Energy for generations

ESB FISHERIES CONSERVATION ANNUAL REPORT

(YEAR ENDING DECEMBER 2023)

A report on ESB Fisheries Conservation activities to the Department of Environment, Climate and Communications.

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Welcome

ESB has been responsible for the management and preservation of fisheries on the rivers in which we operate since the beginning of ESB's hydro generation operations in Ireland.

ESB's fleet of hydroelectric stations have a combined production capacity of 220MW located on five rivers across Ireland. Together, they provide enough renewable electricity to supply up to 180,000 customers, contributing to ESB's Driven to Make a Difference: Net Zero by 2040 strategy. Complementing ESB's overarching ambition to eliminate carbon from electricity, our strategy commits to stepping forward on social and environmental responsibility.

In the latter part of 2022 and into early 2023, ESB Fisheries updated its' conservation strategy in keeping with the Corporate Policy commitment to 'step forward on social and environmental responsibility, cultivating a safe, sound, and sustainable ethos in line with our values'. The revised strategy is titled ESB's Sustainable River Strategy.

ESB's Fisheries Conservation Team works with a range of local and national stakeholders to bring ESB's Sustainable River Strategy to life through the operation of three salmon conservation hatcheries, the river habitat restoration programme, and the eel trap and transport programme, as well as day to day fisheries management activities. You can find the details of these activities for 2023 in this following report.

This work is only possible thanks to the support and partnership of local and national stakeholders which includes angling clubs, community groups, University College Cork, Queens University Belfast, Inland Fisheries Ireland, The Marine Institute, The Department of Environment, Climate and Communications, and The Department of Agriculture, Environment and Rural Affairs, Northern Ireland.

On behalf of ESB, I would like to thank each of our stakeholders for their guidance and support over the past year.

Jim Dollard,
Executive Director, Generation & Trading, ESB

Notes

Introduction to the hydroelectric catchments

ESB operate hydroelectric generating stations on five river catchments. The fisheries are managed in co-operation with Inland Fisheries Ireland (IFI), the Department of Environment, Climate and Communications and the Marine Institute. The Northern Ireland owned section of the River Erne is under the control of the Department of Agriculture, Environment and Rural Affairs (DAERA, Northern Ireland).

The **Shannon catchment** including that of the estuary covers approximately 17% of the area of Ireland. Ardnacrusha generating station, constructed between 1925 and 1929, harnesses the 10,400km^2 of the catchment area upstream. The **Clady catchment** is situated in North Donegal. The River Clady was harnessed for the generation of electricity during the 1950's. The scheme involved the creation of a diversion canal and penstock from the River Clady approximately 3km from the sea and the transfer via this canal and penstock to a generating station, which discharges to the Crolly estuary. The **Liffey catchment** includes three hydroelectric generating stations at Poulaphuca, Golden Falls and Leixlip which were constructed during the 1940's. In addition to the supply of water for hydroelectric generation, the reservoirs created also provide water supplies to Dublin city. The **Lee catchment** includes two hydro stations commissioned in the 1950's. Two large reservoirs were created, Carrigadrohid (5.3km^2) and Iniscarra (9.3km^2), upstream of both stations. The **Erne catchment** is a transboundary river system, with large stretches in both Northern Ireland and the Republic of Ireland. The hydroelectric scheme was constructed during 1946-1955 and consists of two generating stations at Cliff and at Cathaleen's Fall.

An outline of the various programmes of work that ESB Fisheries are involved with, and the time periods involved are shown in Table 1.

An IFI fisheries protection boat approaching Ardnacrusha station on the Ardnacrusha tailrace at night in May 2023.

Table 1. The annual work programmes completed by ESB staff during the year.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Task
												Silver eel Trap and Transport
												Juvenile eel Trap and Transport
												Tree/Shrub clearance (NPWS)
												Instream habitat works
												Electrical fishing surveys
												Construction of fishing stands, styles & footbridges
												Adult hatchery broodstock trapping
												Stripping hatchery broodstock
												Hatchery rearing (egg to fry stage)
												Restocking juvenile hatchery salmon
												Hatchery salmon smolt release
												Fish Counters (Operation and Management)

IFI drone footage showing Ardnacrusha station on the Lower Shannon.

IFI drone footage showing the Lower Shannon below the Ardnacrusha tailrace.

Chapter 1. Atlantic Salmon

Although the construction and operation of the ESB hydro schemes has had an impact upon salmon populations, the impact of extensive drainage schemes, water regulation and canalisation, intensive farming, afforestation, and extensive water pollution have also impacted negatively. Increased marine and coastal exploitation levels since the 1960's followed by the incidence of Ulcerated Dermal Necrosis (UDN), and more recently decreasing marine survival have also added to the reduction in numbers of self- sustaining stocks of salmon. An example of this may be seen in the annual numbers of salmon entering the River Erne system which remained at a high level until the late 1960's, but thereafter fell to lower levels (Figure 1).

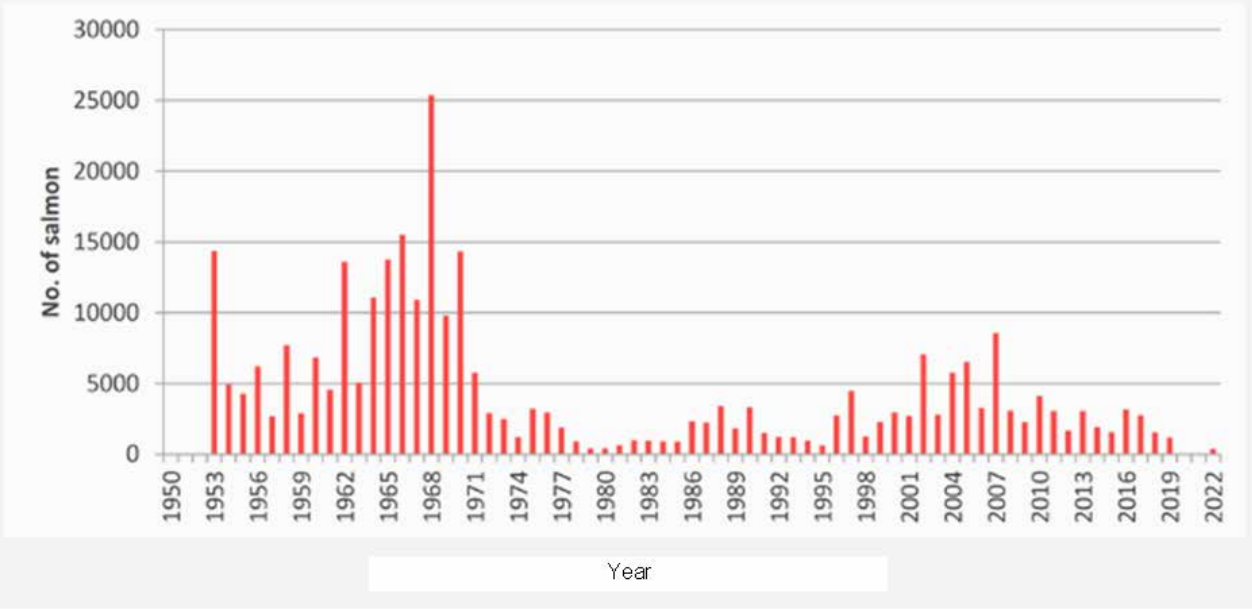


Figure 1. The number of salmon ascending the fish pass at Cathaleen's Fall hydroelectric generating station on the Lower Erne from 1953 to 2023. There was no census data for 2020 and 2021.

1.1 Salmon Hatcheries

ESB operates three samon hatcheries, to ISI 14001 standard, at Parteen Weir on the River Shannon, at Ballyshannon on the River Erne, and at Carrigadrohid on the River Lee. These hatcheries capture the returning adult salmon, incubate salmon ova and rear them though their life stages until they are fin-clipped smolts which are released each year as part of the hatchery ranching programmes. The production numbers for each of the three salmon hatcheries is shown for 2023 (Table 2.).

Table 2. The releases of juvenile salmon of various life stages from each of the three salmon hatchery units.

	Catchment		
Salmon lifestage	**Shannon**	**Erne**	**Lee**
Pre-smolt		40,297 (Glenfarne)	
Smolt	18,800 (Parteen hatchery)	50,860 (Ballyshannon Hatchery)	65,735 (Iniscarra cemetary)
Unfed fry	223,225 (Big Brosna (Clodiagh & Cappagh/Kilcrow)	220,630 (Glenfarne)	
Fry		209,816 (Colebrook & Arney)	
Autumn Parr	17,369 (Suck)		
Excess broodstrock		198 (Swanlinbar)	

1.2 Hatchery Broodstock Collection

Returning adult salmon provide the hatchery broodstock and are captured at each of the three catchments for the period October to December each year. They are separated in adult salmon traps from wild salmon by the presence of an adipose fin clip. The numbers of adult and wild fish trapped for 2023 for each of the three catchments is shown in Table 3. All hatchery salmon are retained for breeding purposes and wild fish are released above the salmon traps.

Table 3. The number of adult salmon removed from the adult salmon traps in 2023.

	Shannon		Erne		Lee		Total
	Wild	**Hatchery**	**Wild**	**Hatchery**	**Wild**	**Hatchery**	
October	43	206	13	73	0	0	335
November	99	362	21	116	25	150	773
December	24	32	25	79	0	0	160
Total	**166**	**600**	**59**	**268**	**25**	**150**	**1268**
No of hatchery salmon stripped	209 pairs		156 pairs		48 pairs		413

1.3 Fisheries Conservation Generation Protocols

ESB operates protocols at the Hydro stations as a fisheries conservation measure. These protocols are for those hydro stations that lie in the migratory path of downward moving juvenile salmon and upward migrating juvenile eel. Each catchment protocol is specific to each location due to differing infrastructure and flow regimes and involve a range of measures including dusk and dawn generation to near maximum efficiency during the months of April and May and early June and continuous spilling of surface water through a spillway gate and through the fish passes located at the particular station.

1.4 Adult Salmon Census and Return Rates

Adult salmon return rates are having a serious negative effect upon Irish salmon populations. Returning adult salmon numbers are assessed using 'Vaki RiverWatchers' which are automatic infrared fish counters. These counters are located upon the River Shannon (Ardnacrusha and Parteen Weir), the River Erne (Cliff station), the River Lee (Iniscarra station and the River Clady (Gweedore Weir), Census work on the River Liffey uses a 'Logie' counter which is located at Leixlip station. The 2023 census data for each catchment is shown below in Table 4.

Table 4. The nett upstream movement of salmon for each catchment.

	Shannon		Erne	Liffey	Clady	Lee
	Parteen Reg. Weir	**Ardnacrusha station**	**Cliff station**	**Leixlip station**	**Gweedore Weir**	**Iniscarra station**
January	0	0	0	0	0	No count
February	0	0	0	0	-6	No count
March	1	0	0	170	2	No count
April	23	4	0	14	2	No count
May	68	10	0	44	1	0
June	103	15	10	17	1	3
July	72	7	61	33	30	5
August	23	2	15	17	-3	0
September	46	14	130	6	2	0
October	249	18	40	13	0	0
November	461	4	-60	36	0	25
December	56	1	-9	37	2	21
Total	**1102**	**75**	**187**	**387**	**31**	**54**

Chapter 2. River Shannon Habitat Enhancement Projects

In general, the specific areas of the River Shannon catchment which have been selected for habitat restoration works, are those catchments which have been previously drained, and which presently suffer from having a homogenous canalised type of habitat, with a capacity of supporting a limited number of fish species and life stages. The list of sites to be worked upon is also reviewed by the Shannon Fisheries Partnership Group which is a partnership arrangement made up of ESB Fisheries Conservation, Inland Fisheries Ireland (IFI) and local angling clubs.

The habitat work programme may be categorised into two different areas:

- **Instream work:** This work involves the recreation of the riffle-glide-pool sequence in rivers which the building of stone vortex weirs and alternating deflector placement of random boulders, spawning gravels and rock armour for bank protection. The timing of the works is especially important as spawning fish may be present during the late autumn to late spring months. Therefore, all instream works are scheduled for the period May to mid- September.
- **Riparian/bank side work:** This work is carried out during the winter months as tree pruning is prohibited under law during the bird nesting season. Works include the removal of excess overhanging vegetation, where it causes excessive shade or 'tunnelling' of the river. Excessive tunnelling by riverbank vegetation prevents light entering the river and thereby reduces the instream productivity. Other work involves the provision of cattle drinking areas with the aim to provide restricted access to the river (within a discrete area), whilst preventing cattle trampling an entire river ban area, which thereby may cause later erosion. Other work includes providing access to the river by footpaths, gates, footbridges, styles etc., but only after the prior permission of the landowner. Fencing works is also provided on occasion and is to the farming 'Acres' scheme standard where required.

The catchments worked upon in 2023 included: the Mulkear, Shannonbridge, McNamara's Lake, Castleconnell and the Nenagh River. The Little Brosna (Camcor tributary) and the Ballyfinboy River.

Each specific site work plan is drafted by IFI staff working in a partnership approach with ESB Fisheries Conservation staff. Where appropriate, the Office of Public Works (OPW) and the National Parks and Wildlife Service (NPWS) are notified of these works and a screening report for an 'appropriate assessment' document is completed. Permission for access to the individual work sites are also requested from the local landowners and with the co-operation of the local angling clubs and other recreational riverine users. Where works were either uncompleted or partially completed in 2023 (due to unplanned changes such as the weather (rainfall/river discharges) or prioritisation of other ESB work, or where the progress of these works be slower than planned, these sites will be completed in 2024.

New signage and a new replacement ring buoy on McNamara's Lake.

Before and after photographs of one of the footbridges located on the Shannonbridge fishery area.

New fencing being delivered and then deployed along the banks of the Breaghmore site on the Camcor River.

A newly erected public access point on the banks of the Ballyfinboy River.

A pedestrian entrance gate located on the Ballyfinboy River.

ESB Fisheries safety signage and both new and old fencing posts being used for site fencing in 2023.

New fencing being erected along a newly rock armoured section of riverbank on the Breaghmore site on the Camcor River. Random boulders have also been placed within the pool area above the newly constructed stone vortex weir.

Chapter 3. The European Eel

The impact of Hydro generating plant on migrating adult eels is mitigated somewhat through the operation of a comprehensive trap and transport system for migrating silver eels on the Shannon, Erne and Lee. The targets under this conservation initiative were initially established under the National Eel Management Plan during 2009-2011. Percentage targets are set for the Erne and the Shannon based on the annual eel production in their catchments and are on a rolling target based on a 3-year basis allowing shortfalls in one year to be made up the following year. The annual target set on the Lee is set at 500kg of migrating adult eels. The results for the three catchments for 2023 and some subsequent years are shown in Table 5 below. The table shows that ESB are exceeding the Trap & Transport targets consistently in recent times.

Table 5. Total amounts (kg) of silver eel trapped and transported and the success relative to the targets set out in the National Eel Management Plan for the Shannon, Erne and Lee for the past 5 years. The 2009-2023 and the success relative to the targets set in the National Eel Management Plan.

Year	Lee T&T catch (Kg)	Target (Kg)	Relation to target	Shannon T&T catch (Kg)	Relation to target	3 year running average	Erne T&T catch (Kg)	Relation to target	3 year running average
2019	1,098	500	219.6%	11,853	31%	44%	39,651	50%	60%
2020	1,082	500	216.4%	21,229	51%	44%	46,957	50%	72%
2021	1,033	500	206.6%	18,751	78%	53%	45,000	50%	57%
2022	1,087	500	217.4%	19,929	54%	61%	40,531	50%	65%
2023	1,173	500	234.6%	23,882	94.4%	75.5%	48,027	50%	77%
Totals 2019 - 2023 and **(2009 - 2023)**	5,473Kg **(9,737Kg)**			95,644Kg **(315,865Kg)**			220,166Kg **(579,837Kg)**		

3.1 Juvenile Eel Trap and Transport Stock Enhancement

As a fisheries conservation measure, ESB captures upward migrating juvenile eel at three catchments. These are trapped using 'elver' boxes into which elvers climb and are trapped. These are then emptied, catches weighed, and the contents released into the catchment areas above the hydro stations. Separately, unquantified amounts of juvenile eels may also utilise the various fish passes for their upstream migration. On the R. Shannon, the combined catches for Ardnacrusha station and Parteen Regulating Weir were 974.2kg. The catches of juvenile eel (839.9kg) at Parteen Regulating Weir were a mixed catch of fingerling eel and elver. All catches of juvenile eel are released into the River Shannon catchment above Ardnacrusha station and Parteen Weir. Like previous years, the results again show the juvenile eel recruitment to be in decline.

The Iniscarra elver trap had a catch of 1.2kg. These juvenile eels were primarily 'bootlace eel' rather than elvers. The catches were released into the mid-catchment of the River Bride, which enters the River Lee below Iniscarra station.

On the River Erne, a total catch of 561.7kg was reported for the three Cathaleen's Fall elver traps during 2023. The catch of elver for the period 1960 to 2023 is shown in Figure 2. The 'River Erne Elver Monitoring/Trapping Protocol' (agreed between ESB, Inland Fisheries Ireland and Department of Agriculture, Environment and Rural Affairs, Northern Ireland), involves frequent surveillance and emptying of the elver traps.

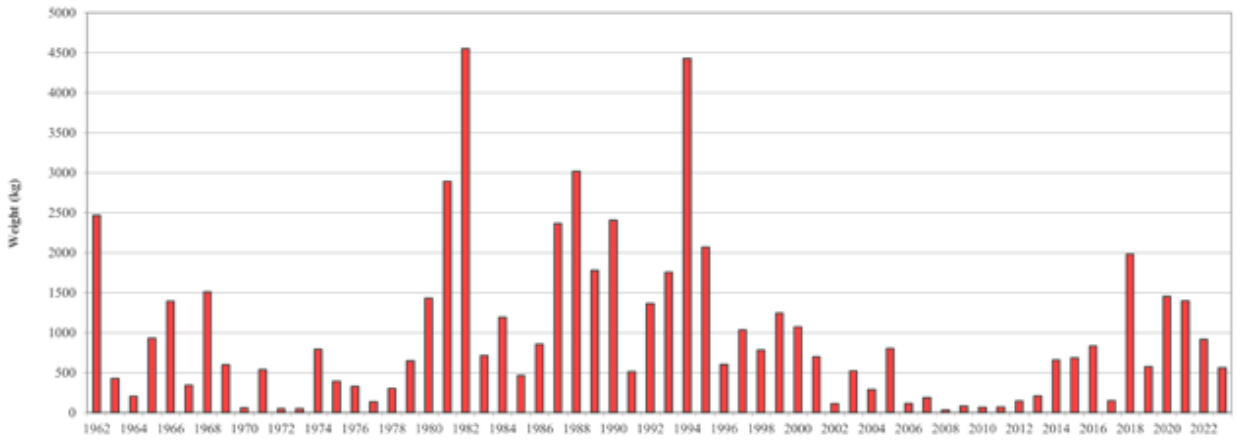


Figure 2. The catch of juvenile eel from Cathaleen's Fall generating station for 1960-2023.

Chapter 4. The Sustainable River Strategy

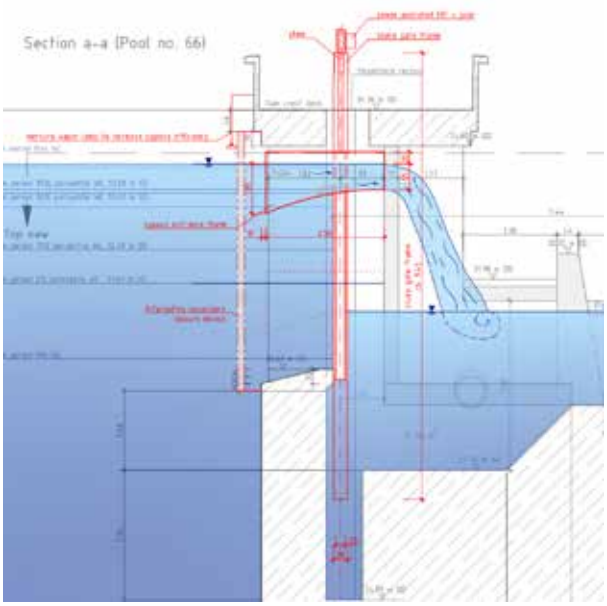
In the latter part of 2022 and into early 2023, ESB Fisheries has updated its' conservation strategy. A Steering Group was established with the aim of bringing the strategy in line with current policy as well as in keeping with the Corporate Policy commitment to 'step forward on social and environmental responsibility, cultivating a safe, sound, and sustainable ethos in line with our values'.

The revised strategy is now far broader than the previous strategy which mainly had a focus on operational matters relating to the three salmon hatcheries, the Eel Trap & Transport initiatives, river enhancement projects and the management of ESB fisheries. The updated strategy, now titled 'ESB Sustainable River Strategy' is based around the following three strategic goals:

1. Shift the balance between fisheries conservation and renewable generation based on scientific evidence.
2. Implement a Nature Positive Approach along 30% of ESB owned river channel or lakeside habitat by 2030.
3. Commit to a measurable net gain of ESB's contribution to our communities through sustainability initiatives.

A list of objectives and actions have been detailed under each of these strategic goals. This revised strategy has been briefed to several key stakeholders and the feedback has been overwhelmingly positive. Steps are now underway to plan the implementation of this strategy.

Under this new strategy, ESB Fisheries is identifying conservation projects for further development. Examples or projects currently underway are conservation projects on the river Erne where there are two areas for improvement identified in both hydro stations. These are the repurposing of the Erne smolt gates and also modifications to the Erne fish passes (the addition of climbing substrate within the side-slots of both fish passes). Also, for the river Clady, following discussions with relevant stakeholders and the appointment of a Fisheries engineering consultant, it is planned to construct a new vertical slot fish pass at Gweedore Weir to replace the existing Borland MacDonald fish lift.



A side view drawing of the proposed smolt and isolating gates with associated control and lifting mechanisms.

The presently closed Erne stations smolt gates, which will be fitted with a movable flume gate over which water will be spilled to provide an alternate downstream route for migrating fish.

Footpath clearance along the riverbank at Castleconnell.

Construction of a stone vortex weir and bankside rock armour on the Breaghmore section of the Camcor River.

New repairs to the Clady River footbridge.

An aerial photo of Gweedore Weir on the Clady River, Co. Donegal.

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