar* (Young & Williams, 1984a; Moorkens, 1996, 1999). Ziuganov & Nezlin (1988) have proposed that the relationship of pearl mussels and salmon is symbiotic. The fish provides the essential step in the mussels' life cycle, and mussels improve water quality by filtering water (Figure 17).

The Owenriff Sub Basin Management Plan (2010) states the following:

*“In Ireland, adequate numbers of host fish occur in at least some rivers with inadequate *Margaritifera* recruitment, however, where nutrient levels have increased, more host fish may be required as compensation. A comparison of trout versus salmon dominated rivers of Ireland quickly shows that 100% of pearl mussel rivers are salmon and sea trout rivers, thus while brown trout make an effective host fish, the natural home of *Margaritifera* in Ireland is within low productivity rivers dominated by salmonids that go to sea to get nutrition” ²².*

Unfortunately, the upper Owenriff system provides an ideal habitat for pike to spawn and to ambush salmonoid fish both indigenous and migratory (Figure 18a & 18b).

Figure 19 proves the end result of this pike predation, which shows a series of photographs of a 12 lb. pike caught under a Section 59 authorisation on Lough Bofin (Owenriff system). This large invasive pike had consumed a 3-4 lb. Atlantic salmon hen fish who did not have the opportunity to spawn. The half digested salmon was removed for inspection by a present IFI officer.

²¹ Freshwater Pearl Mussel - Second Draft - Owenriff Sub Basin Management Plan - NS2- March 2010.

²² Freshwater Pearl Mussel - Second Draft - Owenriff Sub Basin Management Plan - Appendix A - Section 3.1.35 - NS2 - March 2010.



Figure 18a. The above image is of a butts section on the Owenriff system. Note the weed, which is a perfect spawning site for pike. The lake narrows at both ends providing ambush points for migratory trout and salmon (Donnellan 2016)



Figure 18b. The above image is of the lower section on the Owenriff River below the Canrawer waterfall in partial flood and fast flowing. The gravel beds make these waters more conducive to salmonoids (Donnellan 2016)



Figure 19. Images of a 12 lb. pike caught in Lough Bofin (Owenriff system) on November 20th 2016 with a 3-4 lb. Atlantic salmon hen fish containing un-spawned eggs being removed from its gullet by an IFI officer (Lough Corrib Angling Federation 2016)

Salmonoid & Pike Interactions in other Irish Lakes

In Dr Martin O Grady's book 'Brown Trout in Ireland', the author notes:

*"Extensive research has shown that small < 40cm and medium sized < 60cm pike eat few fish in productive limestone lakes. They have a remarkably similar diet to that of adult trout and perch, consuming large quantities of micro invertebrates. Once pike exceed 60cm in length they become largely piscivorous. See Sheelin data 1978 - 2006"*²³ (Figure 20).

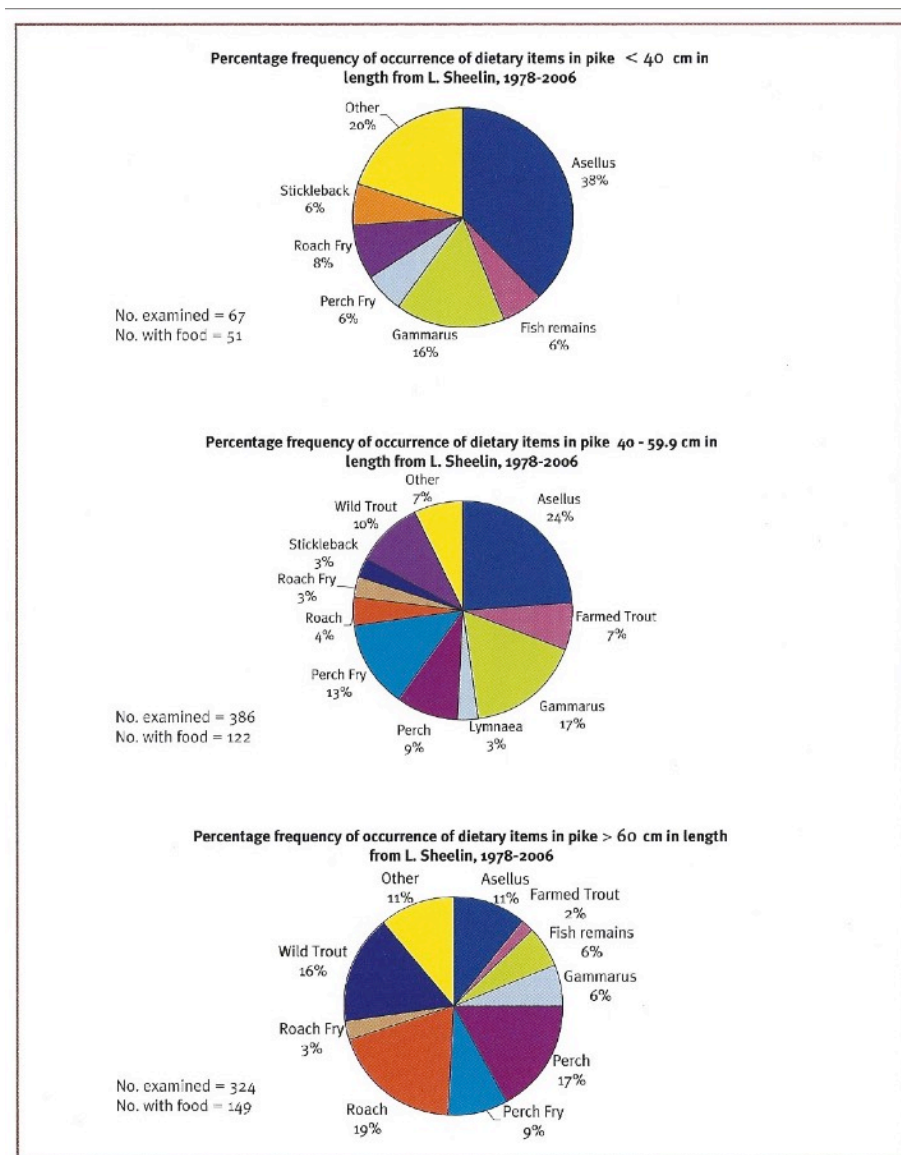


Figure 20. Lough Sheelin Data 1978-2006 (Dr Martin O'Grady - Brown Trout in Ireland - CFB - 2008)

²³ Dr Martin O'Grady, 'Brown Trout in Ireland', Central Fisheries Board, ISSN:1649-265X.

In summary, as Sheelin pike mature, they compete with juvenile trout for food and when they are of a sufficient size will prey on trout.

Also Dr O’Grady notes in the same publication that the management of pike stocks is not a critical factor on all trout lakes. Why?

“Investigations have shown that the extent of quality pike nursery areas in a lake, rather than the availability of fodder fish, is the primary factor controlling adult pike numbers. For example in Lough Derravaragh, despite a huge increase in the availability of fodder fish, following the introduction and establishment of a very large roach population, there was no corresponding increase in adult pike” (Figure 21).

Dense weed beds are limited in extent on Derravaragh while being very extensive on Sheelin thus limiting pike numbers.

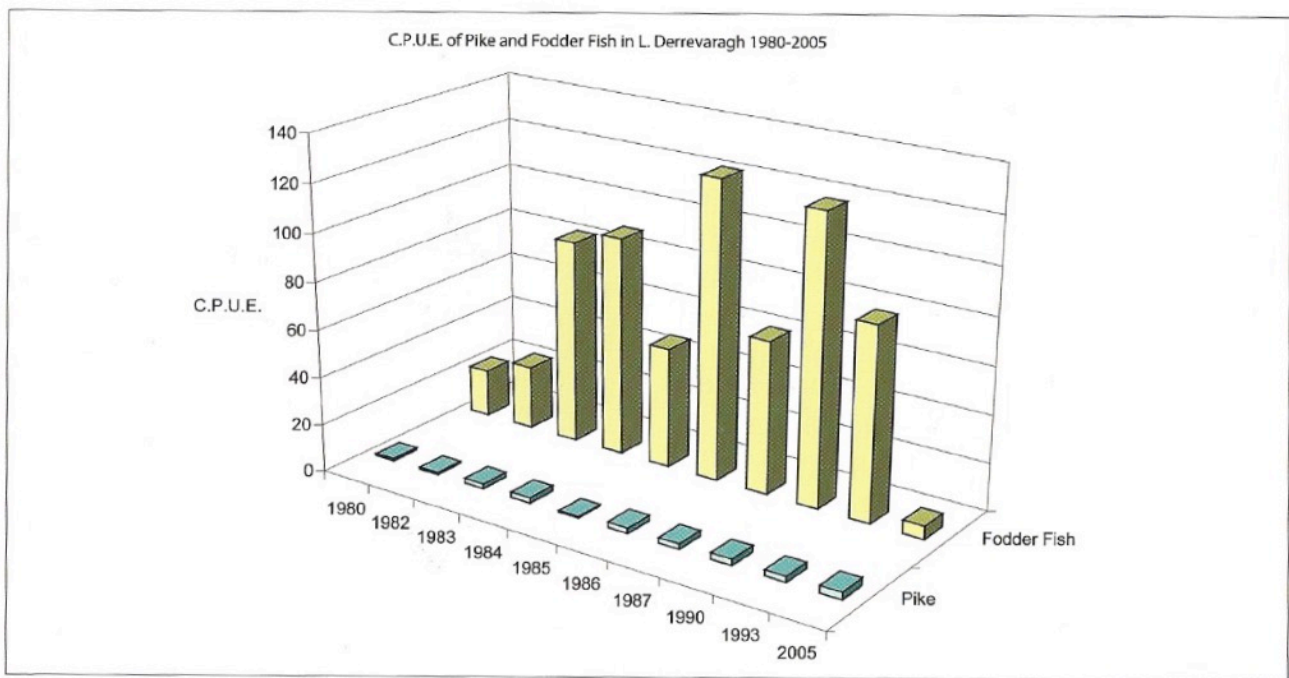


Figure 21. Derravaragh Data 1980-2005 (Dr Martin O’Grady - Brown Trout in Ireland - CFB - 2008)

As mentioned previously, the current management of pike stocks is considered crucial on a number of lakes such as Corrib and Mask, being managed as brown trout fisheries. Nevertheless, for reasons outlined above, it is less important on Derravaragh, Ennell, Inchiquin and Owel.

Considering Dr. O’Grady’s research, it would be logical and rational to draw the following conclusion.

Given the large quantities of vegetation (areas to spawn) and large food sources within easy reach, pike, if not controlled will become the dominant biomass in Lough Corrib again thus repeating history pre 1898.

The areas of Lough Corrib that are noted pike holding or ‘pike hole’ locations have reoccurring features of being close to inflowing rivers, vegetation, weed growth and a variation in lake bed structure.

There is a perception that controlling pike numbers on Lough Corrib has led to their demise, this is simply not the case. If any person would doubt this, they should view the online photographs of recently caught large pike particularly at [‘www.fishingireland.pl’](http://www.fishingireland.pl) and other social media websites (Figure 22).



Figure 22. Lough Corrib pike 35.5 lbs. caught May 2012 (fishingireland.info)

What are the options with respect to pike on Lough Corrib?

- Stop all pike control measures and let pike become the dominant fish species, the lake would revert to a mixed fishery. The lake would then evolve in to a trolling/lure fishery as it was before it became a managed salmonoid fishery nearly 120 years ago. The lake would metamorphose in to fishery containing a large number of pike with a small population of large trout.
- Continue with current policy to control pike numbers at their present biomass using gill netting.
- If gill netting is stopped then all pike caught by rod and line could be retained at the anglers discretion.

The present strategy employed by Inland fisheries Ireland (IFI) to manage trout fisheries within the state, where an angler can only retain one pike and that fish to be less than 50cm where other pike control measures are in place needs further examination.

It could be argued that the fall in numbers of visiting European Continental pike anglers to Ireland, that followed the introduction of the one pike limit, which in effect became mandatory catch and release is no coincidence. This has resulted in a dwindling of tourist anglers to Ireland and consequently a migration of European anglers to Scandinavia where pike may be taken with no legal implications.

Andree's Angelreisen (Germany's 2nd largest angling service) as of 2016 will no longer include Ireland in its pike fishing itinerary.

Kingfisher Reisen (Germany's premier service for angling & hunting) in 2015 moved Ireland out of its principle catalogue.

Orchape (France's premier service for angling & hunting) do no longer offer Ireland in its main programme.

Finally, with the looming of 'Brexit' on the horizon what potential knock on effects will this have on tourist anglers from the north of Ireland and Britain?

Effects of Pike on Ferox(Piscivorous) Trout

It may seem counter intuitive that large brown trout be it Ferox or piscivorous would be in any danger from pike but all trout irrespective of their genetic make up have the same life cycle regardless of how great or small they may eventually grow.

In Dr. Ron Greer's (a noted Scottish fisheries biologist & Ferox angler) book 'Ferox Trout & Arctic Charr', he states:

"However, pike are not native to many upland situations and may interact very differently than the way they do in their natural range. In larger lochs there seems to be habitat segregation, with pike living in shallower zones and the charr in the deeper, but pike prefer the same ideal shallow water as trout do.

Apart from the direct competition for food with the Ferox "Piscivorous" trout we have to consider what effects pike have on recruitment of juvenile trout to the main piscivorous period of their lives. Pike, like ferox have a preferred prey size. If we are to believe the viewpoint of pike enthusiasts then pike would spend their time eating younger pike and the population would be dominated by large individuals. These larger pike are quite capable of consuming thirty to thirty-five centimetre trout, just the size for turning into main-phase Ferox. I know from the work of colleagues in Loch Leven that only a small portion of the many pike stomachs they examined contained other pike. Their preferred prey was trout even in the presence of a substantial population of perch. The presence, or, more correctly, the introduction of pike into Highland Ferox or charr waters worries me. As a keen pike angler myself I used to accept the role of pike as being acceptable in this situation. Now I am less sure.

We cannot "blame" pike for responding to a physical change caused by our engineering actions, but the biological implications remain. If pike were not present in the first place then there would be no increased pressure on descending Ferox smolts. Pike in their natural habitat are an asset to be cared for, but their occurrence in Ferox and charr waters where they are present only because of human action is a cause for concern. No further introductions should be made"²⁴.

OABA members have noted this behaviour in the context of Lough Corrib with Ferox trout being caught during the 2016 season which show signs of past potential pike predation (Figure 23a & 23b). Corrib has a world renowned Ferox stock, do we want to put further pressure on it by a burgeoning pike biomass (Figure 24a, 24b & 24c)?

²⁴ Greer, R.B. (1995). 'Ferox Trout & Arctic Charr; A predator, its pursuit & prey'. Swanhill, Shrewsbury.



Figure 23a & 23b. A Ferox trout of 6.5lbs. (25.5 inches) caught trolling off Bure Rock on February 18th 2016 with old injuries sustained from pike predation (Little 2016)



Figures 24a, 24b & 24c. Catch and release of a large Corrib Ferox trout, this valuable fishery could be put into danger by a larger pike biomass (Donnellan 2016)

Destructive Pike Behaviour

In Dr Greer's previously mentioned book 'Ferox Trout & Arctic Charr', the author made the following very insightful observation on the destructive nature of pike in northern latitudes:

"It is part of the mythology of the pike anglers' sub-culture that pike are some kind of ecological balancing act. This is simply not the case in small, shallow charr and trout lakes. In Swedish Lapland, one form of revenge on a neighbour who has poached on another's Cloudberry heath (a highly prized resource in Lapland) is to stock pike into the offender's charr lake. The charr (Figure 25), a favourite food of the Sami people is then wiped out. Something similar happened in small Highland trout lochs such as Loch Choin and Loch Kinardochy in northern Perthshire. Pike were totally removed from the latter by the fish poison rotenone as part of an experiment in the rearing of salmon in still waters. In Loch Choin the rotenone was less effectively used in an attempt to remove pike in order to re-establish a trout fishery. For a few years this worked, but gradually from a few survivors the pike returned to dominance and although there is occasional trout still caught, by and large the loch is not worthwhile from this point of view" ²⁵.

The said author also noted the following:

"In some Austrian lakes the growth rate of charr was reduced following the introduction of pike. This was thought to be due to charr learning to avoid the littoral zone and therefore predation pressure from pike. As a consequence they had to submit on the poorer food supply of the pelagic zone" ²⁶.



Figure 25. Male Arctic charr (top) and brown trout (bottom) from Glenicmurrin Lough, Co Galway (Ecofact Environmental Consultants 2016)

²⁵ Greer, R.B. (1995). 'Ferox Trout & Arctic Charr; A predator, its pursuit & prey'. Swanhill, Shrewsbury.

²⁶ Greer, R.B. (1995). 'Ferox Trout & Arctic Charr; A predator, its pursuit & prey'. Swanhill, Shrewsbury.

Lough Corrib Lagarosiphon Major (Invasive Weed) Infestation

Lagarosiphon major is an invasive, non-native, aquatic plant species that was first recorded in an Irish natural aquatic habitat in 2005. At that time, the plant was present in Rinerron Bay on upper Lough Corrib and had established a surface canopy covering 12 ha of water. This dense, surface growth precluded recreational boating or angling in the bay and impacted indigenous floral and faunal communities that were resident in the area (Figure 26) ²⁷.

Lagarosiphon major (Curly leaved waterweed) is native to southern Africa, where its biomass can interfere with commercial navigation and water-based recreation (CEH, 2004). This species is acknowledged to be an aggressive invasive species in freshwaters. In Ireland, Lagarosiphon is legally sold as an oxygenating plant for use in artificial watercourses.

In a 2007 CFB (Central Fisheries Board) case study written by Dr Caffrey and Dr Acevedo, the following was stated about the Lagarosiphon infestation and the consequences it had for the fish species within Lough Corrib:

“It is anticipated that the impact on natural indigenous fish communities in the lake will also be significant as the habitat conditions created by dense Lagarosiphon stands are not those preferred by wild brown trout. By contrast, this habitat structure will probably favour the proliferation of coarse fish, perch and pike in Lough Corrib. Many of these species deposit their adhesive egg masses on submerged plants and the newly hatched fry use the protection afforded by the vegetation while at the most vulnerable stage in their life cycle. In addition, pike commonly avail of the concealment provided by the dense vegetation to stalk prey” ²⁸.

This scenario has been borne out internationally by other researchers who have shown that because pike function as ambush predators and require suitable habitat for rearing, survival and feeding, the absence or a reduction of vegetative cover has reportedly resulted in lower pike survival and lower production ^{29,30}.

²⁷ Lagarosiphon major in Lough Corrib – Management Options; JM Caffrey & S Acevedo Central Fisheries Board - 2008.

²⁸ Case Study - Lagarosiphon major - An Aggressive Invasive Species in Lough Corrib - Dr Caffrey & Dr Acevedo, CFB 2007.

²⁹ Fabricius, E. 1950. Heterogeneous stimulus summation in the release of spawning activities in fish. Annual Report to the Institute of Freshwater Resources, Drottningholm. 31: 57-99.

³⁰ Franklin, D. R., and L. L. Smith. 1963. Early life history of northern pike, *Esox lucius*, with special reference to the factors influencing the numeral strength of year classes. Transactions of American Fishery Society, 92: 91-110.

Over the last eight years the IFI have been running a programme of managing and removing the invasive weed from Lough Corrib. The funding for this vital programme was due to expire in October 2016 but Minister of State for Gaeltacht Affairs and Natural Resources Seán Kyne made a vital decision in allowing funding to continue for the programme, therefore indirectly giving a boost to Corrib salmonoid stocks ³¹.



Figure 26. Lagarosiphon infestation on Lough Corrib 2006 (Botanic Gardens Ireland 2016)

³¹ Connacht Tribune Newspaper - August 14th 2016 - IFI continues to fund programme to rid Corrib of pondweed.

Angling Attitudes

This policy document has attempted to deal with trout (salmonoid) fishing on Lough Corrib. As highlighted, each individual fishery has to be considered on its own merits as genetic research has shown that each fishery has its own unique traits.

There is a toxic tone currently present within the angling community and unfortunately at times this has become confrontational both on and off Lough Corrib. Trout caught on a dapped fly or a cast bait or a trolled lure are not held in the same regard as those taken on artificial fly be it wet or dry.

Some of the most accomplished fishermen who have ventured out on Lough Corrib were not noted fly fishermen.

Unfortunately, a rising trend on the Corrib is that of the fundamentalist 'Catch and Release' (C&R) angler who if given a chance will try to convert anglers into believing that their philosophy and the lake including its salmonoid stock would not exist without them.

There have been multiple confrontations on the lake pertaining to the above involving innocent club members in recent times.

Currently, catch and release practice on Lough Corrib is more of a moral or an ethical question. No angler is forced to retain fish nor should the converse apply.

Catch and Release (C&R) Effects on Trout

There is an assumption that all trout released after capture by the angler will swim away and survive. However, this is simply not the case according to many international research studies.

In 1992, Canadian Scientists Ferguson and Tufts noted the following in their research paper on the 'Physiological Effects of Brief Air Exposure in Exhaustively Exercised Rainbow Trout (*Oncorhynchus mykiss*): Implications for "Catch and Release" Fisheries':

*"Rainbow trout (*Oncorhynchus mykiss*) which were air exposed for 60 seconds after exhaustive exercise initially had a much larger extracellular acidosis than trout which were only exercised. In both groups, however, plasma pH returned to normal by 4 hours. Blood lactate concentrations were also greater in the air-exposed fish and continued to increase throughout the experiment. During air exposure, there was retention of carbon dioxide in the blood, and oxygen tension (P_{O_2}) and*

haemoglobin: oxygen carriage ($Hb:O_2$) both fell by over 80%. After 30 minutes of recovery, however, blood gases resembled those in fish which were only exercised. Finally, survival after 12 hours was 10% in control fish and 88% in the exercised fish but fell to 62 and 28% in fish which were air exposed for 30 and 60 seconds, respectively, after exercise. These results (Figure 27) indicate that the brief period of air exposure which occurs in many "catch and release" fisheries is a significant additional stress which may ultimately influence whether a released fish survives"³².

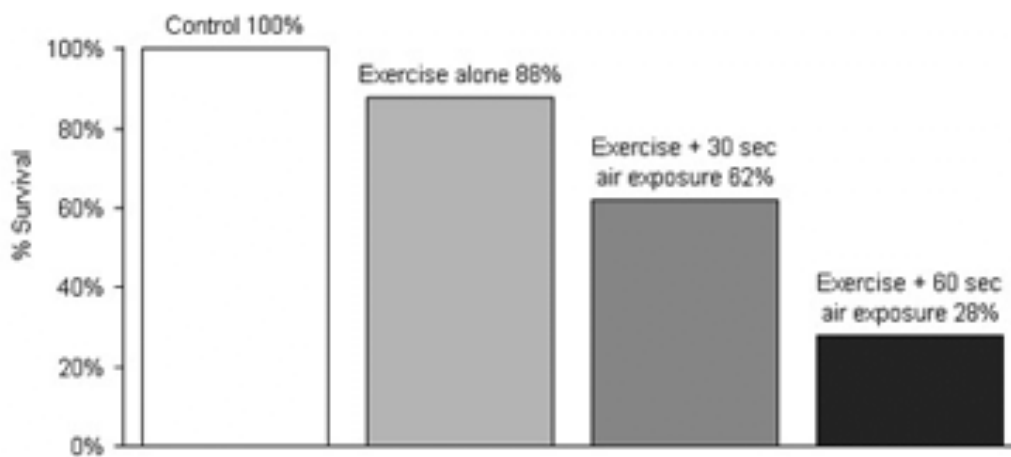


Figure 27. Ferguson & Tufts 1992 research in bar graph form (fishpain.com)

Given the above bar graph how much does the innocent C&R photo effect the trout's future prospects?

In 2014, Dan Dauwalter, a fisheries scientist with Trout Unlimited in the USA noted the following:

"Fish are stressed when caught by anglers due to capture, handling, and air exposure. When fish are harvested for consumption these stressors are, of course, irrelevant. However, anglers often practice catch-and-release so that fish may be caught again, and fishery managers use regulations that require release of some fish of a given size or species to improve or conserve populations. Even when fish are alive at the time of release, the stress to a fish from being caught and released

³² Ferguson, R.A.; Tufts, B.L. 1992: Physiological effects of brief air exposure in exhaustively exercised rainbow trout (*Oncorhynchus mykiss*): Implications for "catch and release" fisheries. Canadian Journal of Fisheries and Aquatic Sciences 49: 1157-1162.

can result in delayed mortality, reduced reproductive success, or increased vulnerability to predation”³³.

In 2013, Steven J Cooke, a fisheries scientist at Carleton University in Canada produced a research paper titled, ‘The physiological consequences of catch-and-release angling: perspectives on experimental design, interpretation, extrapolation and relevance to stakeholders’. In concluding the paper Cooke *et al.* noted the following:

“From the moment that anglers select a rod and reel combination based on its strength and line limits, to the bait type and hook type they select, to the season when they go fishing, to the water body on which they fish, anglers have already made decisions that can influence the degree of disturbance of a C&R event prior to their first cast. Although there are certainly instances in which we would not expect physiology to be overly informative such as when acute injuries (e.g. owing to deep hooking) lead to severe blood loss and mortality, physiological tools have become common in C&R science and have greatly advanced our understanding of the sublethal effects of C&R angling”³⁴ (Figure 28).

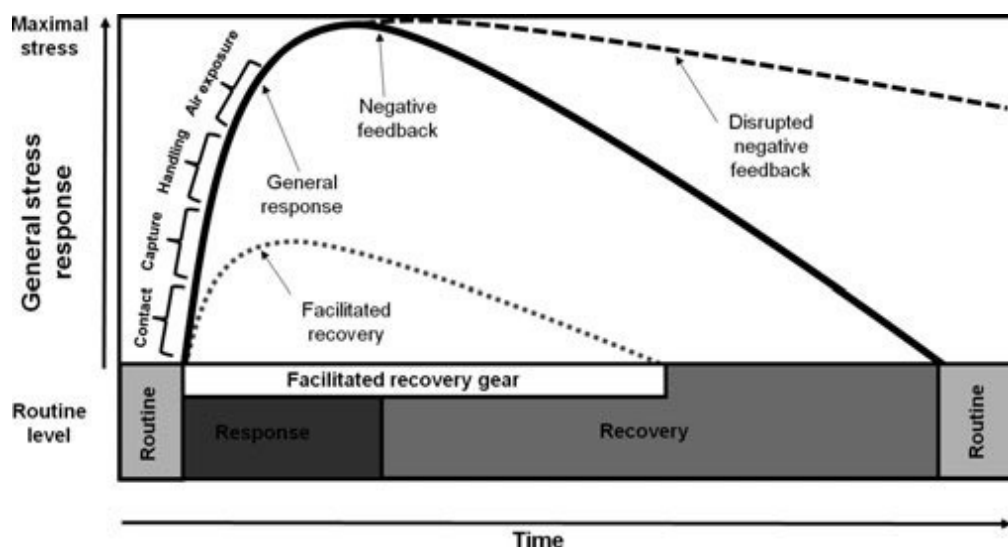


Figure 28. Schematic of general stress response from fish capture. Negative feedbacks can result in reduced reproduction or increased predation risk. Facilitated recovery can reduce stressors using facilitated recovery gear. (From Cooke *et al.* (2013).)

³³ Dauwalter, D.; 2014: Fish stress from catch and release fishing. Trout Unlimited.

³⁴ Cooke, S.J., G.D. Raby, M.R. Donaldson, S.G. Hinch, C.M. O’Connor, R. Arlinghaus, A.J. Danylchuk, K.C. Hanson, T.D. Clark, and D.A. Patterson. 2013. The physiological consequences of catch-and-release angling: perspectives on experimental design, interpretation, extrapolation and relevance to stakeholders. *Fisheries Management and Ecology* 20:268-287.

In 2004, USA scientists Meka and McCormick noted the following in their research paper on the 'Physiological response of wild rainbow trout to angling: impact of angling duration, fish size, body condition, and temperature':

"This study evaluated the immediate physiological response of wild rainbow trout to catch-and-release angling in the Alagnak River, southwest Alaska. Information was recorded on individual rainbow trout (n = 415) captured by angling including landing time and the time required to remove hooks (angling duration), the time to anaesthetise fish in clove oil and withdraw blood, fish length and weight, and water temperature at capture locations. Plasma cortisol, glucose, ions (sodium, potassium, chloride), and lactate were analysed to determine the effects of angling duration, fish size, body condition, and temperature. Levels of plasma ions did not change significantly during the observed physiological response and levels of plasma glucose were sometimes influenced by length (2000, 2001), body condition (2001), or temperature (2001). Levels of plasma cortisol and lactate in extended capture fish (angling duration greater than 2 minutes) were significantly higher than levels in rapid capture fish (angling duration less than 2 minutes). Rapid capture fish were significantly smaller than extended capture fish, reflecting that fish size influenced landing and handling times.

The results of this study indicate the importance of minimising the duration of angling in order to reduce the sublethal physiological disturbances in wild fish subjected to catch-and-release angling, particularly during warmer water temperatures. It is also important to note that factors such as fish size may influence both the duration of angling and subsequent physiological response"³⁵.

Roger Young of the Cawthorn Institute in New Zealand noted in a 1999 report prepared for Fish & Game New Zealand:

"C&R should only be considered where angling pressure is likely to influence the trout population, and where trout density is naturally low. Most fish that are released will survive, but changes in behaviour of trout after being caught and released appears to alter trout catch-ability and has the potential to reduce the growth rates and carrying capacity of trout populations"³⁶.

The said author also noted in the same report:

³⁵ Meka J.M. & McCormick S.D. (2005) Physiological response of wild rainbow trout to angling: impact of angling duration, fish size, body condition, and temperature. Fisheries Research 72, 311–322.

³⁶ Young R. (1999) Catch and Release: a review of overseas research and implications for New Zealand. Cawthorn Institute. Prepared for Fish & Game New Zealand.

“One concern regarding C&R is its ethical basis. For some non-anglers, C&R may be seen as torturing fish for no apparent reason. Animal rights lobby groups are beginning to actively protest against C&R fishing and such protest has led to a prohibition of C&R angling in Germany (Spitler 1998)”.

Taking the above selected research in to consideration and applying it to a hypothetical situation on Lough Corrib. One angler catches and kills four trout above the current size limit and then leaves the lake. The second angler who is practicing C&R tactics fishes throughout daylight hours landing and returning numerous fish.

Who has potentially the greater impact on the lake?

Oughterard Hatchery (Incubation Unit)

The Oughterard trout hatchery is the oldest running salmonoid hatchery in the world, commencing operations in 1852 as a salmon hatchery. In 1908, it became a trout hatchery when the then Department of Agriculture, on behalf of the Corrib Fisheries Association, redesigned and equipped a building which consisted of an iron shed 95 feet long by 12 feet wide. The average number of trout stripped at this time was 1,100 and the average ova laid down was a million a year. The hatchery continued operations until 1925 when the Corrib Fisheries Association was dissolved and it closed, subsequently falling into disrepair.

In 1938 a group of anglers met in The Castle Hotel at Abbeygate Street in Galway, to discuss ways of improving trout fishing on Lough Corrib and they decided to rebuild a new trout hatchery in Oughterard. Within months they had raised the £450 to cover costs and by the end of the year the new hatchery was built and ready to start operations.

Apart from a short period under the control of the now defunct Western Regional Fisheries Board, the hatchery has been run by members of the Oughterard Anglers and Boatmen Association ever since, with the property now vested in the Lough Corrib Angling Federation, a grouping of angling clubs around the lake.

In 1990, the Lough Corrib Angling Federation decided that the hatchery needed major refurbishment, so a fund raising committee was formed with the aim of raising £50,000. At the time a formal application was made to the Irish Government for a grant from the National Lottery Fund, but after a year's delay and no grant money forthcoming the anglers decided to go it alone. In 1992 a complete reconstruction was carried out, fitted with new stands and pipe work for the incubation trays. A filter unit was built to prevent silting of fish trays, and a new concrete access bridge was also put in place. A new water supply was installed consisting of an 8" water pipe laid upstream. All this work was completed in time for the 1992-93 incubation period.

Every year a netting licence is granted to the Lough Corrib Angling Federation by the IFI and at the end of October, nets are laid on the Owenriff River where over the course of a week on average a brood stock consisting of 200 to 300 hens and 150 cock fish are taken to the hatchery.

In November the hen fish are stripped of their ova and these in turn are fertilised by the milt of the cock fish. The ova are then left in the incubation unit of the hatchery and over the course of the next 4 to 5 months are tended to by local volunteers of the hatchery team. During this time team members have to go in every night and make sure development is going according to plan and any damaged ova have to be removed.

During the stripping days, local schoolchildren and scout groups from around the county visit the hatchery to witness first hand this process. The children are educated by the volunteers on the hatchery, the importance of Lough Corrib and the biology of wild Corrib trout (Figure 29a & 29b).

All fish (all brood stock) are released unharmed back into Lough Corrib a week after the stripping. Between January and February the ova develop into fry and, while still possessing their yolk sac, about quarter of a million unfed trout fry are distributed through out the Owenriff system by all the angling clubs of the Lough Corrib Angling Federation. Some of the unfed fry are also used in restocking programs for stream enhancement by the IFI.

The volunteer work being done in the Oughterard hatchery is now seen as important intervention to the survival of the wild trout stocks in the Owenriff System, and the wider Lough Corrib Catchment. Over the last three to four decades the trout spawning beds of the Owenriff system have suffered heavy fertiliser run-off from massive plantations of conifer trees, and in recent years are being devastated by an illegal and criminal pike introduction.



Figure 29a & 29b. Stripping trout at the Oughterard hatchery & educating local children (OABA 2016)

Anglers & Riparian Stakeholder Contribution to the Lake

The Inland Fisheries Ireland (IFI) budget from central government funding is €27 million. The total estimated economic contribution of recreational angling in Ireland is €755 million with an estimated 406,000 individuals having participated in angling over the course of 2012 ³⁷.

There is no state rod licence (excluding salmon & sea trout). A state rod licence is a non-runner with respect to the cost of administration of such a scheme with ID cards, enforcement and data protection etc, which would soon soak up any revenue earned.

Lets examine how tax revenue is generated from a typical days fishing on Lough Corrib.

An angler goes to his shed retrieves his outboard engine (+ VAT) and puts it in the boot of his car, places rods (+ VAT) on the roof of his car, drives to the petrol station to fill his tank with outboard fuel (+ VAT + excise), buys flies/ lures etc (+ VAT) and fishes from his Irish built lake boat (+ VAT) etc. Angling is one of the most expensive sports in Ireland to be involved in, direct tax from those employed and indirect taxes flow from angling's participation costs. Also, most of the IFI budget (€15 million out of €27 million) is spent on wages/salaries so factor in the income tax, USC and PRSI returned to the exchequer.

Anglers through the clubs distributed throughout Lough Corrib contribute roughly €10,000 per year to Cairde Loch Coiribe. This fund goes into stream enhancement and improvement works for spawning.

As stated previously, the Oughterard hatchery is run solely by volunteer anglers. Every October anglers under a strict IFI licensing regime net the Owenriff river for migratory trout. These fish are striped for their ova and milt, which produces on average 400,000 eggs annually. These eggs are incubated over a four to five month period and monitored daily by volunteer anglers until the fry are ready to released back in to the Corrib system. All stripped fish are returned unharmed to the lake. This annual conservation measure occurs with no cost to the Irish state.

Without pressure from local angling clubs, funding for the control of the invasive weed 'Lagarosiphon major' was due to cease in October 2016 potentially devastating trout stocks and having other environmental effects on Lough Corrib. Thankfully, the funding will remain in place for this very important conservation effort.

³⁷ National Strategy for Angling Development - The Economic Contribution of Pike Angling in Ireland 2015.

Current Lough Corrib Trout Catch Limits

The Oughterard Anglers and Boatmen Association (OABA) believe that the current status quo should remain of a four trout limit per day with a minimum size of 33 centimetres/13 inches with only one fish allowed of specimen size (≥ 10 lbs).

This gives the anglers who may only fish Lough Corrib a few times a year a chance to retain fish if they choose and while minimising the impact of taking trout by rod and line on the lake.

According to the IFI, there is an adequate stock of Corrib trout and a very small percentage are cropped every year. The IFI stated in their 2012 Lough Corrib stock report that angling pressure by rod and line was not an issue for the lake and therefore the lake is a sustainable trout fishery provided pike stocks are managed.

Clubs and other organisations who have a preference always retain the option to organise their events on a C&R basis.

Submission Summary

If the world was mapped according to premier brown trout fisheries, Ireland would rank as the pre-eminent superpower.

Of the thirteen lakes in western Europe classified by the EU as ecologically significant brown trout fisheries, twelve are in Ireland. To put this in context, there is only one trout fishery of consequence in the whole of Britain – Loch Leven in Scotland.

According to Dr Martin O’Grady of Inland Fisheries Ireland (IFI), our waterways are blessed with a unique morphology that makes the island a veritable Shangri-La for trout.

The shallow limestone waters across Ireland support a rich plant life, which provides a productive base for the insects, snails, shrimp and coarse fish that trout feed on. In mainland Europe, many of the big lakes are too deep to sustain a comparable level of life.

In this policy document the OABA have shown the following:

- The great limestone lakes, in particular Lough Corrib, are considered the greatest wild game fisheries in Europe and even the world.

- Wild salmonoid fisheries in Europe have collapsed, and the great western lakes of Corrib and Mask are the last remaining true wild brown trout fisheries.
- In essence there are only seven Irish fisheries where pike control measures are being applied.
- All other Irish fisheries have no pike control measures in place, and the pike angler is unrestricted in the pursuit of his prey throughout the whole country.
- In the past, when pike control measures were not in place on Lough Corrib, trout yields dropped precipitously.
- On reintroduction of these measures, trout yields recovered within approximately three years.
- Visiting European (French and German) pike anglers have ceased to travel to fish for pike on the western lakes once they could not repatriate quantities of pike flesh for consumption.
- The argument that in the absence of control measures that pike will become dominant in the western lakes is scientifically proven. The seven managed trout lakes particularly Lough Corrib provides the ideal habitat for pike to become the controlling biomass as they are an apex predator with a high fecundity who will push salmonoids to the margins.
- Pike, over a certain size move from being omnivorous to piscivorous.
- Pike, that have become piscivorous, show, in the presence of varied prey species such as roach or perch, a preference for salmonoids.
- Pike have never existed in the upper Owenriff system i.e. above the Canrawer waterfall, as far as the written records have shown from 1908 until their recent illegal introduction.
- This new addition of a piscivorous predator, with a preference for salmonoids as its food source, in the important salmon and brown trout spawning nursery of the upper Owenriff system is an ecological disaster particularly for the Freshwater Pearl Mussel.
- Our (OABA) belief is that, in the absence of continuing pike control measures Lough Corrib will cease to be one of the last remaining wild game fisheries of the World. Instead the Corrib will metamorphose in to a mixed fishery populated by large numbers of piscivorous pike and a small number of large piscivorous trout as it was in the nineteenth century thus destroying fly fishing and dapping on the lake.

- The push to apply catch and release (C&R) equality to all fishing methods and species will allow an equilibrium akin to a 'game reserve' being achieved is fundamentally flawed with respect to current scientific research.
- The majority of rod caught Corrib trout exposed to air, photographed for 'catch and release' and mishandled will probably not survive their release.
- Our Irish pike angling colleagues have unrestricted pike domains throughout the entire country, with the exception of the seven managed trout fisheries. Therefore, the Lough Corrib trout angling fraternity are not seeking to impose trout angling on any of those non-managed fisheries or create political agitation with respect to those fisheries.

Oughterard Anglers and Boatmen Association (OABA) Proposals

- We propose that Lough Corrib and all its tributary systems are designated and enshrined for perpetuity in Irish law as a 'Salmonoid Fishery'.
- We propose the immediate and permanent removal of rod and line catch limits on pike including 'Section 59 authorisations' for Lough Corrib and its tributaries. This will also encourage the return of Continental European anglers and the socio-economic benefits that it will bring to Co. Galway. It will also help control and manage pike stocks with no additional government spending required.
- We propose that the IFI subject to exchequer funding increase the range and scope of strategic gill netting as required for pike in order for their population to be kept as low as reasonably practical for the benefit of trout and salmon stocks. Gill netting on Lough Corrib must target pike at their spawning time on an annual basis for effectiveness and to minimise by-catch.
- We propose that the IFI is given sufficient government and/or EU funding to permanently remove all invasive pike in the upper Owenriff system so that migratory Atlantic salmon and lake trout can spawn without the risk of predation in an EU recognised ecologically sensitive system containing the Freshwater Pearl Mussel.
- We propose that the upper Lough Corrib (all water to the northwest of the Kilbeg-Knockferry line) is closed to all rod and line angling from October 1st to February 14th inclusive in order to protect Ferox trout and migratory spawning trout who are being targeted by unscrupulous predator anglers under the pretence of winter pike fishing.

The OABA and fellow Corrib trout anglers have no wish for these proposals to be imposed on any other freshwater body in Ireland apart from the other IFI designated managed trout fisheries subject to agreement with their respective stakeholders. We hope that our fellow Irish pike angling colleagues would see the necessity and the validity of these proposed measures in order to protect Lough Corrib for future generations, what is an international game angling treasure.

The Oughterard Anglers & Boatmen Association Committee,

November 28th 2016.

APPENDIX I
COUNTER ARGUMENTS
TO THE IRISH PIKE LOBBY NARRATIVE

“Where you have a mixed fishery (pike/trout), you need a balanced fish population”.

Many pike lobbyists talk about ‘balanced populations’, ‘natural balance’, ‘population equilibrium’ or ‘dynamic equilibrium’. This idea first reared its head, in a paper titled ‘Pike in Your Waters’ produced by the Pike Anglers’ Club of Great Britain in 1992. Much of the academic research focused on in this paper was in relation the amount of prey required to sustain a pike population. From their research, the Pike Anglers’ Club suggest that 300 lb. of prey fish would be able to support 30 lb. of pike without any long term, adverse effects on the abundance of either type of fish. They use an analogy of prey fish representing a sum of money which is invested, where pike will consume the interest, leaving the capital sum untouched.

Obviously, this analogy is completely flawed as the ‘capital sum’ (Corrib trout brood stock) as the Pike Anglers’ Club describe it has a finite lifespan and trout cannot match pike fecundity.

O’Grady *et al.* (1996) estimated that the pike population in Lough Corrib, in 1995 alone, had probably consumed 255,000 trout, a maintenance ration for pike of circa 116 tonnes of trout per annum. While there are established roach populations in both Corrib and Mask the numbers present are very small – the culturally eutrophic (high biological productivity due to excessive nutrients) conditions which caused the “explosion” of roach stocks in waters like Sheelin and Derravaragh have not developed in these western lakes. Consequently trout will be the dominant food item in the pikes diet. The existing pike stock in Corrib in 1996 had probably consumed a total of circa 736,463 trout to reach their recorded standing crop figure in 1996 (O’Grady *et al.*, 1996). Lough Corrib, like Lough Sheelin, has very extensive weeded areas. Recent electro-fishing surveys have indicated that these zones are very high quality pike nursery areas. It is likely therefore that, like the Lough Sheelin population, the pike population can expand to exploit any increases in available fodder fish (mostly trout (80%) in this case). **An uncontrolled pike population in Lough Corrib has the capacity to consume circa 50% of the trout standing crop thereby seriously depressing the quality of this fishery as a trout angling venue.** The survey data compiled for Lough Corrib in 1996 followed a lengthy period when no pike control programme had been in place. A review of the pike stock structure on lower Lough Corrib, at intervals, from 1968 to 1996 shows just how effective adult pike control programmes can be when in place.

Historical reports from the 1830’s, suggest that if the Corrib is left unmanaged it becomes a pike dominated fishery.

“Pike are native to Ireland and should be protected as such”.

In Dr. Pedreschi’s recent study, ‘Genetic Structure of Pike and their History in Ireland’, she refutes the simplistic view that pike were anthropogenically (result of human influence) introduced in to Ireland around the 16th century (Went, 1957) and may have first colonised Ireland naturally. In this study, two strains of pike were noted in Ireland with one probably being introduced from Britain by the Normans in the 12th century. The study doesn’t show if the Corrib pike population was a natural colonisation or an anthropogenic (effect resulting from human activity) introduction from another established Irish population. Dr. Pedreschi’s conclusions on the origins of Irish pike have been questioned by Dr. Dennis Ensing in Northern Ireland. It also important to note that Dr. Pedreschi’s research was sponsored by the IFPAC (Irish Federation of Pike Angling Clubs) to the tune of €5,000 approx.

Pike are given immense protection through the ‘Conservation of Pike Bye-Law No. 805 (2006)’ including pike stocks on the seven recognised trout fisheries by the IFI. This erroneous policy must be changed. Nevertheless, pike populations reside unimpeded throughout the rest of the country.

It also worth noting that Roderick O’Flaherty (1629-1718), gentleman naturalist and historian from Moycullen wrote the following in 1682: *“There was never a pike ... as yet engendered in all this countrey, nor in the adjacent parts of Mayo or Galway counteys”*.

“Foreign anglers refuse to come to Ireland due to our ‘pike management’ operations”.

This argument has been used by many pike lobbyists but not substantiated by any hard facts or evidence. It is suggested by numerous scribes that anglers from abroad are appalled by the use of barbaric gill nets. Yet in the UK, gill nets have been used in pike management surveys on Lake Windermere in Cumbria without too much fuss from UK anglers. Gill nets are also used extensively in Alaska to remove pike from water bodies where they aren’t native in order to protect valuable salmonoid fisheries.

Gill nets are an effective management tool for pike on Lough Corrib. Some by-catch is inevitable with their use but it is a small price to pay on one of the last remaining wild trout fisheries of the world.

French and German anglers don’t travel to Ireland anymore not because of IFI’s policy but that they cannot catch and kill pike as a food source (various angling tour agencies having dropped Ireland from their itineraries).

“Pike culls increase the number of juvenile pike”.

This argument is consistently used by pike anglers to suggest that pike culls increase juvenile pike numbers and therefore put further predation pressure on prey fish (trout) stocks.

The key tenet of this argument is to suggest that larger pike are mostly cannibalistic and therefore keep smaller pike in check. Pike lobbyists quote research from (Popova 1978), Grimm (1981), Otto (1979) and Mann (1982) to support their thesis. The Pike Anglers' Club of GB make the following claim: *“Large pike represent the only natural piscivorous predator of smaller pike and their presence will help to keep the number of small pike in check”*.

Many studies have shown cannibalism to be important in the diet of pike when other prey were not available (Raaf, 1988; Treasurer & Owen, 1991).

In Estonia researchers on Lake Peipsi concluded that cannibalism does not play an important role in the diet of pike as alternative fish species (such as smelt, ruffe, perch) were abundantly available and the population density of pike was low (Kangur, 1999).

With respect to Ireland and Lough Corrib, Dr Martin O’Grady has clearly proven that pike in trout lakes show a clear preference for indigenous trout even if other prey fish are present.

In research on Lough Sheelin pike from 1978 to 2006, Dr O’Grady showed that pike over 60cm consumed mostly trout, roach, perch, gammarus and asellus. This clearly disproves the cannibalistic claim in an Irish context.

“Trout numbers have dropped since 1996 when gill netting recommenced on Lough Corrib”.

It is true that trout numbers have dropped, however this assumption is based on the limited evidence of two stock surveys carried out in 1996 and 2012 on Lough Corrib. Pike lobbyists fail to acknowledge in their assertion, the ecological changes in the lake such as the charr extinction, the roach introduction, the establishment of zebra mussels since the early 2000’s, water quality issues, the Lagarosiphon major epidemic and global warming that could have influenced trout fecundity. However, the IFI deemed that the CPUE value (catch per unit effort) calculated from the 2012 survey for trout was no cause for concern. To draw parallels between pike gill netting and potentially reduced trout stocks is plainly incorrect.

“Pike angling is worth €750m to the Irish economy annually”.

According to a report for the National Strategy for Angling Development published in 2015, titled ‘The Economic Contribution of Pike Angling in Ireland’, stated that the total economic contribution of recreational angling in Ireland to be approximately €755 million. In the same report, domestic pike anglers had an annual domestic expenditure of €68,430,000. Overseas pike anglers had an annual expenditure of €5.8 million. The total estimated expenditure of all pike anglers is €75 million.

In the same report, there are 84,962 trout anglers compared to 41,482 pike anglers. This figure is for domestic and foreign anglers. The gross expenditure per person for a trout angler is judged to be €1,281 compared to €1,808 for a pike angler. However, the gross expenditure for pike anglers is calculated to be €75 million (highlighted above) compared to €109 million for brown trout anglers and €154 million for salmon and sea trout anglers.

According to another 2015 report by the National Strategy for Angling Development titled ‘The Economic Contribution of Brown Trout Angling in Ireland’, the angling types of salmon, sea trout and brown trout supports a combined total of 5,088 Irish jobs compared to 1,147 jobs for pike angling.

“Pike don’t prey on salmonoids just coarse fish”.

There are numerous reports of the detrimental effects of introduced pike on salmonids. Effects on sport fisheries for trout have been reported for a variety of systems in North America (McMahon and Bennett 1996) and Europe (Broughton 2001). Aguilar *et al.* (2005) cites predation on stocked trout in Lake Davis, California, where illegal introduction of pike has been well studied and where there is also a threat to the native chinook salmon *Oncorhynchus tshawytscha* in nearby watersheds. Pike may also be involved in the decline of native cutthroat trout *O. clarki lewisii* and bull trout *Salvelinus confluentus* in Montana (McMahon and Bennett 1996; Muhlfeld *et al.* 2008).

Perhaps the most exhaustive assessment of the potential impact of pike introductions on salmonoids is in Alaska. The Southcentral Alaska Northern Pike Control Committee (2006) has reviewed the issue, and the following discussion is based on their report. The chief concern is predation on natural and supplemented populations of Pacific salmon *Oncorhynchus spp.*, which could have both economic and ecological consequences given the salmon’s position as a keystone species that acts not only as a consumer of prey but also as food for mammals and birds, as well as a supplier of nutrients to terrestrial ecosystems. Rainbow trout maintained in many Alaskan lakes by annual stocking programs are also believed vulnerable to predation by illegally introduced pike.

In Alaska, the main problem is introductions outside the pike's native range (the species occurs naturally throughout much of the state), and the authors of the Alaskan report cite anecdotal reports of pike appearing in freshwater salmonoid rearing habitat and lakes. A good example is the Kenai River system, where illegal introductions in tributaries have resulted in infiltration of many small lakes and streams; pike are now believed to use the mainstream river as a migratory corridor. There are even reports of pike being caught by commercial fishermen in Cook Inlet, suggesting more widespread dispersal.

“Lakes should be left alone to produce pike over 40 lbs. for anglers”.

This is another misconception peddled by pike anglers as a counter argument to pike culling. Dr Martin O' Grady has proved through his research that large productive water bodies such as the Corrib, the pike stock does not include large numbers of fish greater than 10 kgs or 22 lbs. *“There is a misconception among anglers that there is an endless number of 20 to 30lb. fish in such waters this is simply not the case as few fish live long enough to reach that weight”*³⁸.

“Excessive angling on the Corrib has reduced trout stocks not pike predation”.

The current angling pressure on Corrib trout stocks is minimal compared to the last few decades. Commercial trout fishing has ceased on the Corrib, fewer recreational anglers are fishing the lake and less trout are killed under the four fish per angler daily limit. This is borne out from the 2012 IFI Corrib stock survey which stated the following: *“If excessive angling catches were responsible for reducing trout stocks in recent years then a significant reduction should be seen in the numbers of larger older fish in the 2012 survey - this is not the case. It is the smaller fish, not the larger individuals, which are poorly represented in the stock”*.

“Pike anglers will pay big money to fish waters that produce big pike”.

Pike anglers both foreign and domestic make a valuable contribution to the Irish economy. However, as stated above there is a misconception that the great Irish lakes could produce lots of pike in the 20 lb. to 40 lb. bracket if left unmanaged. As Dr O'Grady has stated in the past few pike live long enough to attain those weights. Even on lakes particularly the Shannon system where there is no management of pike stocks few 'leviathan' fish are caught by rod and line. Ceasing pike culling will not provide better sport for 'trophy' pike hunters.

³⁸ The Ecology, Biology and Management of pike in Irish waters with particular reference to wild brown trout lake fisheries - Dr O'Grady & Dr Delanty - CFB 2008.

“Pike do not need management, they are nature’s cost neutral fishery manager”.

This argument is used regularly by pike anglers in-conjunction with the ‘natural balance’ theory to prove the ineffectiveness of pike culling. From an Irish perspective, pike don’t ‘self regulate’ as suggested in Irish trout lakes as proven by Dr O’Grady. While there are studies, which show that pike culling may lead to a zero change or even an increase in pike biomass, pike anglers do accept that when culling is efficient, intense or continuous that pike will not regain their former biomass ³⁹.

“Culling of pike to optimise wild trout stocks is flawed and outdated”.

While the culling of fish may seem barbaric, immoral and ‘politically incorrect’, it has been proven to be highly effective on Lough Corrib. Culling may not ‘optimise’ trout stocks to their maximum particularly on Lough Corrib where the native trout have been subjected to numerous ecological pressures. Nevertheless, the various culling programmes have preserved the native trout throughout the last century.

Lough Corrib in the 19th century was a lake dominated by pike. In 1898, the Corrib Fisheries Association was set up via public meeting. This association along with the Board of Conservators commenced a highly successful pike netting programme. During the years 1901 to 1913 a total of 50.4 tons of trout was caught at Oughterard alone. This was an average annual individual catch of 217 lbs. taken during the Spring months of each year. Over the years, 1937 to 1948 this catch figure fell to 59 lbs. according to the Fish House records at Oughterard. One must point out that Corrib Fisheries Association was dissolved in 1925, which effectively ended pike culling until 1953, when the Inland Fisheries Trust recommenced pike control. By 1956, 1957 and 1958, the average annual landing per boat had risen to 179 lbs. and daily individual bags of 14 lbs. or more were not uncommon. These historical records show a clear correlation between pike control and improving trout stocks.

“Kingsmill Moore, author of “A Man May Fish”, first cast a line on the Corrib in 1926 and fished the water for 10 years until in 1936 due to deteriorating fishing he said goodbye”.

One pike lobbyist in a published article quotes how Kingsmill Moore left Lough Corrib in 1936 due to deteriorating trout fishing ⁴⁰. The said lobbyist, doesn’t attribute the decline to any one factor but suggests that the Corrib was once a great trout and pike fishery. Kingsmill Moore cites in his own book that *“the great days of*

³⁹ “Pike in Your Waters” - The Pike Angler’s Club of Great Britain - Second Edition - 2003.

⁴⁰ An Irish Angler’s World -Misconceptions on a Cull - Should IFI’s Pike Management Policies be Re-assessed? - Ashley Hayden - March 2014.

the Corrib were over before 1926". When one looks at the real facts, it was the Corrib Fisheries Association who were responsible for the 'great days' with their systematic pike culls from 1898 to 1924. No pike culling occurred post 1924 which shows in Kingsmill Moore's anecdotal observations from 1926 to 1936 of declining trout catches.

"We never got more than nine trout on a September day, from five to seven trout was normal, the average weight always at least 2 lbs. Within a few years the fishing had declined, the average catch falling to four, to three, to two and at last sadly I said goodbye to Corrib" (Kingsmill Moore 1960).

"Corrib was a great trout & pike fishery with both species residing harmoniously side by side".

Lough Corrib trout and pike have never resided harmoniously side by side. Records from the 19th century show that the Corrib was a pike dominated fishery (Belton 1834).

Juvenile pike from 0cm to 40cm compete with trout for the same food sources such as asellus, gammarus, roach fry and perch fry. Once a pike reaches 40cm, the competing trout now becomes the prey. By the time pike reach 60cm in length, they become largely piscivorous.

In Dr Pedreschi's 2014 report titled, 'The Diet of Pike in Irish Watercourses', the author noted the following:

"More recently, O'Grady & Delanty (2008) have also highlighted the piscivorous habits of pike >60cm, which is further supported here, and described a preference of pike for eating trout in Lough Sheelin. As a 60cm fish in Ireland is estimated to be 5-6 years old (O'Grady and Delanty 2008), and as relatively few fish have been found to live beyond 6 years in Irish waters (Healy 1956; O'Grady & Delanty 2008), the impact of pike on brown trout may not be as drastic as previously feared, as it seems few individuals reach an age / size suitable for predating primarily on trout. The present study suggests that since the invasion of roach throughout Irish waterways, particularly since the 1970s (IFT Reports; King et al. 2011), a certain amount of predation pressure on trout in may have been alleviated. However, continued monitoring is essential for management purposes, as pike may predate more heavily on trout if roach stocks collapse, which can happen with the introduction of invasive mussels and clams".

Lough Corrib is a world recognised salmonoid fishery and has been for nearly 120 years. Therefore it must be protected as such. Every town and village around the Corrib rely on the maintenance of a salmonoid fishery not the development of a pike fishery.

“Lough Corrib was a successful mixed fishery but gill netting diminishes Lough Corrib’s potential as resource”.

Lough Corrib was never considered a ‘mixed fishery’ and has been managed as a salmonoid fishery since 1898. This policy has been in-situ since before the foundation of the Irish state. As George Barron a renowned Welsh international angler and author wrote in a recent letter to the IFI, “what would current trout stocks in Corrib be, if no pike culling had been done?”.

Every effort should be made to protect the Corrib as one of the 13 European lakes that are ecological significant wild trout fisheries. Irish fisheries legislation and ancillary bye-laws must reflect this status.

‘Lough Corrib’ is a worldwide recognised brand just like ‘Coca-Cola’, ‘Apple’ or ‘Manchester United’. This level of brand recognition cannot be bought or advertised. Even people who have little or just a passing interest in angling, associate Lough Corrib with trout fishing and mayfly hatches not pike fishing. Why destroy such a brand image?

“30% of pike need to be netted for a cull to be effective”.

This myth has been propagated since 1992 when the Pike Anglers’ Club of Great Britain produced their infamous ‘Pike in Your Waters’ document. This claim is made without any reference to a peer reviewed scientific paper or study but attributed to a communique from the UK NRA. Nevertheless, in the same document, the Pike Anglers claim that “improved trout survival rates can be achieved where culling is intense and continuous, but the manpower costs associated with culling can be substantial (Broughton & Fisher 1981)”. They did not quantify manpower costs.

“Visiting pike anglers outnumber trout anglers by 13% to 7%”.

While it is widely acknowledged that pike anglers make a significant economic contribution annually as per the report for the National Strategy for Angling Development, this contribution is not significant in terms of Lough Corrib and its hinterland. People must realise that the Corrib system has significant salmon fisheries at the weir on the Galway (Corrib) River and the Cong River. The Corrib system is also a hugely significant salmon nursery. The combined annual expenditure of salmon/sea trout/brown trout anglers is €263 million compared to €75 million for pike anglers (National Strategy for Angling Development). Who would the west of Ireland benefit most from?

“Trout anglers just kill all their fish in competitions and blame pike for declining trout stocks”.

It is a fact that trout anglers kill fish particularly on Lough Corrib but any fish caught are consumed and not wasted. This practice has been a tradition for centuries and there is nothing immoral about the practice. Every wild fish be it freshwater or saltwater consumed in the world must be taken from some water body. There is currently a healthy stock of Corrib trout and a very small percentage are cropped every year. IFI stated in their 2012 Lough Corrib stock report that angling pressure by rod and line was not an issue for the lake. Conservation measures have been put in place such as a 4 fish bag limit and minimum length of 13 inches, which all responsible anglers adhere to. Commercial fishing is now non-existent on the Corrib and the number of recreational anglers is diminishing due to the pressures of modern life. As a result, angling pressure on the lake is negligible.

More clubs around the Corrib are moving towards C&R (catch & release) competitions but the benefits of such are open to debate with respect to academic research in to the effects of C&R on fish populations.

Those Corrib anglers that take fish every year from the lake also give back to the lake by volunteering at the hatchery in Oughterard and giving their time to the Lough Corrib Angling Federation. The Oughterard hatchery is run solely by volunteer anglers. Every October anglers under a strict IFI licensing regime net the Owenriff river for migratory trout. These fish are stripped for their ova and milt, which produces on average 400,000 eggs annually. These eggs are incubated over a four to five month period and monitored daily by volunteer anglers. All stripped fish are returned unharmed to the lake. The Federation has also been involved in many other projects down through the decades, protecting Lough Corrib as a world class salmonoid fishery.

“Pike anglers fish year round and will bring economic benefits to the Corrib during the trout off season”.

It is certainly true that pike anglers can fish 12 months of the year but Lough Corrib is certainly not an attractive destination during the depths of winter. Firstly, the lake is too dangerous during the winter from a boating perspective with the continual winter storms and high winds from the Atlantic. Accessibility to the lake is another factor with flooding becoming more prevalent every passing winter. Lack of daylight is another serious impediment to winter fishing. There are far more attractive and sheltered destinations in Ireland for winter piking such as canals, small lakes and gravel pits where pike management does not take place.

“Pike get little credit for the essential work they do in regulating the balance of fish populations in fisheries”.

This argument is used regularly by pike anglers in-conjunction with the ‘natural balance’ theory to prove the ineffectiveness of pike culling. From an Irish and international perspective, pike don’t ‘self regulate’ or ‘balance fish populations’ as suggested in trout lakes as proven by Dr O’Grady and many other international scientists mentioned in this submission. While there are some studies, which show that pike culling may lead to a zero change or even an increase in pike biomass, pike anglers do accept that when culling is efficient, intense or continuous that pike will not regain their former biomass (Broughton & Fisher 1981).

“In these modern times it is unwise for man to interfere with the balance of a nature in any eco system with removal of an apex predator”.

If the ‘apex’ predator was not removed from the Corrib over the last one hundred years, what state would the trout fishery be in now? We know from historical evidence that in the nineteenth century, the Corrib was dominated by pike. Historical evidence also shows that when pike are netted, the trout catches improve dramatically within three years. As pike is an apex predator, it is even more reason for their numbers to be controlled in a salmonoid fishery.

“Pike have a purpose, it’s well known that pike will go for the slowest and weakest fish, we can only surmise at the number of potentially disastrous epidemics that pike have nipped in the bud”.

This mistaken assertion promoted by pike anglers has no basis in any scientific research. As trout are piscivorous also, couldn’t they carry out this ‘clean up’ function if they weren’t predated on?

“Removing all of the pike from a water body, you are probably going to end up with a lake full of stunted fish, prone to disease, and to fish kills in hot or thundery weather”.

This pseudo scientific assertion is often expressed by some pike anglers but is completely fictitious when the scientific and anecdotal evidence is examined.

“Pike act as pollution control or “water guardians” and keep a fishery healthy”.

This assertion is based on the following assumptions:

“Nutrients coming into water, cause excessive phytoplankton growth, (excessive nutrient levels often arrive courtesy of farm run off, via a feeder stream, or perhaps via the water table sustaining a lake). Unrestricted phytoplankton growth can cause a crash in the waters night time oxygen levels, causing fish and weed to die off, and leading to eutrophication, when bacteria feeding on the black, stinking, dead mess at the bottom of the lake, starve the water of all oxygen and render it lifeless. Normally zooplankton feed on the phytoplankton preventing this situation arising. This mechanism, protecting the water from such disaster, suffers when the “planktivorous” fish life, their numbers swelled by so much available food, and unchecked by natural pike predation, reduces the amount of zooplankton below the threshold necessary to keep the phytoplankton growth in check. A healthy balanced population of pike keeping down the numbers of smaller “planktivorous” fish prevents this happening”⁴¹.

Therefore, according to the pike angler’s logic, a pike predating on planktivorous fish (small juvenile trout) keeping their numbers down produces a healthier fishery? This logic is utter nonsense. Pike are a clear and present danger to salmonoid stocks in wild fisheries.

⁴¹ <http://www.pffa.co.uk/pike-information/the-case-for-pike>, Leon Roskilly

APPENDIX II

GLOBAL INVASIVE SPECIES DATABASE

INVASIVE SPECIES SPECIALIST GROUP

ESOX LUCIUS



GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Esox lucius*

Esox lucius

System: Freshwater

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Actinopterygii	Esociformes	Esocidae

Common name

great northern pike (English), hecht (French), northern pike (English), grand brochet (French), American pike (English), great northern pickerel (English), Great Lakes pike (English), common pike (English), snake (English), pike (English), pickerel (English), jack (English), jackfish (English), brouchet (French), hauki (Finnish), wolf (English), brouchetta (French), brochet du nord (French), bec de canard (French), brochet (French), poignard (French), lanceron (French), sifflet (French), schnuck (German), grashecht (German), schnock (German), bunthecht (German), heichit (German), hecht (German), schnöck (German), heekt (German), hechten (German), scheckhecht (German), hengste (German), snook (German), lucio (Spanish), luccio (Italian), lúcio (Portuguese), Europäischer hecht (German), brouché (French), höch (German)

Synonym

Esox boreus , Agassiz 1850
Esox estor , Lesueur 1818
Esox lucioides , Agassiz & Girard 1850
Esox lucius atrox , Anikin 1902
Esox lucius bergi ,Kaganowsky 1933
Esox reichertii baicalensis , Dybowski 1874
Luccius vorax ,Rafinesque 1810
Lucius lucius , L.
Trematina foveolata , Trautschold 1884

Similar species

Summary

The northern pike, *Esox lucius*, is a predatory freshwater fish that is an opportunistic feeder. It is common in lakes, basins and rivers in the United States, Canada, central Asia, Siberia and many places in Europe. It is also present in the Aral, Arctic, Baltic, Barents, Black, Caspian, North and White seas and Atlantic basins. *E. lucius* exhibits genetic differentiation among its worldwide populations.



[view this species on IUCN Red List](#)



GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Esox lucius*

General Impacts

Esox lucius can cause the alteration of fish community species composition, by both predation and competition. As *E. lucius* is an opportunistic feeder, it is able to adapt to whatever prey fish are present. *E. lucius* may also hybridise with native fish species, e.g. *E. masquinongy* in the United States and Canada. (Fuller 2010; Harvey 2009).

Management Info

Common management techniques used for controlling *E. lucius* populations include culling and poisoning with rotenone. (Harvey 2009).

Principal source:

Compiler: IUCN SSC Invasive Species Specialist Group with support from the Overseas Territories Environmental Programme (OTEP) project XOT603, a joint project with the Cayman Islands Government - Department of Environment

Review:

Publication date: 2010-10-07

ALIEN RANGE

[1] ALGERIA
[1] IRELAND
[1] MADAGASCAR
[2] PORTUGAL
[1] TUNISIA

[1] ETHIOPIA
[1] ISLE OF MAN
[1] MOROCCO
[1] SPAIN
[1] UGANDA

Red List assessed species 4: CR = 1; VU = 3;

[Iberocypris alburnoides](#) VU

[Salvelinus fimbriatus](#) VU

[Pseudochondrostoma willkommii](#) VU

[Salvelinus grayi](#) CR

BIBLIOGRAPHY

8 references found for *Esox lucius*

Management information

Harvey, B. 2009. A biological synopsis of northern pike (*Esox lucius*). Can. Manusc. Rep. Fish. Aquat. Sci. 2885: v + 31 p.

Summary: Available from: http://dsp-psd.pwgsc.gc.ca/collection_2010/mpo-dfo/Fs97-4-2885-eng.pdf [Accessed 26 July 2010]

IUCN/SSC Invasive Species Specialist Group (ISSG), 2010. A Compilation of Information Sources for Conservation Managers.

Summary: This compilation of information sources can be sorted on keywords for example: Baits & Lures, Non Target Species, Eradication, Monitoring, Risk Assessment, Weeds, Herbicides etc. This compilation is at present in Excel format, this will be web-enabled as a searchable database shortly. This version of the database has been developed by the IUCN SSC ISSG as part of an Overseas Territories Environmental Programme funded project XOT603 in partnership with the Cayman Islands Government - Department of Environment. The compilation is a work under progress, the ISSG will manage, maintain and enhance the database with current and newly published information, reports, journal articles etc.

General information



GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Esox lucius*

Cowx, I.G., Nunn, A.D., Harvey, J.P., Noble, R.A., Bolland, J.D. & Taylor R. 2008. Investigation into the distribution and abundance of coarse fish populations in still waters in the Isle of Man. Unpublished draft report to Department of Agriculture, Fisheries and Forestry

[FishBase, 2010. *Esox lucius* Linnaeus, 1758 Northern pike](#)

Summary: Available from: <http://www.fishbase.org/Summary/SpeciesSummary.php?id=258> [Accessed 26 July 2010]

[Freyhof, J. & Kottelat, M. 2008. *Esox lucius*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.3.](#)

Summary: Available from: <http://www.iucnredlist.org/apps/redlist/details/135631/0> [Accessed 26 July 2010]

[Fuller, P., 2010. *Esox lucius*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL.](#)

Summary: Available from: <http://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=676> [Accessed 26 July 2010]

[Integrated Taxonomic Information System \(ITIS\), 2010. *Esox lucius* Linnaeus, 1758](#)

Summary: Available from: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=162139 [Accessed 26 July 2010]

[Varnham, K 2006. Non-native species in UK Overseas Territories: a review JNCC Report No. 372](#)

Summary: Available from: http://www.caymanbiodiversity.com/wp-content/uploads/2007/10/jncc372_web.pdf [Accessed 9 April 2010]

APPENDIX III

LETTER OF SUPPORT FROM

MR GEORGE BARRON

WORLD RENOWNED WELSH INTERNATIONAL FLY FISHERMAN, FLY TYER &
ANGLING AUTHOR

Inland Fisheries Ireland - Pike and Trout policy review.

28th. November 2016

Dear Sirs

I am a regular visiting angler who has been fortunate enough to have enjoyed fishing for wild brown trout on all the Great Western Loughs of Ireland during the last thirty odd years, both competitively but mostly for pleasure. The attraction for me has always been, and hopefully always will be, attempting to catch the great trout of incredible quality that inhabit Lough Corrib, unquestionably the finest wild brown trout fishing venue in Europe.

Therefore, it is with great sadness and somewhat unbelievable, that I should even find it necessary to contemplate writing this letter in support of a submission document being prepared by the Oughterard Anglers and Boatmen Association expressing their very genuine concerns regarding a cessation of pike culling on Lough Corrib.

As a species, pike must surely inhabit almost every river and lough and open drain in Ireland and they are not, and likely never will be a species under threat. Pike can, and do, live and survive in the muckiest and unhealthiest of water environment - something wild brown trout can't do - and in many instances they have been criminally introduced by 'others' to the detriment of the indigenous brown trout and other migratory fish. Something perhaps, and much to their embarrassment, Inland Fisheries Ireland should have devoted extra resource to prevent and remedy, rather than pander to lobbying by a Body who have the opportunity to practice their sport on waters far more numerous than the few, but very fertile limestone waters in the country, such as Lough Corrib. Inland Fisheries Ireland have also been given a remit within which they have been trusted to look after and manage Lough Corrib and its incredible ecology, not just for the benefit of a few but for the benefit of the majority and the country. Corrib is one of Ireland's crown jewels and unreservedly, it must be the IFI's duty to preserve and look after this special place for future generations to enjoy and fish and to ensure that 'common sense' regulation overrides budget and manpower constraints as would appear to be the issue at present.

Currently in the UK, certainly in Wales, the Bodies overseeing fishing interests are also trying to juggle priorities against falling Government revenues and are failing badly. We have now reached a point where the angling clubs are beginning to work hand-in-hand with those in control, definitely in situations where local issues can be resolved by voluntary labour supplied by local clubs. I can envisage a similar working partnership in and around Lough Corrib to benefit both the IFI and the clubs, and more importantly, to benefit the Lough and its major resource, the wild brown trout. It's not rocket science to realise that if the culling of pike on the lough is stopped, the new, greater head-count of pike will ultimately thrive and increase, creating intense pressure on wild trout stocks and producing an unsustainable balance in the future. A point has recently been highlighted and well documented in an excellent article in a local newspaper by Danny Goldrick. Once a trout fishery slides into decline it will never recover. As a nation, Scotland should hang its head in shame at the demise of Loch Leven, a natural fishery that once provided eyed-ova to the rest of the world to enhance and improve stocks. Today, in a relatively short period, in one generation in fact, it has become a mere shadow of what was once the greatest wild trout venue in the world. My worry is, that if the policy for cessation of pike culling on Lough Corrib goes ahead, I will be witnessing the beginning of the end for the place I lovingly refer to as Mecca. The IFI and the Irish Government must remember and be aware of the outcome from a lobby by game anglers in the late 1980s and the resulting consequences, and think long and hard on this issue. I, and many like me will watch with great interest as to how this issue is resolved, and hopefully still be able to consider whether Lough Corrib remains a worthy place to visit and fish once or twice a season.

Yours sincerely

George Barron
Brynawel
Talybont, Wales. SY24 5HE



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