

National Programme: Habitats Directive and Red Data Book Fish Species

Summary Report

2023

IFI/2024/1-4697



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Habitats Directive Report 2023

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Executive Summary

Inland Fisheries Ireland (IFI), on behalf of the Department of the Environment, Climate and Communications (DECC), is responsible for monitoring and reporting on the Habitats Directive Annex II/V fish species (lamprey, shad, pollan and salmon). In the most recent Article 17 report (2019), brook lamprey (*Lampetra planeri*) and Killarney shad (*Alosa fallax killarneyensis*) were assessed as having a favourable conservation status. The status of river lamprey (*Lampetra fluviatilis*) is unknown and there is a focus on assessing the distribution of this species in the current reporting cycle. Sea lamprey (*Petromyzon marinus*), twaite shad (*Alosa fallax*) and pollan (*Coregonus autumnalis*) have a bad conservation status and conservation measures will have an important role in attempting to improve the prospects for these species into the future.

The monitoring programmes for lamprey and shad continued in 2023, which represented the fifth year in the 6-year Article 17 reporting cycle (2019 – 2024). The field work schedule runs from March to October and the HD team use a variety of survey techniques to collect data on the various life stages of these conservation fish species. Weather conditions were more challenging in 2023 compared to the past couple of years. High rainfall in March, early April and again from August to October resulted in higher river flows and this impacted river lamprey redd count surveys and, to an even greater extent, larval lamprey surveys.

Larval lamprey electro-fishing surveys were conducted between the 14th August and 13th October in 2023. A total of 50 index sites within 7 catchments and 5 RBDs (Eastern, South-Eastern, South-Western, Western & North-Western) were sampled. These included the Nore, Munster Blackwater, Bandon and Laune SAC channels and the Avoca, Corrib (west) and Erne (Annalee River) non-SAC channels. Persistent rainfall and flood conditions in rivers throughout the survey period prevented sampling of a number of catchments scheduled for the current year, including the Boyne, Feale, Mulkear, Moy, Swilly, Leannon and Shannon (Brosna-Clodiagh River). A total of n=1,025 *Lampetra* spp. (river/brook lamprey) was recorded in 2023 and 2 sea lamprey juveniles (macrophthalmia) were recorded from a site in the Laune catchment.

River lamprey redd counts were carried out from March to May on eight SAC and non-SAC catchments (Dee, Boyne, Avoca, Nore, Owenavorrhagh, Slaney, Suir and Mulkear). Sites where redds were previously observed were visited on several occasions. Surveying was also extended to include a new catchment, the Mulkear, part of the Lower Shannon SAC, with new observations of river lamprey spawning recorded at 3 locations upstream of a major weir. Unfortunately, spawning records for 2023 were absent across the remainder of the catchments, the only exception being the Suir where redds are noted at 3 locations. A protracted spell of unsettled weather during this period resulting in elevated river levels may have affected spawning success across numerous catchments during 2023.

Sea lamprey spawning hotspot surveys were undertaken in May and June across the network of established locations, many situated below major barriers to passage. Redd count data for 2023 once again indicate a generally stable situation, with activity noted across several SACs.

Shad egg kick sampling was undertaken on the River Barrow at St. Mullins in 2023. Egg surveys are an effective technique for investigating the location, timing and duration of twaite shad spawning events. Weekly sampling occurred over an 11-week period from 11th April to 20th June. Eggs were first recorded in the third week of April (with a water temperature of 13.4°C) and almost continuously for a 7-week period up to the last week of May. The total number of eggs was n=673, with the highest count (n=521) occurring in the first week of May.

Investigative shad egg surveys on the River Suir in 2022 identified spawning activity at a site in the upper estuary (upstream of Carrick-on-Suir). Weekly sampling was carried out and this was repeated in the current reporting year. The site was sampled over a 10-week period in 2023 from 20th April – 21st June. Eggs were recorded consecutively for 5 weeks, peaking with a count of n=95 eggs on 24th May when the water temperature was 17.5°C.

As part of IFI's National Bass Conservation programme, seine netting surveys for juvenile bass (*Dicentrarchus labrax*) were carried out between 22nd and 24th August 2023 at 3 locations on the Munster Blackwater, Barrow and Slaney estuaries, all of which are designated SACs for twaite shad. As young-of-year shad are often captured as bycatch in these surveys, they give an indication of successful spawning events for this species in the respective rivers. Thirty-one shad, measuring 59 - 80 mm total length were captured from Lickey Point on the lower Munster Blackwater estuary/Youghal Harbour. These all appear to be young-of-the-year shad. Another eleven shad (69 – 98 mm) were captured at Fisherstown on the Barrow/Nore estuary while no shad were recorded from Mary's Point on the lower Slaney estuary.

Juvenile smelt (*Osmerus eperlanus*), a Red List species (King *et al.* 2011), were also recorded from the seine netting surveys of the Munster Blackwater estuary. Two young-of-year smelt (80 & 81 mm respectively) were captured at Lickey Point. No smelt were recorded from the seine nets at Fisherstown in the Barrow/Nore Estuary or Mary's Point on the Slaney estuary. This is the first time that no smelt were captured in the Barrow/Nore Estuary since 2016.

The fish communities in 3 estuaries (Munster Blackwater, Barrow-Suir and Slaney) were surveyed *via* trawled transects from the 28th August - 5th September. These surveys are conducted annually primarily to provide data for IFI's National Bass Programme. Species of interest to the Habitats Directive Monitoring Programme are also occasionally encountered. Twenty-two shad (82 – 204 mm) and 0 smelt were captured from trawls on the Barrow-Suir estuary. One shad (measuring 380

mm) but no smelt were captured from the Munster Blackwater estuary while neither species were encountered in the Slaney estuary trawls.

1. Introduction

Biodiverse and healthy freshwaters are of prime importance for ecosystem functioning and organismal well-being (Lynch *et al.*, 2023). This realm, as with all others, has been significantly impacted during the Anthropocene by human activities (Dudgeon *et al.*, 2006; Arthington *et al.*, 2016; Reid *et al.*, 2019; Albert *et al.*, 2021). Freshwater species have been disproportionately affected when compared to terrestrial and marine species (WWF, 2022). The pressure on freshwater fishes is particularly pronounced; freshwater accounts for 1% of all global aquatic habitats, however freshwater fishes comprise 51% of all known fish species (WWF, 2021). The most-recent assessment of the world's freshwater fish species reveals that 25% (3,086 out of 14,898) are at risk of extinction from manmade pressures such as climate change, pollution, dams, water abstraction, overfishing, invasive species, and disease (IUCN, 2024). Populations of migratory freshwater fish globally have declined by an average of 76% between 1970 and 2016 (Deinet *et al.*, 2020), with average declines especially pronounced in Europe (-93%) in comparison with other continents (Hochkirch *et al.*, 2023). A Europe-wide appraisal of protected species with 'Poor' or 'Bad' conservation status demonstrated that fish and amphibians have the highest share (49%) of species with a deteriorating trend (EEA, 2020).

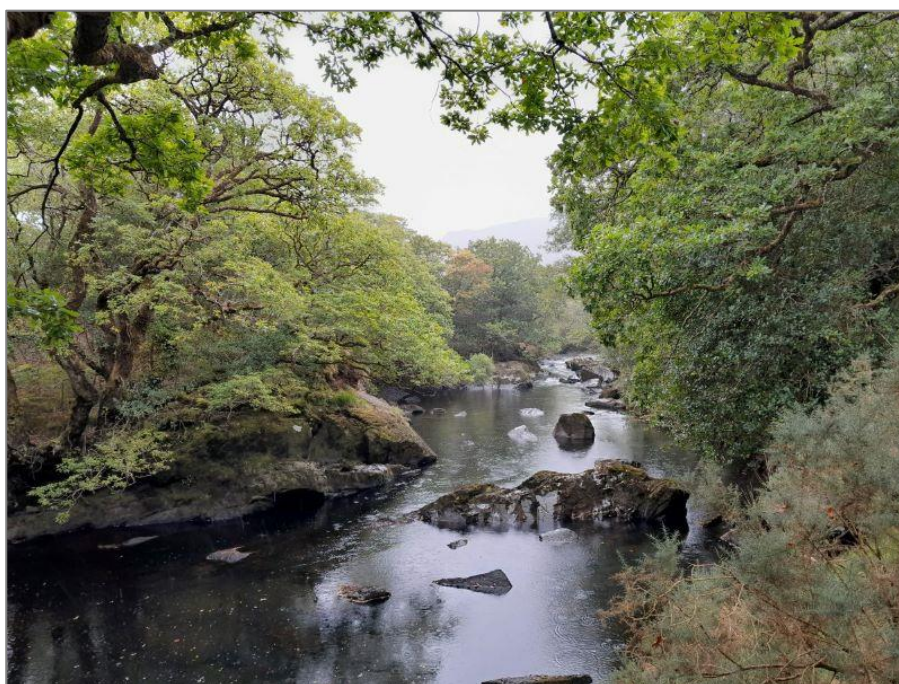


Plate 1.1. The Gearhameen River, Black Valley, Killarney, Co. Kerry.

The current scenario for Ireland is especially concerning, with almost half of all surface waters in 'Unsatisfactory' condition, i.e. 'Moderate' (30%), 'Poor' (15%) and 'Bad' (1%) status, respectively (EPA, 2022). Overall quality has declined since the previous assessment, being particularly pronounced in estuarine and coastal waters in the south and south-east of the country where important SACs for diadromous migratory species are located. Half (50%) of all Irish rivers are

deemed unsatisfactory, and there is an ongoing failure to protect the highest status waterbodies. Agricultural practices have been identified as the most significant pressure, especially in the south of the country, followed by compromised hydromorphology (channel modification, dredging and barriers), manmade pollution (urban, industrial, and domestic discharges), forestry activities and other assorted human impacts. Assessment of EU protected aquatic habitats in Ireland (NPWS, 2019) found that the vast majority (18 out of 20) had 'Unfavourable' ('Inadequate/Bad') status, whilst protected fish species (5 out of 7) were similarly affected (Inadequate/Bad/Unknown). The latest All-Ireland IUCN Red List Assessment for fish is not yet available, however a similar exercise undertaken for England, Scotland and Wales found that 22% (7 out of 32) of freshwater fish species were threatened with extinction (Nunn *et al.*, 2023 a,b). This includes EU Habitats Directive listed species such as twaite shad and Atlantic salmon along with brook, river, and sea lampreys. For twaite shad it was further reported that the UK population had undergone a 29% decline over the period 2008-2020 (Burns *et al.*, 2023).



Plate 1.2. The River Fergus, Ennis, Co. Clare.

Recent years have seen the drafting and ratification of national, pan-European, and international interlocking strategies to halt declines and restore habitats. These include the 2030 European Biodiversity Strategy (European Commission, 2021) with one of its aims to restore at least 25,000 km of the EU's rivers to be free flowing, the EU Nature Restoration Law (European Commission, 2022), the UN Kunming Montreal Global Biodiversity Framework (www.cbd.int/gbf ; Joly, 2022) and Sustainable Development Goals (<https://sdgs.un.org/>), and most recently the 4th National Biodiversity Plan for Ireland (NPWS, 2024). Freshwater habitats and species may, however, require more immediate and drastic interventions (Tickner *et al.*, 2020). In Ireland, the Citizens' Assembly

on Biodiversity Loss (2023) urged all parties and agencies involved to implement and enforce all current legislation and policies to address biodiversity loss, recognising a requirement for ongoing monitoring and collection of high-quality baseline data.

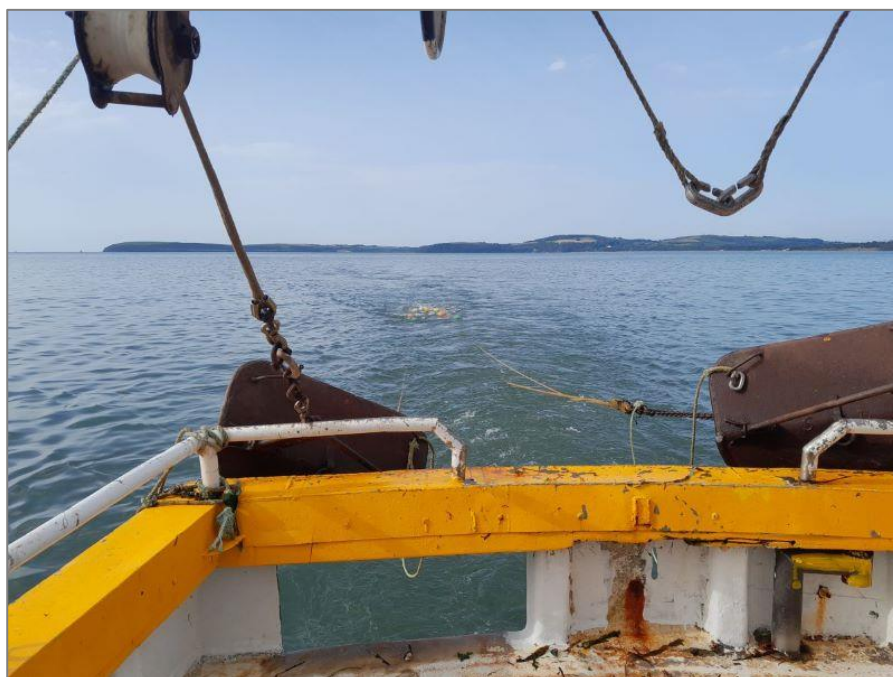


Plate 1.3. Trawling survey, Waterford Harbour.

During 2023, the IFI Habitats Directive team continued their extensive monitoring programme, focussing upon species distributions and abundances, addressing the requirements for Article 17 reporting on listed fish species. During this current 6-year reporting period, the team has built upon and further developed a nationwide network of larval lamprey index sites. Survey efforts directed towards cryptic and data-deficient species, such as river lamprey, sea lamprey and twaite shad continued to yield insightful results. The HD team maintained close links with fellow colleagues to collate data from lake surveys and river surveys regarding the status and distribution of species such as pollan and lampreys. HD staff members were also on hand to assist colleagues from other sections with collaborative netting and trawling surveys in transitional habitats of SACs where various life-stages of several species of interest are encountered. 2023 represents the fifth year in the present 6-year monitoring and reporting cycle (2019–2024) for Article 17. When required, assistance and advice in the field was provided by regionally based IFI colleagues. The HD team also had access to a seasonal research staff member, Lyndsey Casserly, for much of 2023.

2. Lamprey Monitoring Programme

2.1 Larval Lamprey Sampling

The larval stage of the life cycle of a lamprey lasts from 4 – 6 years and during this time they live in fine sediments filter feeding on organic matter. They then undergo metamorphosis which occurs over a few months, usually between July and September. During metamorphosis lamprey are referred to as transformers while the post-metamorphosis stage is called a juvenile or macrophthalmia. As part of the current 6-year monitoring cycle (2019 – 2024), a number of index sites are being sampled for larval lamprey. These sites were selected from previous catchment-wide surveys carried out over the period 2009 – 2018. They will be used to assess the range and population size for brook lamprey (*Lampetra planeri*) as well as the extent and quality of habitat for all 3 lamprey species. The anadromous river lamprey (*Lampetra fluviatilis*) is indistinguishable from brook lamprey at the larval stage and, while larval *L. fluviatilis* may be captured during the surveys, it is assumed the majority of larvae are *L. planeri*, particularly when occurring above natural or artificial barriers to migration. Once metamorphosis has occurred, it is possible to distinguish between the 2 species and, while rarely encountered, river and brook macrophthalmia are noted during surveys. Sea lamprey (*Petromyzon marinus*), also an anadromous species, is distinguishable from *Lampetra* spp. at the larval stage but they are rarely encountered in surveys. This may be due to a number of reasons including a smaller distribution and population size. Further research is also required to understand their habitat utilisation at this early life stage.

A selection of index sites was targeted for larval lamprey sampling during the period August - October in 2023. Surveying during this timeframe provides the best opportunity to capture the full range of size classes from young-of-the-year larvae to macrophthalmia. Index sites have been allocated for 13 SAC and 10 non-SAC catchments within 7 River Basin Districts (RBDs) and will provide data for the assessment of short-term and long-term trends in the population size of *L. planeri*. Sites within SAC rivers will be sampled 3 times, while non-SAC sites will be sampled twice within the 6-year reporting cycle.

High rainfall and river flows throughout the current sampling period had a significant impact on larval lamprey surveying. Monthly average river flows were high, with ≥83% of hydrometric monitoring stations experiencing flows above the long-term average for each month during the August – October period (Monthly reports available at <https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/hydrology-bulletin/>). Electro-fishing surveys were carried out between the 14th August and 13th October in the current year. However, sampling could only be conducted during 3 weeks of this period when conditions were suitable in terms of river levels and water clarity. A total of 50 index sites within 7 catchments/channels and 5 RBDs (Eastern, South-Eastern, South-Western, Western & North-Western) were sampled (Table 2.1). These included the

Nore, Munster Blackwater, Bandon and Laune SAC channels and the Avoca, Corrib (west) and Annalee (Erne) non-SAC channels. Given the prevailing flow conditions, it was not possible to survey 6 catchments/channels also scheduled for the current year, including the Boyne, Feale, Mulkear, Moy, Swilly-Leannon and Brosna-Clodiagh (Shannon). Apart from the Laune and Corrib (west), which were first surveyed in the current year, all of the index sites have been sampled at least once previously in this 6-year monitoring cycle.

A semi-quantitative sample was taken at each site by electro-fishing for 2 minutes in a defined area (1 m²) of suitable nursery habitat, generally comprising fine sediments. A single anode backpack is used to electro-fish for lamprey using a pulsed DC and a low frequency (10 Hz) setting. The anode is placed approximately 10–15 cm above the sediment, energized for 20 seconds, switched off for 5 seconds and this cycle is repeated for a period of 2 minutes. Immobilised larvae are collected using a fine mesh net and transferred to a bucket of water. Once 5 mins have elapsed, a second fishing and, occasionally a third fishing, is carried out until an approximate 50% depletion is achieved. All lamprey are enumerated and measured to the nearest millimetre. As young-of-the-year larvae can be difficult to capture using this method, a quantitative pushnet sample is also taken from adjacent suitable areas of deposition, if available. The spoil from these pushnet samples is emptied onto a tarpaulin sheet and any larvae present are collected for processing.

Water temperature and conductivity were measured at each site and habitat characteristics were noted, including sediment type, water depth, flow type, shading, channel modification etc. A site on the Nore (NOR07) could not be sampled as the channel had been physically modified since previously surveyed in 2020. On that occasion, n=17 larval *Lampetra* spp. were recorded, with a good range of size classes, measuring from 41 mm to 109 mm. The site is on the main channel of the upper catchment (Figure 2.2) and lies within the Local Authority District Drainage Scheme. Maintenance works carried out since 2020, including bank clearance and deepening of the channel, has most likely removed lamprey rearing habitat and the channel is now too deep to survey. At the time of sampling, the general area was explored for an alternative site but no suitable location could be identified.



Plate 2.1. A larval lamprey index site on the Nore catchment (NOR07) in 2020 that could not be surveyed in 2023 following drainage maintenance works

A total of $n=1,025$ larval *Lampetra* spp. was recorded from the catchments/channels surveyed (Figures 2.1 to 2.7). In addition, two *P. marinus* larvae (115 mm & 125 mm) and one macrophthalmia (140 mm) were captured from a site on the Gearhameen River (LAU40) in the Laune catchment. While sea lamprey have been recorded spawning in this river previously (Gallagher *et al.*, 2019), this is the first record of a *P. marinus* macrophthalmia captured in any system since larval lamprey surveys commenced in 2009. The capture of this individual (aged 4 – 6 yrs) is further confirmation of the successful migration of adult sea lamprey through the Killarney lake complex and up into the catchment headwaters to spawn. There were no larvae recorded at 2 sites on the Corrib (COR19a & COR26). Densities ranged from $1/m^2$ at sites on the Nore (NOR59), Munster Blackwater (MBW114) and Annalee (ANN04) to $119/m^2$ at a site on the Avoca (AVC28). High densities ($69/m^2$ – $119/m^2$) were recorded at a number of sites on the Avoca and Munster Blackwater. Mean densities ranged from $11/m^2$ on the Bandon to $78/m^2$ on the Avoca (Table 2.1).

Length-frequency data indicated a range of size classes across the majority of catchments (Figures 2.1 to 2.12), with lengths measuring from 16 mm (young-of-the-year larvae) to 143 mm. Fifteen *Lampetra* spp. transformers were recorded and these ranged in size from 95 mm to 122 mm.

One of the targets of the Common Standards Monitoring protocol for assessing populations of brook and river lampreys (JNCC, 2015) is that, to achieve favourable condition, larval *Lampetra* spp. should have a mean density $>5/m^2$ in sites with suitable habitat within a catchment. They should also be present in not less than 50% of these sites and the full range of size classes, from 0+ to

metamorphosis, should be present. In previous catchment-wide surveys, carried out over the period 2009 - 2018, favourable condition was achieved for the Nore (2018), Munster Blackwater (2014), Bandon (2009), Laune (2014) and Avoca (2009). Catchment-wide data were not available for the Corrib and Annalee.

Table 2.1. Density and population structure of larval lamprey from index sites on 7 channels in 2023.

River Basin District (RBD)	Catchment (* SAC)	No. Sites	Min Density (No./m ²)	Max Density (No./m ²)	Mean Density (No./m ²)	Min Length (mm)	Max Length (mm)
Eastern	Avoca	5	20	119	78	16	132
South-Eastern	Nore*	8	1	26	9	21	143
South-Western	Munster Blackwater*	13	1	73	20	18	142
South-Western	Bandon*	6	5	18	11	21	121
South-Western	Laune*	6	3	29	20	16	140
Western	Corrib (West)	6	0	9	4	21	115
North-Western	Erne (Annalee River)	6	1	56	17	28	125

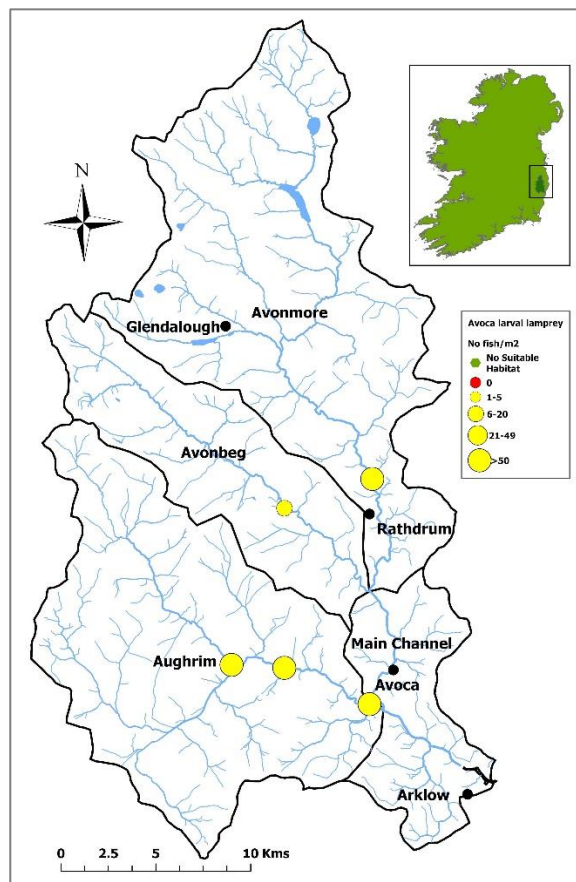


Figure 2.1. Larval *Lampetra* spp. densities at index sites on the Avoca Catchment in 2023.

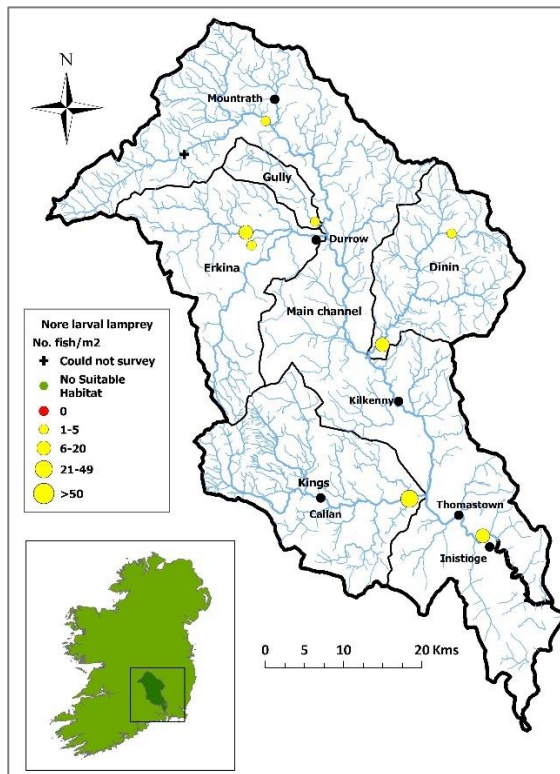


Figure 2.2. Larval *Lampetra* spp. densities at index sites on the Nore Catchment in 2023.

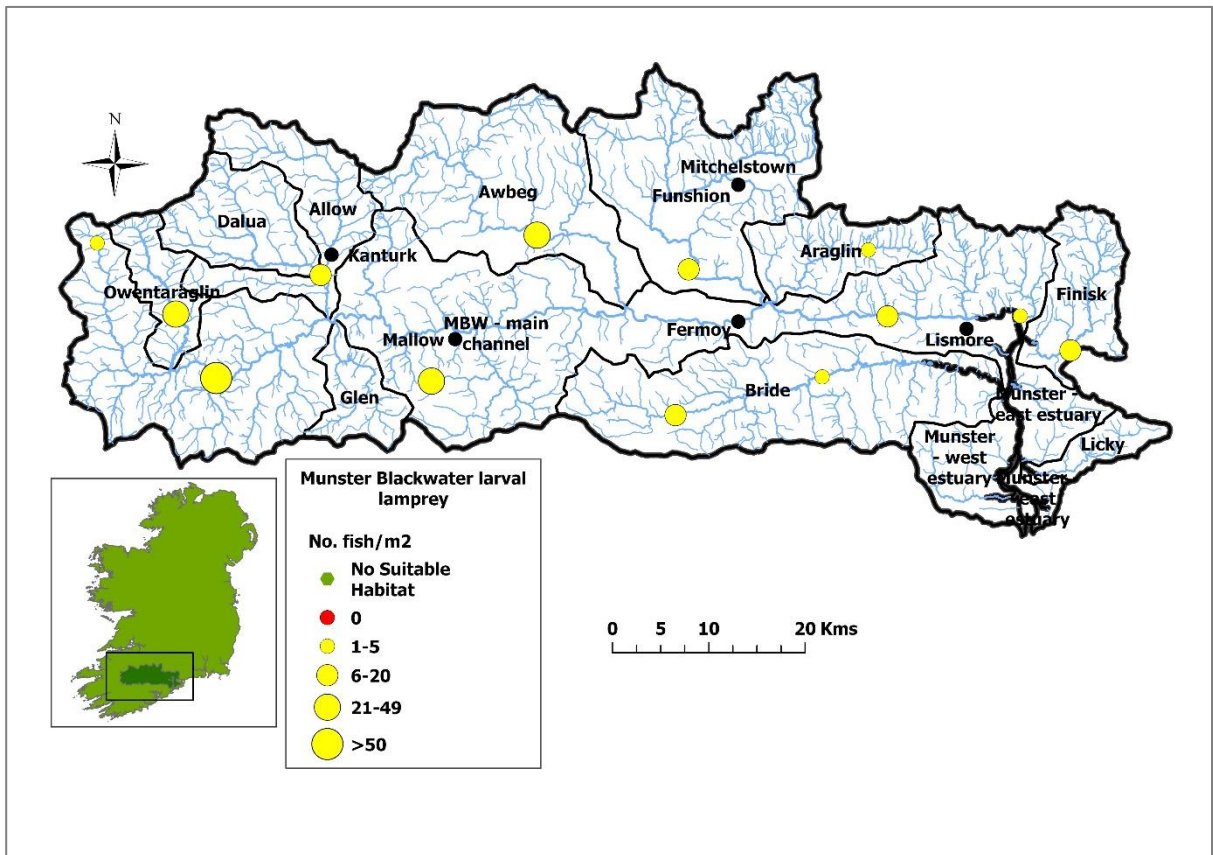


Figure 2.3. Larval *Lampetra* spp. densities at index sites on the Munster Blackwater Catchment in 2023.

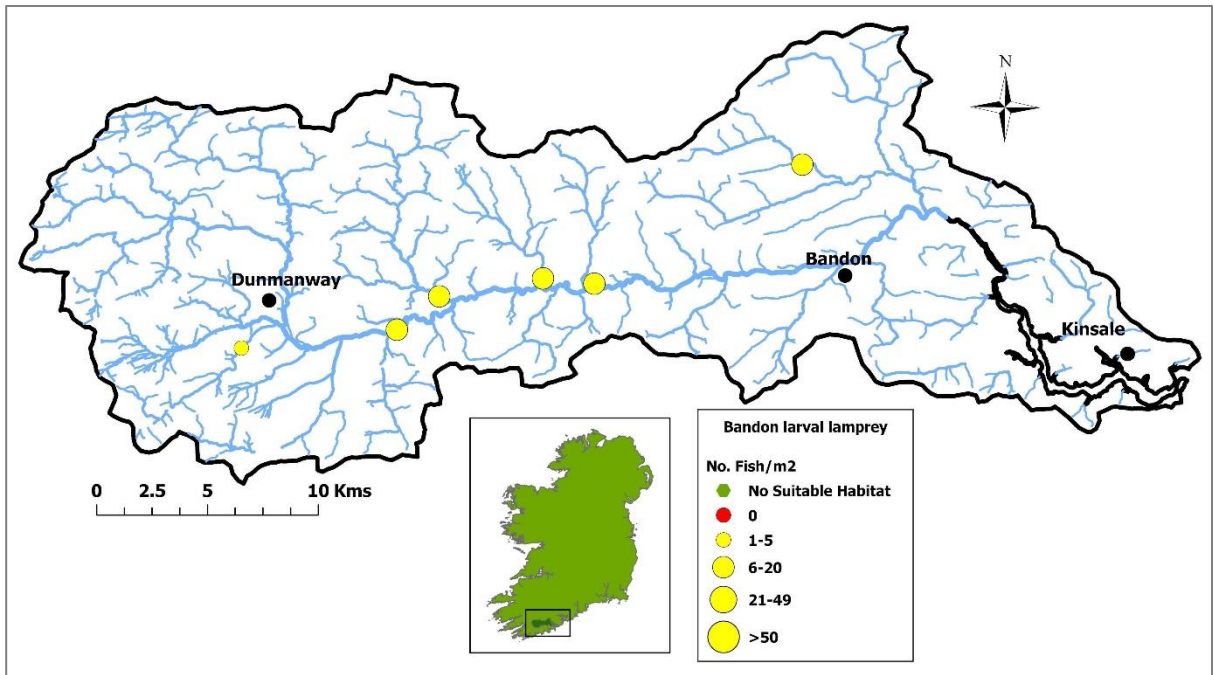


Figure 2.4. Larval *Lampetra* spp. densities at index sites on the Bandon Catchment in 2023.

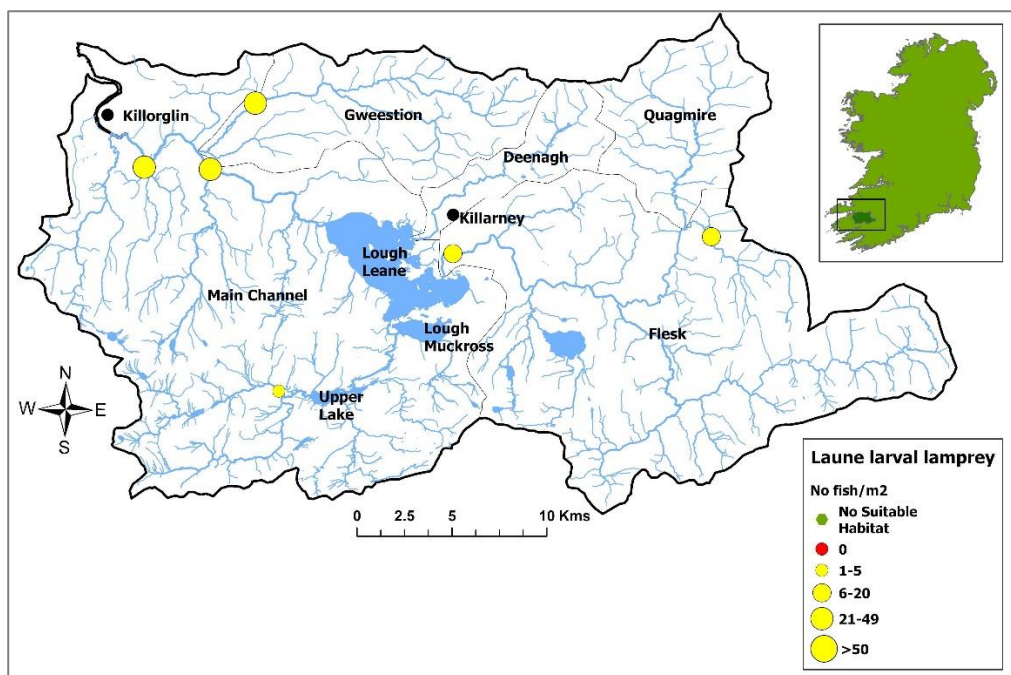


Figure 2.5. Larval *Lampetra* spp. & *P. marinus* densities at index sites on the Laune Catchment in 2023.

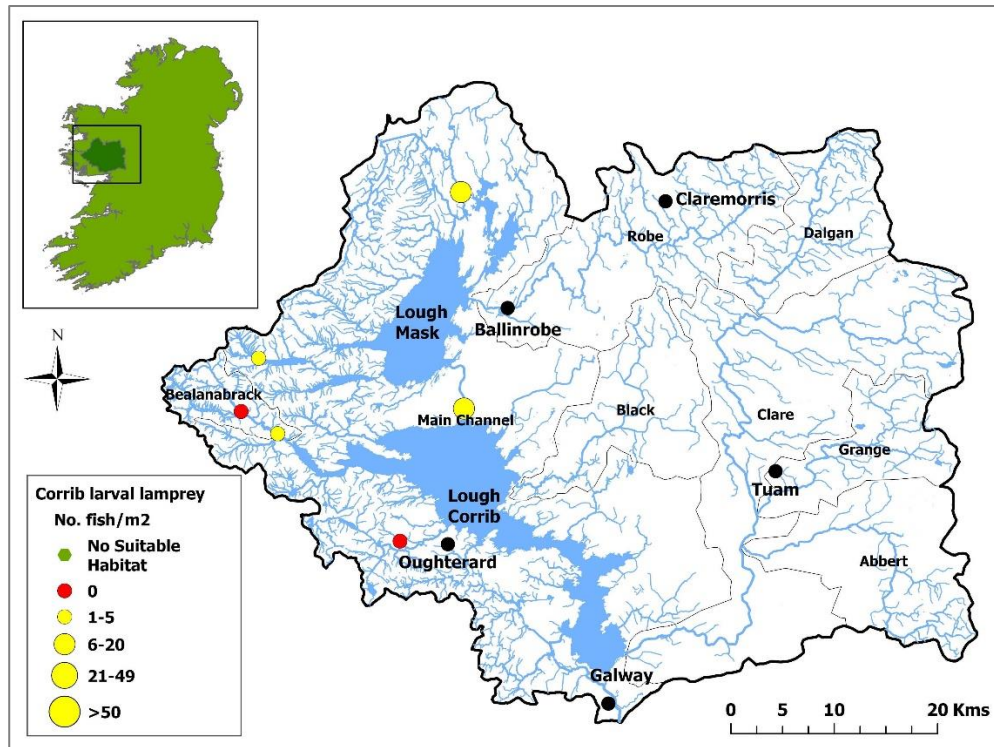


Figure 2.6. Larval *Lampetra* spp. densities at index sites on the Corrib (west) in 2023.

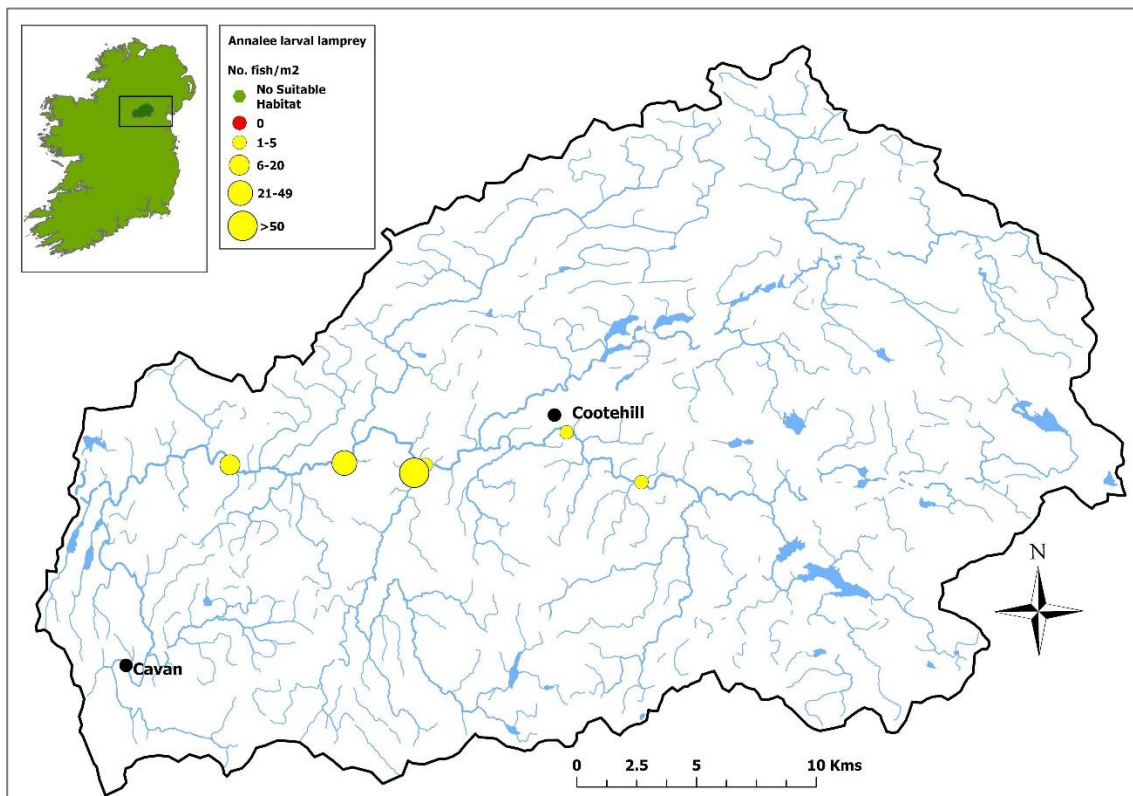


Figure 2.7. Larval *Lampetra* spp. densities at index sites on the River Annalee (Erne) in 2023.

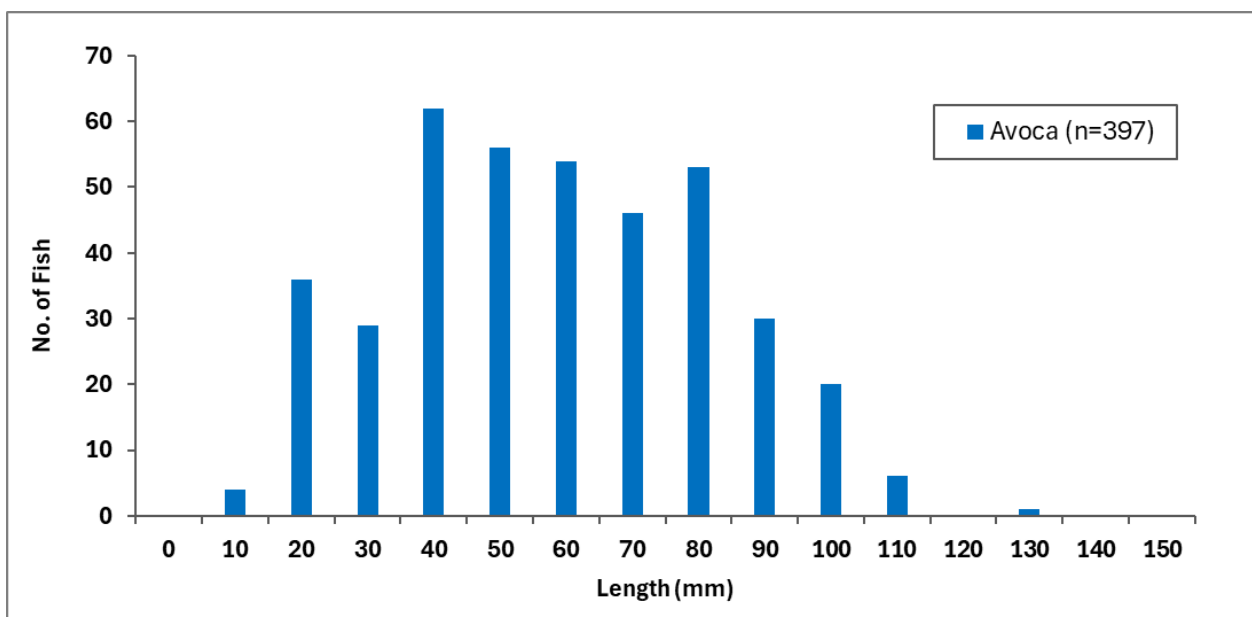


Figure 2.8. Length frequency data for larval lamprey from n=5 index sites on the Avoca River (Eastern RBD) in 2023.

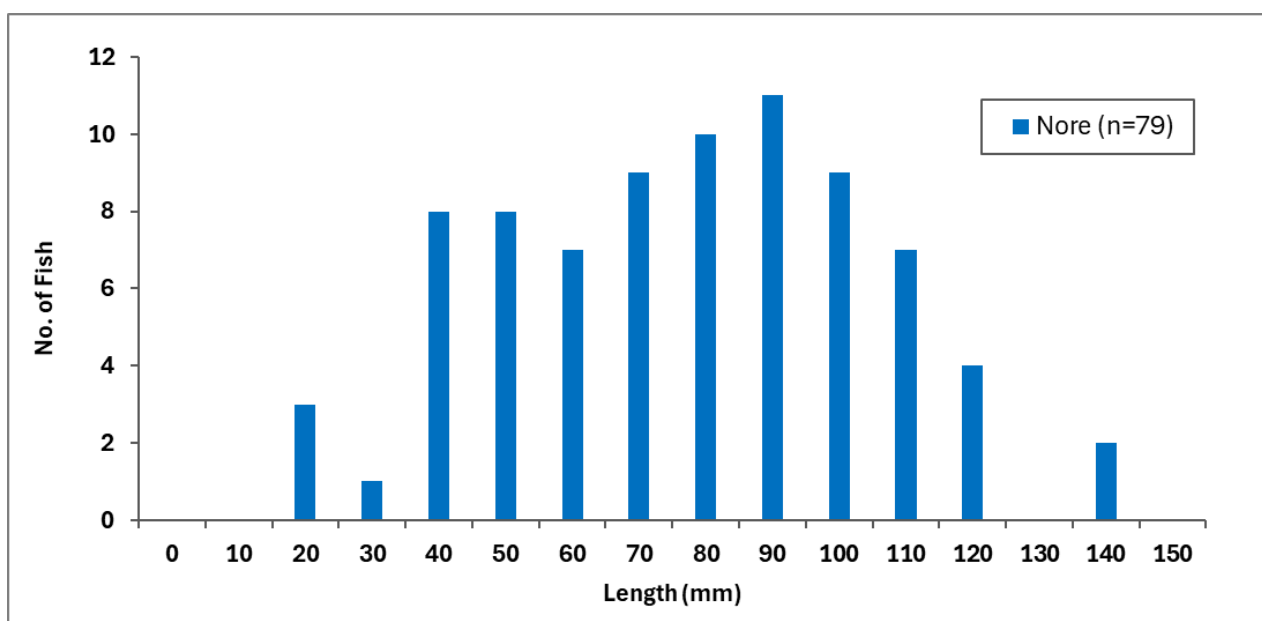


Figure 2.9. Length frequency data for larval lamprey from n=8 index sites on the Nore Catchment (South-Eastern RBD) in 2023.

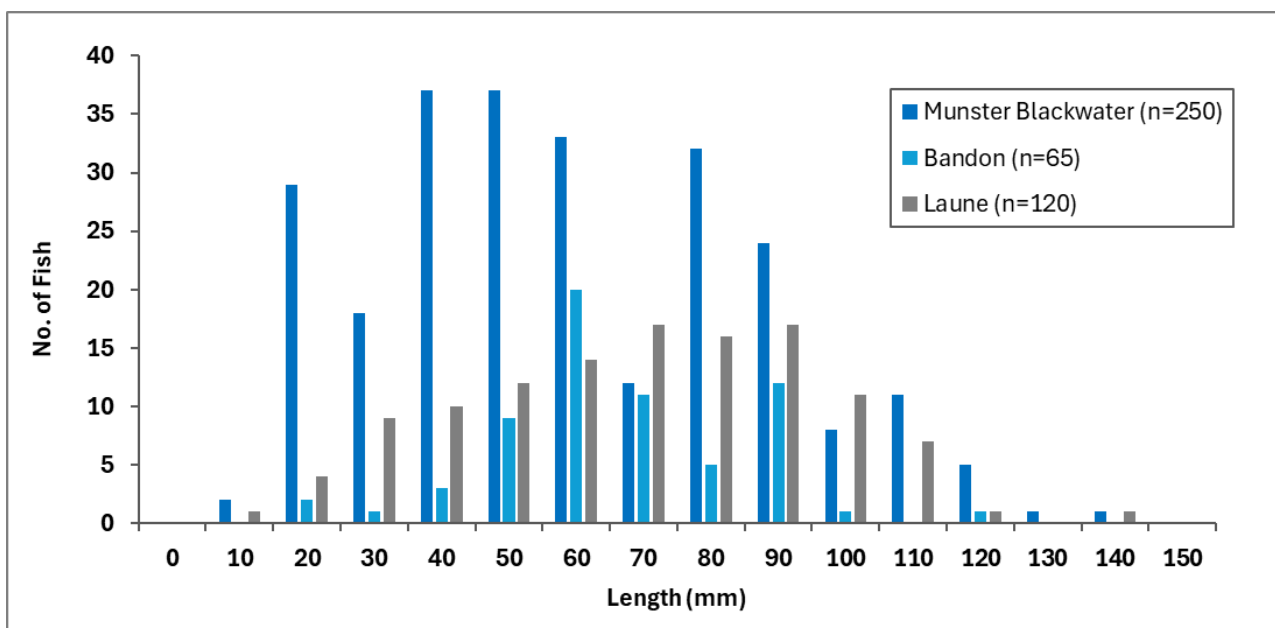


Figure 2.10. Pooled length frequency data for larval lamprey from index sites on the Munster Blackwater (n=13), Bandon (n=6) & Laune (n=6) Catchments (South-Western RBD) in 2023.

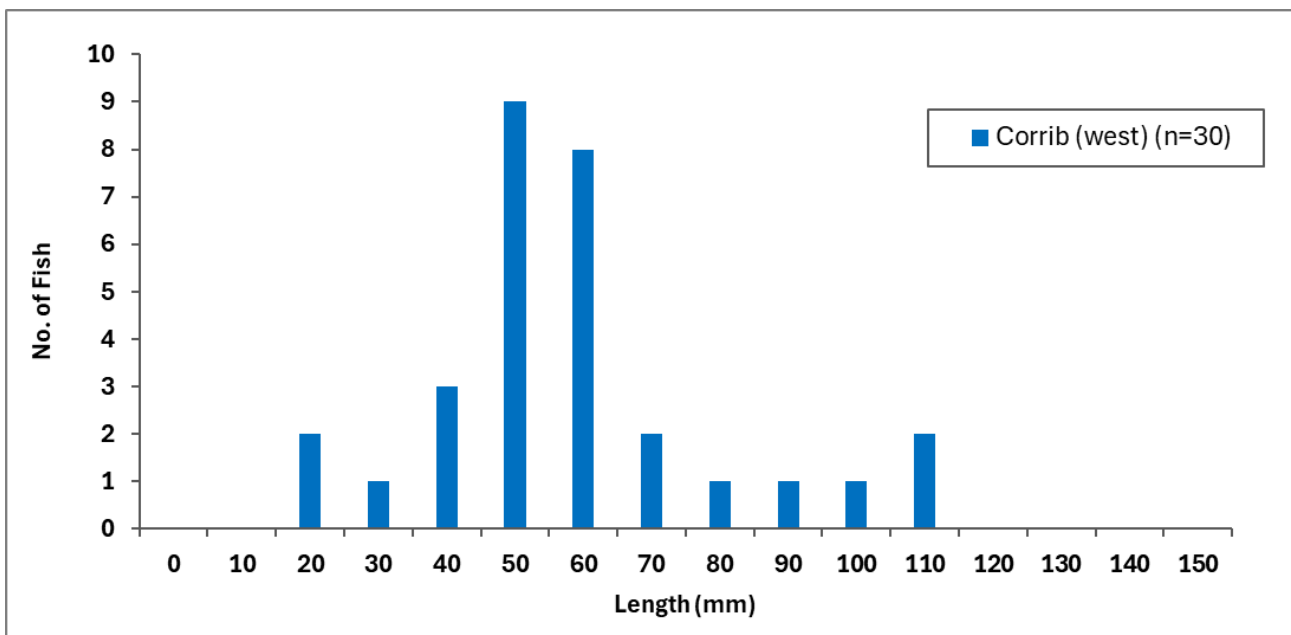


Figure 2.11. Length frequency data for larval lamprey from n=6 index sites on the Corrib (west) (Western RBD) in 2023.

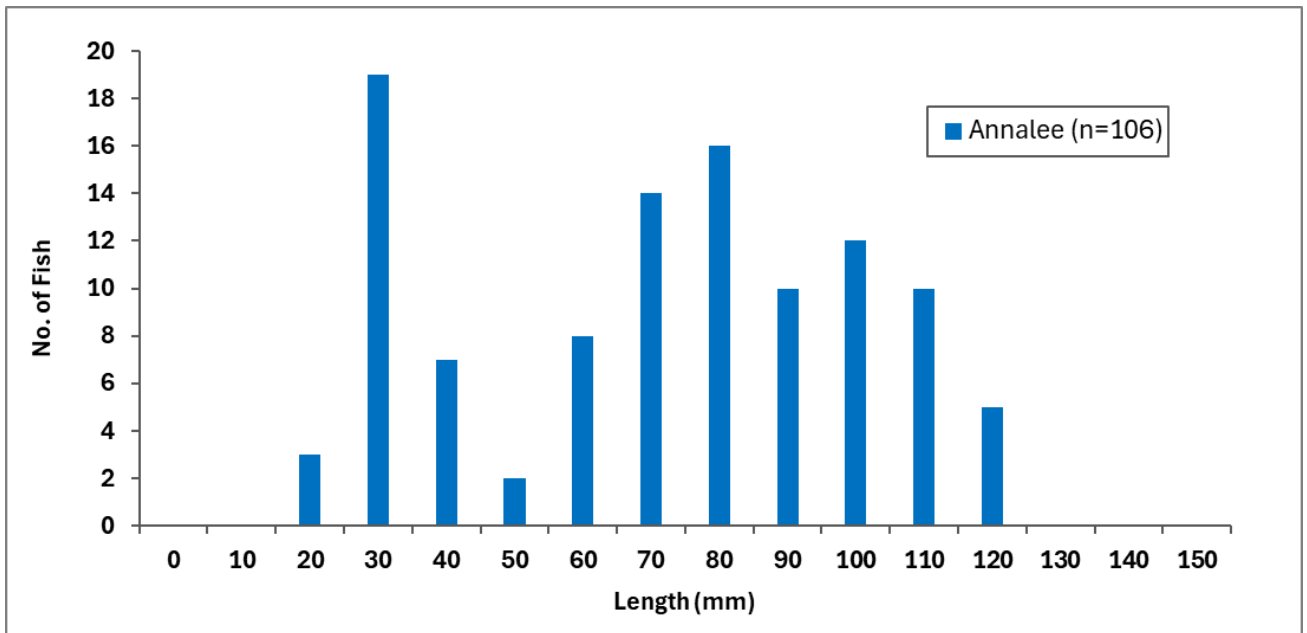


Figure 2.12. Length frequency data for larval lamprey from n=6 index sites on the River Annalee (Erne) (North-Western RBD) in 2023.



Plate 2.2. Sea lamprey macrophthalmia from the Laune Catchment in 2023

2.2 Adult Lamprey Spawning Surveys

2.2.1 River Lamprey Redd Count Surveys

River lamprey are listed in Annex II and V of the Habitats Directive and there are 10 designated Special Areas of Conservation (SACs) for this species. In the most recent reporting cycle 2013 to 2018 (NPWS, 2019), their conservation status was assessed as ‘unknown’ due to a deficiency of data on their distribution and population size. Challenges associated with monitoring this cryptic species include the elusive nature of their spawning activity and the short spring spawning season. This can often coincide with inclement weather and high flow conditions in rivers. In addition, the larvae of this species cannot be distinguished from those of brook lamprey and, therefore, larval lamprey surveys provide only limited data on this species. A dedicated monitoring programme for

river lamprey was initiated in the current reporting cycle (2019 – 2024) involving adult spawning/redd count surveys. An additional objective is to investigate the timing and duration of the river lamprey spawning season in Ireland.

Adult river lamprey spawning surveys were undertaken on the Rivers Avoca, Boyne, Dee, Nore, Owenavorrhagh, Slaney and Suir in 2023. The surveys targeted sites where spawning activity was previously recorded. A number of sites on the Avoca and Slaney are known hotspots for river lamprey spawning and are surveyed annually. Other sites were originally selected based on larval lamprey surveys which noted the presence of suitable spawning gravels and, also, on information from locally based IFI staff.

Redd count surveys were undertaken between 21st March and 19th May 2023 however persistent rainfall leading to high flows and high turbidity in rivers resulted in unfavourable sampling conditions (Figure 2.13). Only 12 days of surveying could be undertaken over the general spawning period. A total of 30 sites were surveyed on between one and six occasions (Table 2.2). Of these, river lamprey redd building activity was recorded at only 3 sites on the River Suir between 17th April and 5th May (Figure 2.13). Redd counts for 2023 were much lower than previous years. In 2022 there was evidence of spawning at 12 of the 36 sites sampled and 68 redds were recorded altogether (Gallagher *et al.*, 2023). The highest redd count that year (21) occurred at a particular site on the River Aughtrim (Avoca catchment). No redds were recorded at important spawning sites on the Avoca and Slaney in 2023 and it is possible that flood conditions obscured or impacted river lamprey spawning activity in the current year (Figure 2.14).

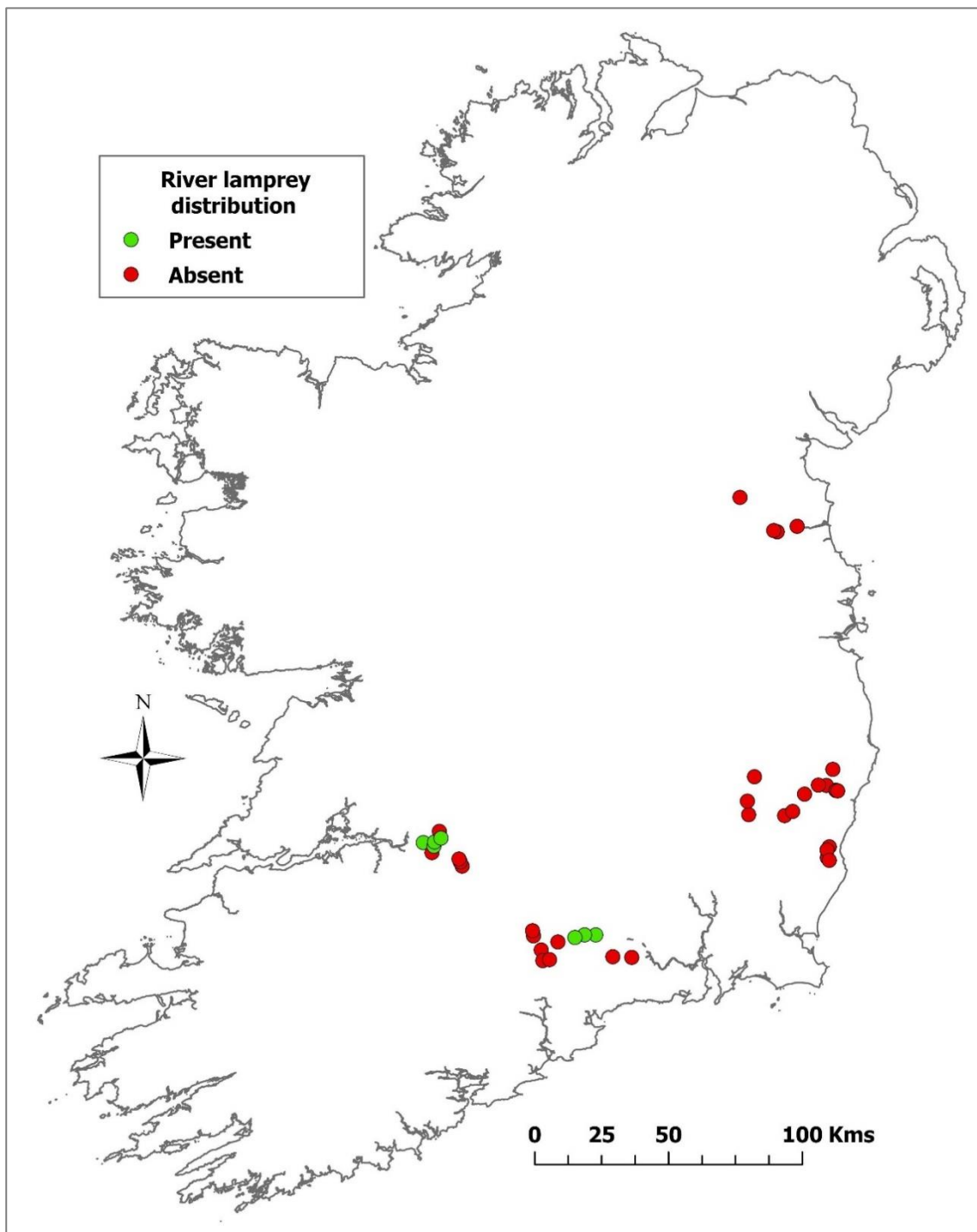


Figure 2.13. Map displaying sites surveyed for spawning river lamprey in 2023.

Table 2.2. River lamprey activity (counts of adult fish and redds) recorded during repeat visits to recognised spawning 'hotspots' during 2023 (* River lamprey SAC).

River	Location	No. of visits	Redds	River lamprey	Temp. Range (°C)
Avoca					
Aughrim	u/s Woodenbridge	6	Absent	Absent	9.7-12.8
Aughrim	u/s Woodenbridge (u/s weir)	2	Absent	Absent	10.9-12.8
Aughrim	Woodenbridge	6	Absent	Absent	9.5-12.7
Aughrim	Coates Bridge	6	Absent	Absent	9.8-10.9
Ow	u/s Aughrim	6	Absent	Absent	9.9-10.7
Avonbeg	Ballinaclash	2	Absent	Absent	12.8
Derrywater	Ballinglen	1	Absent	Absent	11
Boyne *					
Boyne	Slane Castle	1	Absent	Absent	10.8
Boyne	Bridge outside Slane	1	Absent	Absent	13.7
Mattock	New Bridge	1	Absent	Absent	9.9
Dee					
Dee	Woodstown, Nobber,	1	Absent	Absent	14
Owenavorrhagh					
Owenavorrhagh	Ballywater Br.	1	Absent	Absent	13.4
Owenavorrhagh	d/s confluence R. Bracken	1	Absent	Absent	13.1
Owenavorrhagh	Ballycannew	1	Absent	Absent	11.9
Owenavorrhagh	u/s Ballycannew	1	Absent	Absent	12.3
Slaney *					
Slaney	Rathvilly	1	Absent	Absent	12
Slaney	Tomnafinnoge Woods	6	Absent	Absent	9.8-12.5
Slaney	1km d/s Aghade Bridge	3	Absent	Absent	11.2-13
Slaney	Tullow	6	Absent	Absent	11.1-12.8
Derry	Shillagh	6	Absent	Absent	10.3-11.2
Suir *					
Suir	Cahir	1	Absent	Absent	
Suir	Ross Br, Clonmoyle	1	Absent	Absent	12
Suir	Kilsheelan	1	Present	Absent	13.6
Suir	Knocklofty	1	Absent	Absent	
Suir	Ardfinnan	1	Absent	Absent	13.7
Suir	Swiss Cottage	1	Absent	Absent	13.9
Suir	Lowry Br	1	Absent	Absent	12.1
Suir	Clonmel	2	Present	Absent	11
Tar	Tar Br	1	Absent	Absent	12.9
Tar	Goats Br	1	Absent	Absent	12.5
Anner	Anner Br	2	Present	Absent	12.2-12.2



Plate 2.3. River lamprey redds identified from spawning surveys at Annagh Bridge on the River Mulkear, May 2023.

2.2.2. Surveying river lamprey spawning activity upstream of a major obstacle

Annacotty weir on the lower Mulkear River in Co. Limerick represents an extreme obstacle for migratory fish species entering the catchment, being especially problematic for lamprey species. Each year a small number of sea lamprey are noted to successfully ascend the weir and spawn in discrete locations throughout the upper catchment, as demonstrated through annual repeated hot-spot surveying. There are, however, no records of adult river lamprey spawning above this barrier, with the HD team previously concentrating their survey efforts elsewhere.



Plate 2.4. Lamprey migration obstacle on the Mulkear River at Annacotty Weir, Co. Limerick.

During April and May 2023, a concerted effort was undertaken to survey sections of suitable spawning habitats in the upper Mulkear catchment which would be potentially available for any individuals successfully surmounting the barrier. Sites were visited on 5 occasions, starting in mid-April (17th). River lamprey nest building activity, as confirmed by the presence of adult fish, was noted at 4 locations from early May (2nd) on the Newport (Killeenagarraiff) and Clare (Annagh) rivers, coinciding with water temperatures of 13°C (Table 2.3). Brook lamprey spawning activity was also noted at the same locations from late April (25th) onwards. Large areas of shallow excavations or 'super redds', comprising multiple (4-6) commingled spawning bowls, along with smaller individual structures were noted at Annacotty, Killeenagarraiff Bridge, Annagh Bridge and Clonsingle Bridge. Migrating river lamprey likely utilise periods of elevated water levels during winter and early spring floods to ascend or circumvent the barrier at Annacotty. Surveying will be repeated during 2024 and extended to include other sub catchments such as the Bilboa.

Table 2.3. River and brook lamprey activity (counts of adult fish and redds) recorded during repeat visits to potential spawning sites in the Mulkear catchment during 2023.

Date	Location	River Lamprey		Brook Lamprey		Temp (°C)
		Adults	Redds	Adults	Redds	
17/04/2023	Annacotty	-	-	-	-	13.2
	Killeenagarraiff	-	-	-	-	13.3
	Annagh	-	-	-	-	13.4
	Clonsingle	-	-	-	-	13.4
25/04/2023	Annacotty	-	-	-	-	10.0
	Killeenagarraiff	-	-	2	4	9.9
	Annagh	-	-	0	1	10.1
	Clonsingle	-	-	1	3	9.5
2/05/2023	Annacotty	1	12	-	-	13.5
	Scart	-	-	-	-	13.7
	Killeenagarraiff	0	12	No new redds		13.9
	Annagh	0	8	2	2	13.9
	Clonsingle	1	20	5	20	13.3
9/02/2023	Rivers coloured and elevated following rainfall					13.2
16/05/2023	Annacotty	No new redds		-	-	12.1
	Killeenagarraiff	No new redds		No new redds		12.4
	Annagh	No new redds		No new redds		13.2
	Clonsingle	No new redds		No new redds		12.2



Plate 2.5. River and brook lamprey spawning habitat on the Killeenagarrieff River at Annagh Bridge, Co. Limerick.

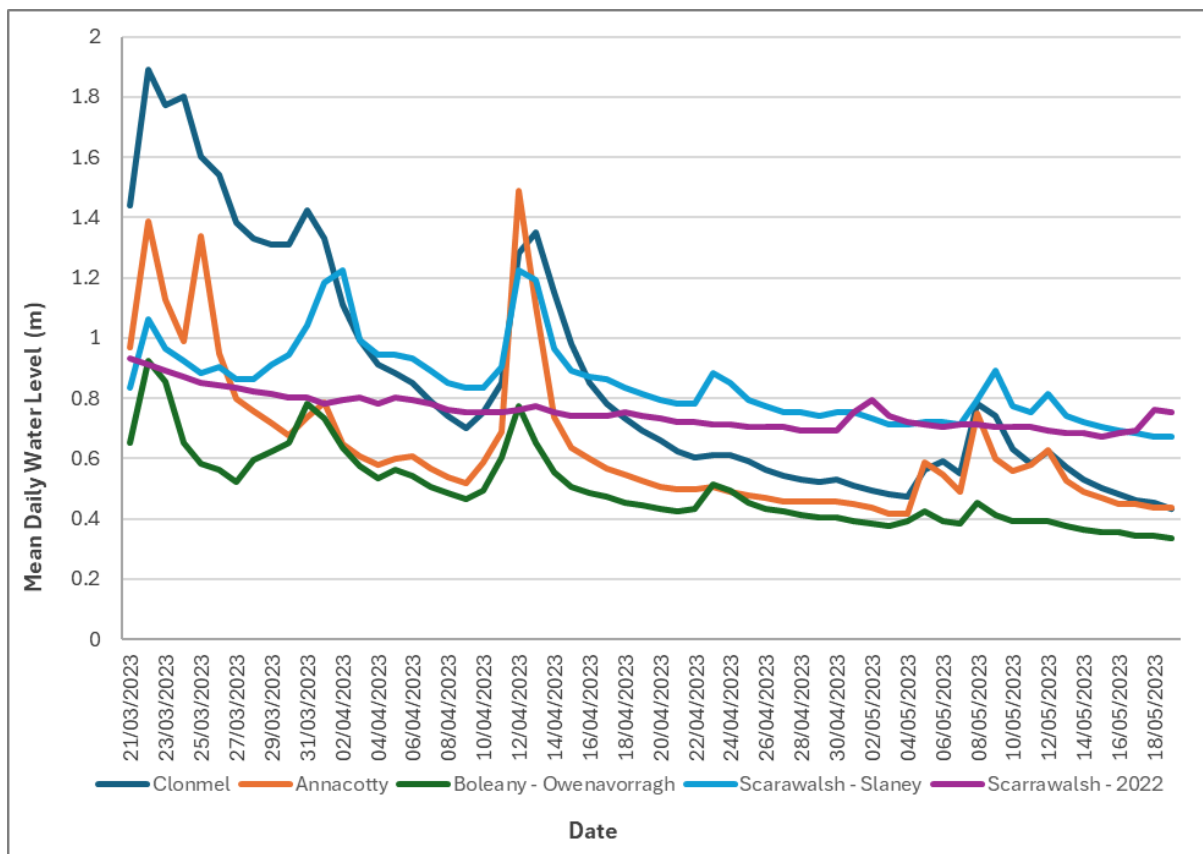


Figure 2.14. OPW water level data 21/03/2023 to 19/05/2023 at river lamprey spawning locations (Scarawalsh OPW 2022 data included for reference).

2.2.3 Sea Lamprey Redd Count Surveys

River Suir spawning surveys

Walkover surveys were undertaken at specific locations on the River Suir during the sea lamprey spawning period (May-June). A total of 5 separate visits were made, each comprising visual inspections and counts at various noted spawning locations between Carrick-on-Suir and Cahir, while also including hotspot surveys in the traditional Clonmel town section. Visits commenced in late May (24th) and continued through June (1st, 8th, 15th and 30th) 2023.



Plate 2.6. Sea lamprey redds on the River Suir at Clonmel.

An overall increase in spawning activity for 2023 was noted for the Clonmel town section when compared to 2022. Redds (n=12) were noted from the outset in Clonmel town (Table 2.2), with this number increasing to 21, including a super-redd structure, by the end of the survey period. Other locations visited along the lower main channel Suir included Knocklofty, Killaloe (d/s River Anner confluence), Kilsheelan and Deerpark, situated 3kms upriver of Carrick-on-Suir immediately above the upper tidal limits. A single redd was recorded at this latter site only. Water temperatures rose gradually during subsequent visits with an overall range of 15-19°C recorded for the period in question (Figure 2.15).

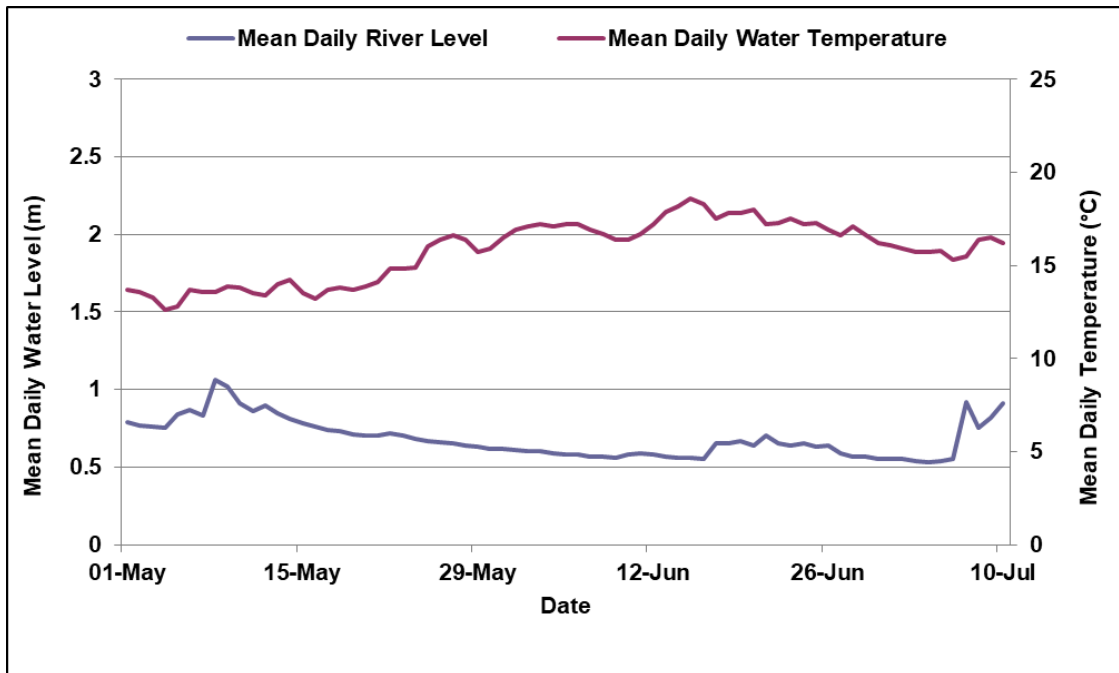


Figure 2.15. River Suir levels and water temperatures measured in Clonmel town (OPW hydrometric gauging station 16011) during the 2023 sea lamprey migration and spawning period.

Monitoring Sea Lamprey Spawning Hotspots

Annual surveys at sea lamprey spawning ‘hotspots’ continued in 2023. Site visits, typically repeated, were undertaken from mid-May (16th) through to late-June (29th) at established spawning sites on individual SAC rivers across the south and southeast, as well as within the Lower Shannon SAC (Figure 2.16), with the aim of recording timing, extent, and annual consistency of breeding effort. Details of hotspot visits as well as results are listed in Table 2.2. It is noteworthy that many of these hotspots are located downstream of manmade barriers, for instance Annacotty, Clonmel, St Mullins and Ennis.

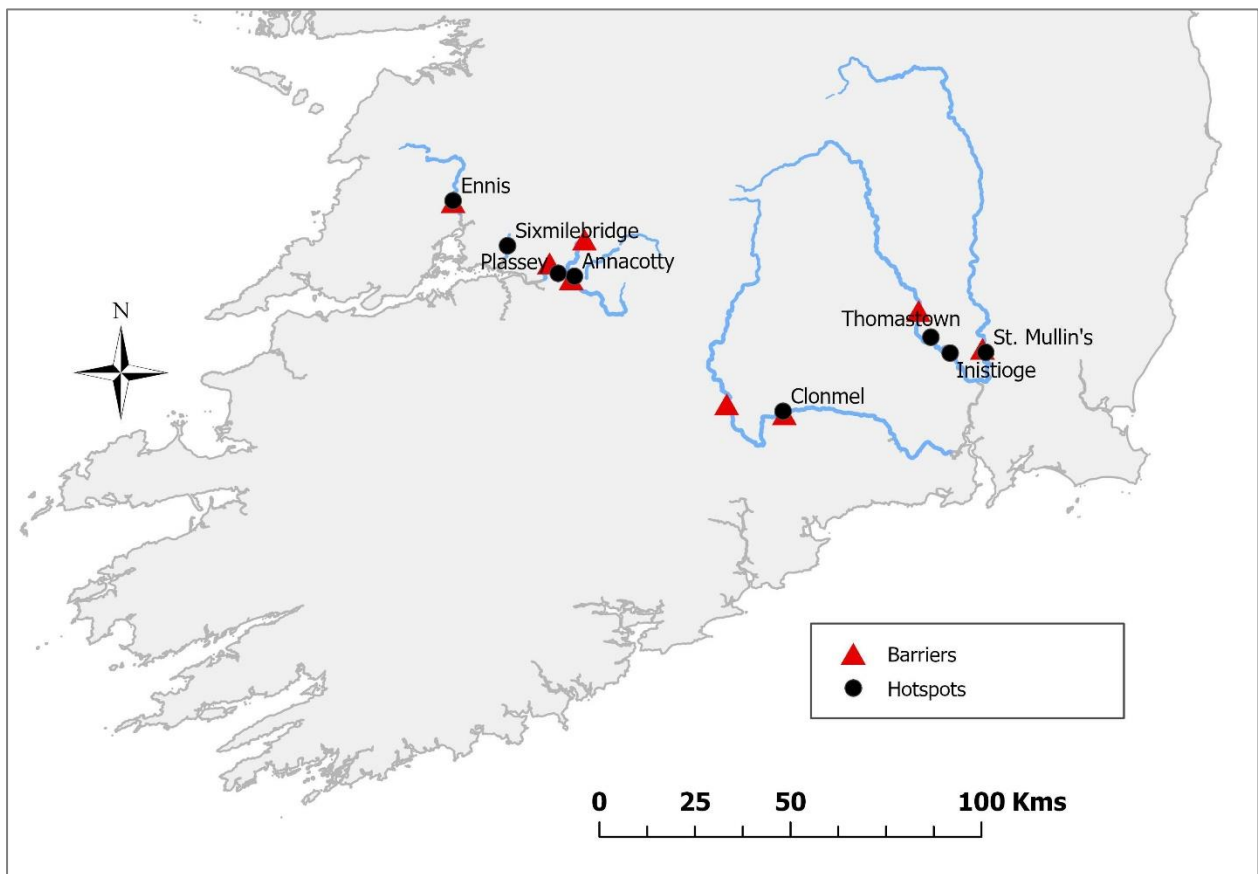


Figure 2.16. Location of principal sea lamprey spawning ‘hotspots’ surveyed annually.

The River Fergus in Ennis town is a well-established sea lamprey spawning location, specifically the 1km urban stretch from Mill Street Bridge and weir downstream through Wood Quay and Harvey’s Quay, through Bank Place and onwards past Club Bridge, along Newbridge Road to Steele’s Rock and the rear of Cusack Park. This urban riverine section was visited twice in late May (24th) and early June (12th), respectively, with up to 45 redds recorded. Adult sea lampreys were also recorded on both occasions throughout the section, many engaged in nest excavation and spawning behaviour (Table 2.4). River temperatures increased from 16.5°C to 21.2°C between visits.



Plate 2.7. Sea lamprey redd, River Fergus, Ennis town section.

The Mulkear River at Annacotty, Co. Limerick was visited on 4 occasions from mid-May (16th) to late-June (29th) 2023. The first visit on May 16th confirmed that spawning had commenced with four redds visible (Table 2.4). Spawning activity continued during May and June with numerous (> 70) and widespread nest excavation noted on all subsequent visits. Water levels and temperatures at Annacotty for the spawning period are displayed in Figure 2.17.

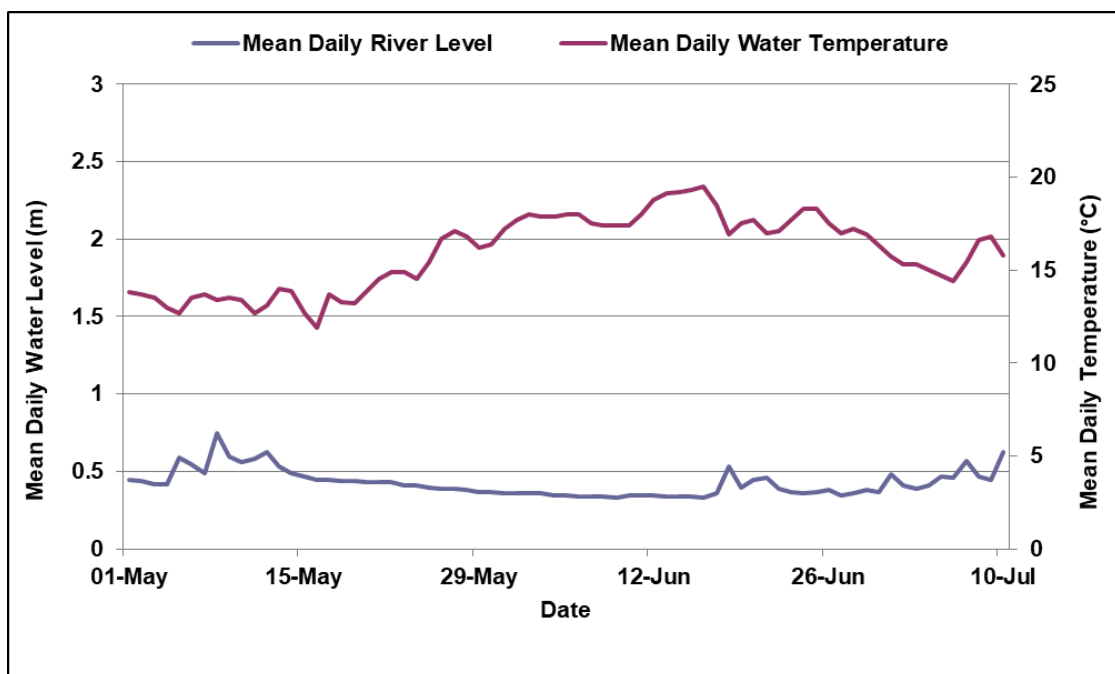


Figure 2.17. Mulkear River levels and water temperatures measured at Annacotty (OPW hydrometric gauging station #25001) during the 2023 sea lamprey migration and spawning period.



Plate 2.8. Sea lamprey redds constructed beneath the New Road Bridge, Annacotty, Mulkear River, Co. Limerick.

Several locations on upstream tributaries throughout the greater Mulkear catchment exist where spawning is recorded almost annually for some, and less frequently for others. These sites were revisited in 2023 to detect successful upstream migration and to appraise the potential of Annacotty Weir to act as an obstacle to passage. Adult fish (n=2) and nests (n=5) were noted at Scart immediately downstream of the confluence of the Mulkear and Killeenagarriff rivers on June 6th. Extensive redd construction (n=23) was detected during searches further upstream at Killeenagarriff Bridge on June 8th, the most recorded from this site to date. Redds were also seen on this date at Annagh Bridge (n=3) and Clonsingle Bridge (n=2). Both latter locations were noted sea lamprey spawning sites during the MulkearLife river restoration project (2009-2014), however, no further activity had been recorded until now.



Plate 2.9. A large sea lamprey redd on the Annagh River, Clonsingle, Co Limerick.

A previously noted spawning location on the Bilboa River at Cappamore had no redds in 2023, the 8th year in succession where none were recorded. The presence of nests at selected locations in the mid/upper catchment implies passage was possible to an extent at Annacotty Weir, however, a general absence from other noted locations suggests ongoing problems posed by this structure.



Plate 2.10. Unused sea lamprey spawning habitat on the Bilboa River, Cappamore, Co Limerick, pictured during typical seasonal flows for June.

Table 2.4. Sea lamprey activity (counts of adult fish and redds) recorded during repeat visits to recognised spawning hotspots during 2023.

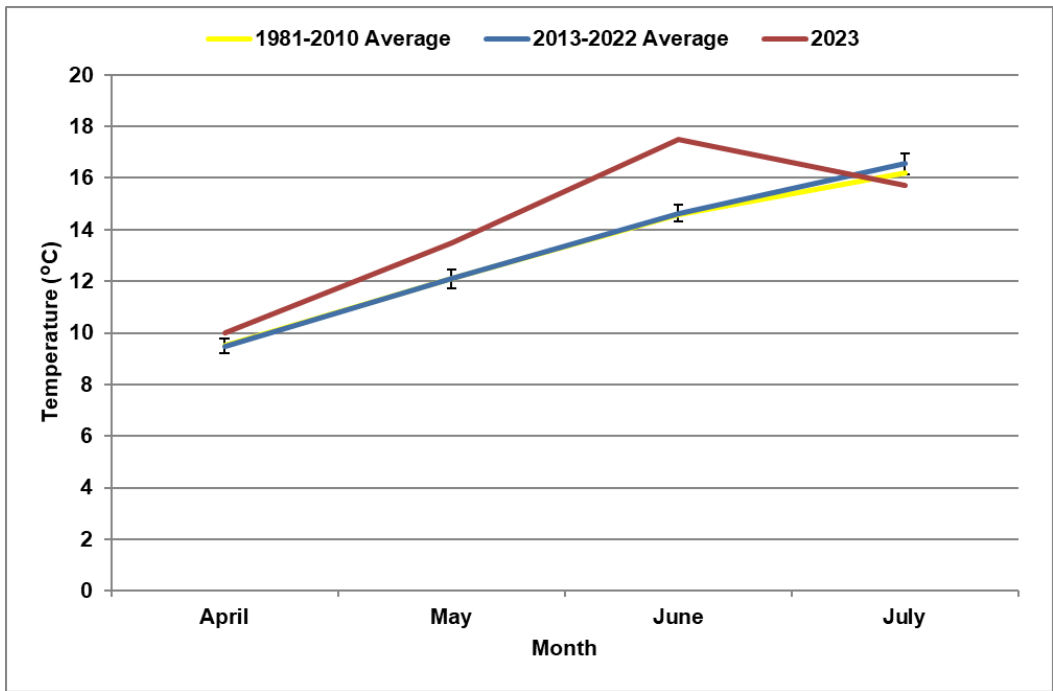
Date	Location	Sea Lamprey	Redds	Temp (°C)
24/05/2023	River Fergus, Ennis Town, Co. Clare	5	24	16.5
12/06/2023		14	45	21.2
16/05/2023	Mulkear River, Annacotty, Co. Limerick	0	4	12.1
31/05/2023		12	60	17.6
6/06/2023		18	60+	17.7
29/06/2023		0	70+	16.8
16/05/2023	River Shannon, UL Living Bridge, Plassey, Co. Limerick	0	0	16.2
31/05/2023		4	5	20.8
6/06/2023		4	12	22.6
12/06/2023	Owengarney River, Sixmilebridge Co. Clare	1	12	21.3
24/05/2023	River Suir, Clonmel, Co. Tipperary	0	12	15.5
1/06/2023		0	19	17.7
8/06/2023		5	22	16.6
15/06/2023		0	22	19.1
30/06/2023		3	23	16.6
2/06/2023	River Nore, Thomastown, Co. Kilkenny	0	3	19.2
29/06/2023		0	7	18.3
2/06/2023	River Nore, Inistioge, Co. Kilkenny	0	0	18.3
29/06/2023		0	0	18.4
18/05/2023	River Barrow, St. Mullins, Co. Carlow	0	0	15.9
31/05/2023		0	9	18.5
7/06/2023		10	21	19.5
14/06/2023		8	22	20.1
20/06/2023		4	23	20.7
29/06/2023		0	23	19.3



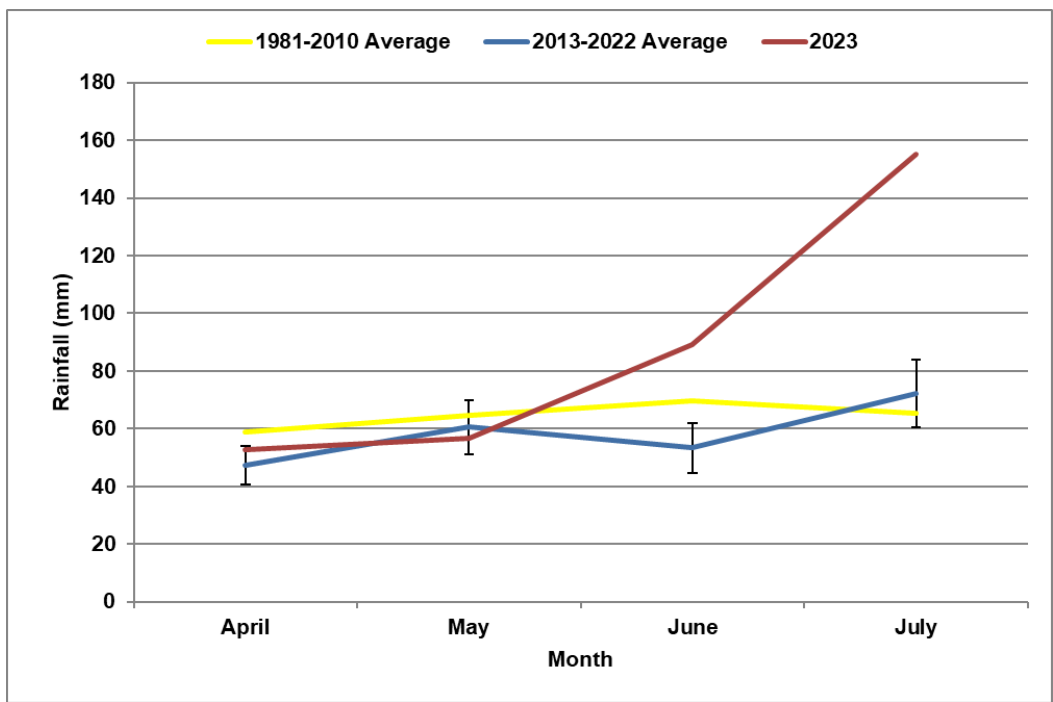
Plate 2.11. Sea lamprey spawning hotspot on the Owengarney River in Sixmilebridge village, Co. Clare.

As was the case in previous years of monitoring, redd building was recorded on the River Barrow below St. Mullins Weir, but to a lesser extent when compared to the 2022 season (maximum count = 20 vs. 98). Spawning was also noted on the Owengarney River in Sixmilebridge, and the River Shannon in the grounds of University of Limerick at Plassey (Table 2.4). Spawning activity was recorded on the River Nore at Thomastown (n=7 redds) after an absence of one season, however no activity was detected at Inistioge where spawning was absent for a second consecutive year (Table 2.4).

Prevailing weather conditions for the entire period both before and during the sea lamprey spawning run were obtained from the Met Eireann synoptic weather station at Shannon Airport, Co. Clare, the data from which should be broadly representative of the Lower Shannon area where most hotspots are located. Air temperatures in June were slightly warmer than average (Figure 2.18a), accompanied by heavy rainfall events in June and July which resulted in elevated river levels and coloration which often precluded spawning surveys and prevented a planned floatover survey on the Munster Blackwater (Figure 2.18b).



(a)



(b)

Figure 2.18. Monthly mean air temperatures (a) and total rainfall (b) from April 2023 to July 2023 recorded at Shannon Airport (Met Eireann) in comparison with both the 30-year (1981-2010) long-term average (LTA) and the preceding 10-year (2013-2022) average.



Plate 2.12. Sea lamprey spawning hotpot on the River Shannon at Plassey, Limerick.

3. Shad Monitoring Programme

3.1 Juvenile Shad Survey

3.1.1 Shad Egg Surveys

Four Special Areas of Conservation (SACs) are designated for twaite shad (*Alosa fallax*) in Ireland. These are located along the south and south-east coasts and include the estuaries of the Slaney, Barrow-Nore, Suir and Munster Blackwater. Shad egg surveys are an effective technique for determining the timing and spatial extent of spawning activity (JNCC, 2015) and have been carried out since 2017, as part of the monitoring programme for this species. All four SACs have been surveyed and, to date, shad (*Alosa* sp.) eggs have been recorded from the Barrow (St. Mullins), Nore (Inistioge), Suir (Carrick-on-Suir) and Munster Blackwater (Lismore) but not from the Slaney.

St. Mullins, located at the upper tidal limit of the Barrow, is well known for its annual run of twaite shad. Spawning occurs below a weir which acts as a substantial, if not complete, barrier to upstream migration. St. Mullins has been the focus of intensive surveying for shad eggs during April to July in 2021 and 2022 over an 11-week and 15-week period, respectively. The River Suir also has an adult shad run and a spawning site was identified in 2022 at the top of the tidal influence (upstream of Carrick-on-Suir). This site was sampled over a 10-week period from April to July. Egg count surveys continued at the Barrow and Suir spawning locations in 2023, with surveying commencing slightly later than previous years (mid to late April) due to high rainfall in March leading to higher flow conditions.



Plate 3.1. Spawning location for twaite shad at the upper tidal limits of the River Barrow. St. Mullins weir can be seen in the background.

Increasing water temperature is an important environmental cue for spawning behaviour and the literature states that eggs develop successfully in the range of 15°C to 25°C. Spawning in Irish rivers

has been recorded in the zone of tidal influence over substrates characterised by coarse sand, gravels, cobbles and boulders. The eggs are clear, non-adhesive, semi-buoyant and range in diameter from 1.5 – 5 mm (usually 2.4 mm). Eggs and sperm are broadcast into the water column with the majority of eggs sinking to the riverbed and remaining in crevices until they hatch 3 – 5 days later.

Samples were collected by kick-sampling for 15 seconds upstream of a hand-held macroinvertebrate net (250 µm mesh) and during low tide conditions. At each site, samples were taken working upstream to avoid re-recording eggs dislodged from an earlier kick sample. Gravels and plant material from each net were sorted by hand and the presence/absence of eggs was recorded. Water levels were variable throughout the spawning period. As stated, sampling commenced later in 2023 compared with the previous year due to higher river flows in March and early April. Rainfall was above average nearly everywhere in March and was wettest in the south and east of the country. By contrast, in April, May and June, total monthly rainfall at Oak Park weather station was below the Long-Term Average (LTA) for each of these months. Monthly average river flows for the Barrow were above the long-term monthly average flows for March – May, while monthly average flows for the Suir were above the long-term monthly average for March and April (Monthly reports available at <https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/hydrology-bulletin/>).



Plate 3.2. Kick-sampling for twaite shad eggs on the River Suir upstream of Carrick-on-Suir.

Weekly sampling occurred downstream of the weir at St. Mullins on the River Barrow over an 11-week period from 11th April to 20th June 2023. Riverbed material consisted of a mixture of cobbles, gravels and coarse sand. Eggs were first recorded in the third week of April (n=5) and almost

continuously for a 7-week period up to the last week of May (Table 3.1 & Figure 3.1). The total number of eggs recorded during the survey period was n=673, with the highest count (n=521) occurring on 3rd May. Water temperatures during the survey period ranged from 9.5°C to 20.7°C. The temperature was 13.4°C on the day when eggs were first encountered and 14.8°C when the highest egg count was recorded. Mean daily water levels (Table 3.1 & Figure 3.2) at the OPW hydrometric station at Graiguenamanagh ranged from 0.43 m (7th and 14th June) to 0.66 m (9th May).

Table 3.1. Shad egg data for St. Mullins in 2023 with water temperature (observed on day of sampling) and water level (OPW Hydrometric Station at Graiguenamanagh)

Date	No. Eggs	Moon Phase	Water Temp (°C)	Water Level (m)
11/04/2023	0	Waning gibbous	9.5	0.628
19/04/2023	5	Waning crescent	13.4	0.608
27/04/2023	0	First quarter	10.8	0.568
03/05/2023	521	Waxing gibbous	14.8	0.528
09/05/2023	49	Waning gibbous	15.6	0.658
18/05/2023	69	Waning crescent	15.8	0.518
23/05/2023	4	New moon	16.6	0.498
31/05/2023	25	Waxing crescent	18.5	0.448
07/06/2023	0	Waning gibbous	19.7	0.428
14/06/2023	0	Waning crescent	20.1	0.428
20/06/2023	0	New moon	20.7	0.448



Plate 3.3. Checking contents of a kick-net survey sample for twaite shad eggs.

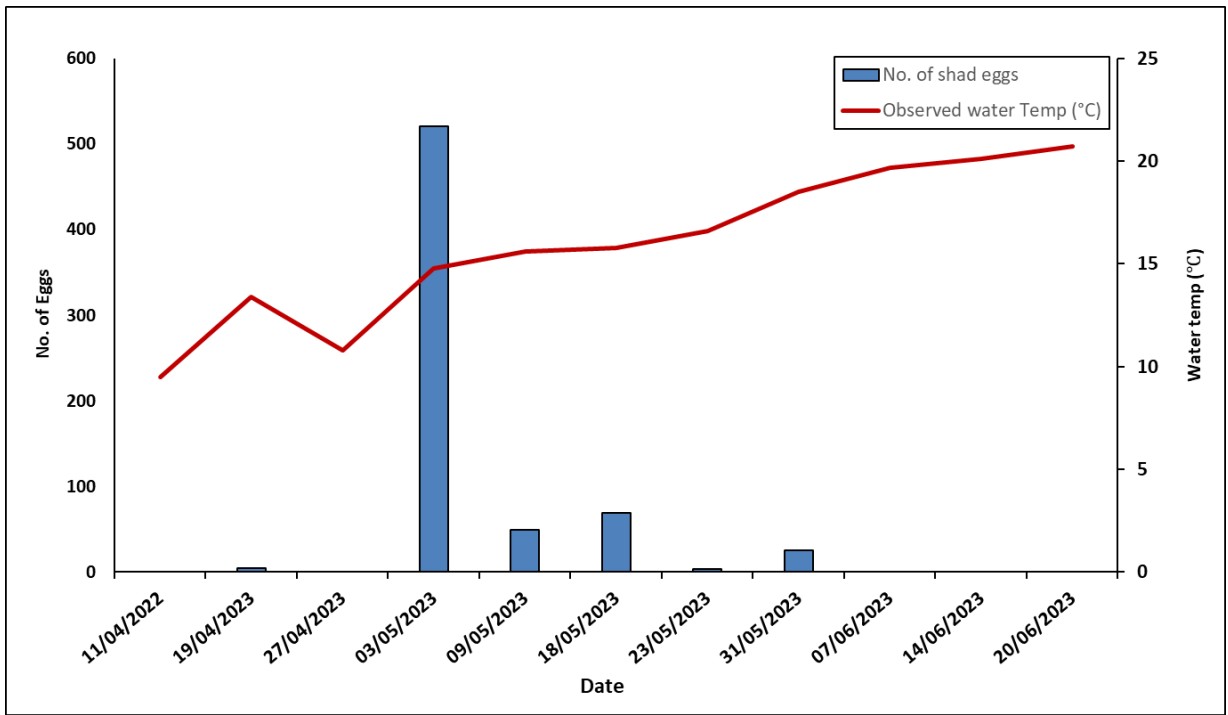


Figure 3.1. No. of shad eggs recorded at St. Mullins (River Barrow) in 2023 with accompanying water temperature data (observed on day of sampling).

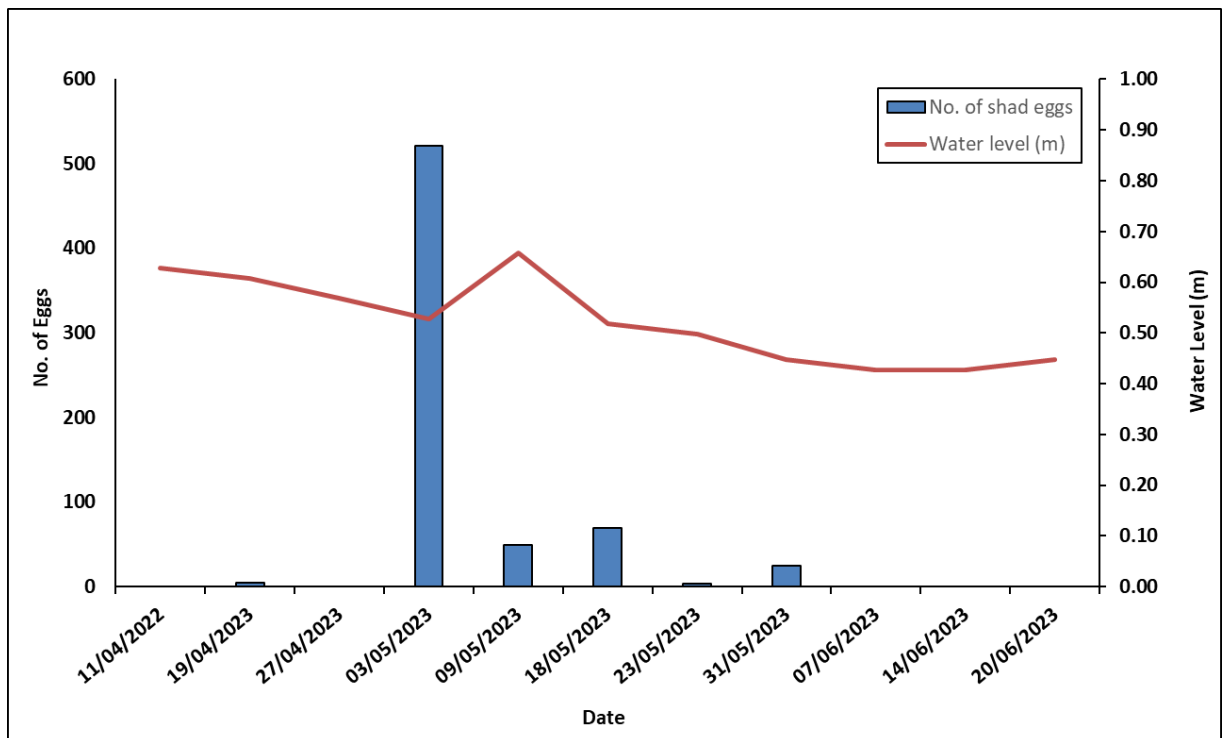


Figure 3.2. No. of shad eggs recorded at St. Mullins (River Barrow) in 2023 with accompanying water level data recorded from the OPW station at Graiguenamanagh

Weekly sampling was carried out at the River Suir site over a 10-week period from 20th April to 21st June 2023. Eggs were first recorded in the first week of May (water temperature 13°C) and consecutively for 5 weeks up to the 1st June. The highest count (n=95) occurred on 24th May when the water temperature was 17.5°C (Figure 3.3). Mean daily water levels (Table 3.2 & Figure 3.4) at the OPW hydrometric station at Clonmel ranged from 0.28 m (15th June) to 0.66 m (20th April).

The shad egg surveys on the Barrow and Suir during 2022 and 2023 are shedding light on the spawning behaviour of twaite shad in Irish SACs. Results have revealed that spawning commences earlier than expected and at lower water temperatures than stated in the literature. In addition, spawning appears to be continuous throughout the season rather than restricted to one or two events as previously assumed.

Table 3.2. Shad egg data for River Suir sites in 2023 with water temperature (observed on day of sampling and water level (OPW Hydrometric Station at Clonmel).

Date	No. Eggs	Moon Phase	Water Temp (°C)	Water Level (m)
20/04/2023	0	New moon	13.2	0.66
26/04/2023	0	Waxing crescent	11.5	0.56
04/05/2023	4	Waxing gibbous	13	0.47
11/05/2023	30	Waning gibbous	14.1	0.58
19/05/2023	17	New moon	15.2	0.43
24/05/2023	95	Waxing crescent	17.5	0.40
01/06/2023	4	Waxing gibbous	18.3	0.33
08/06/2023	0	Waning gibbous	18.9	0.29
15/06/2023	0	Waning crescent	19.8	0.28
21/06/2023	0	Waxing crescent	18.5	0.42

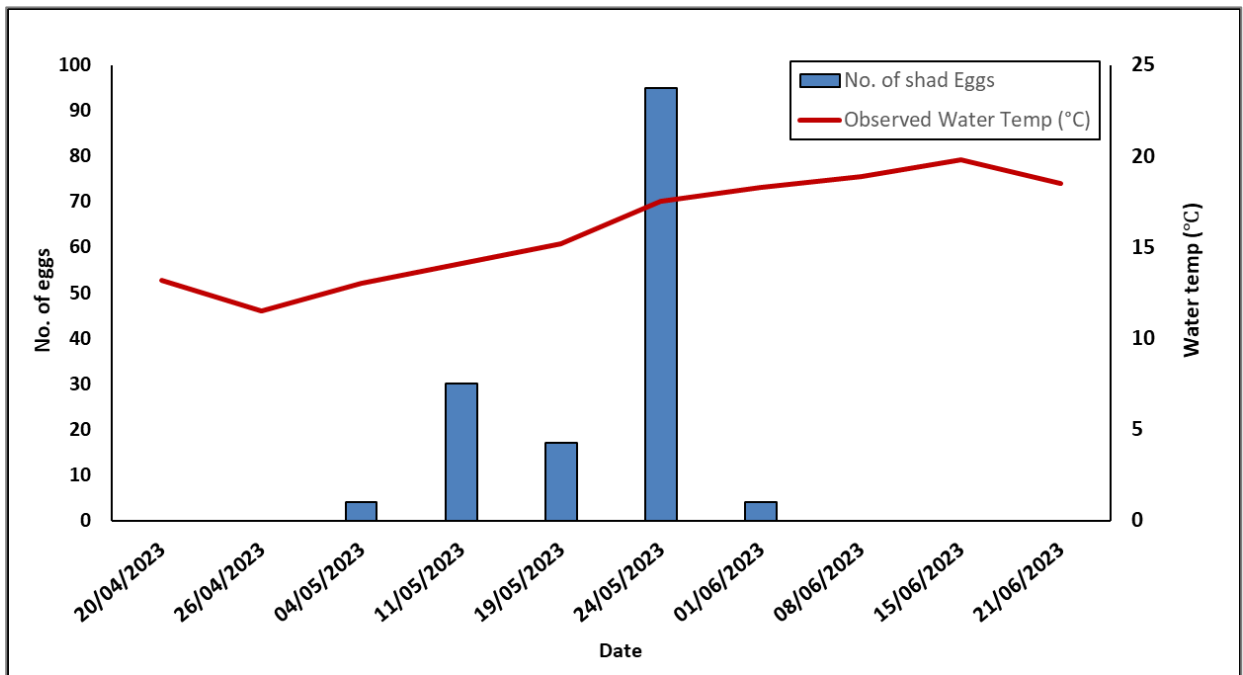


Figure 3.3. No. of shad eggs recorded at River Suir Site in 2023 with accompanying water temperature data (observed on day of sampling).

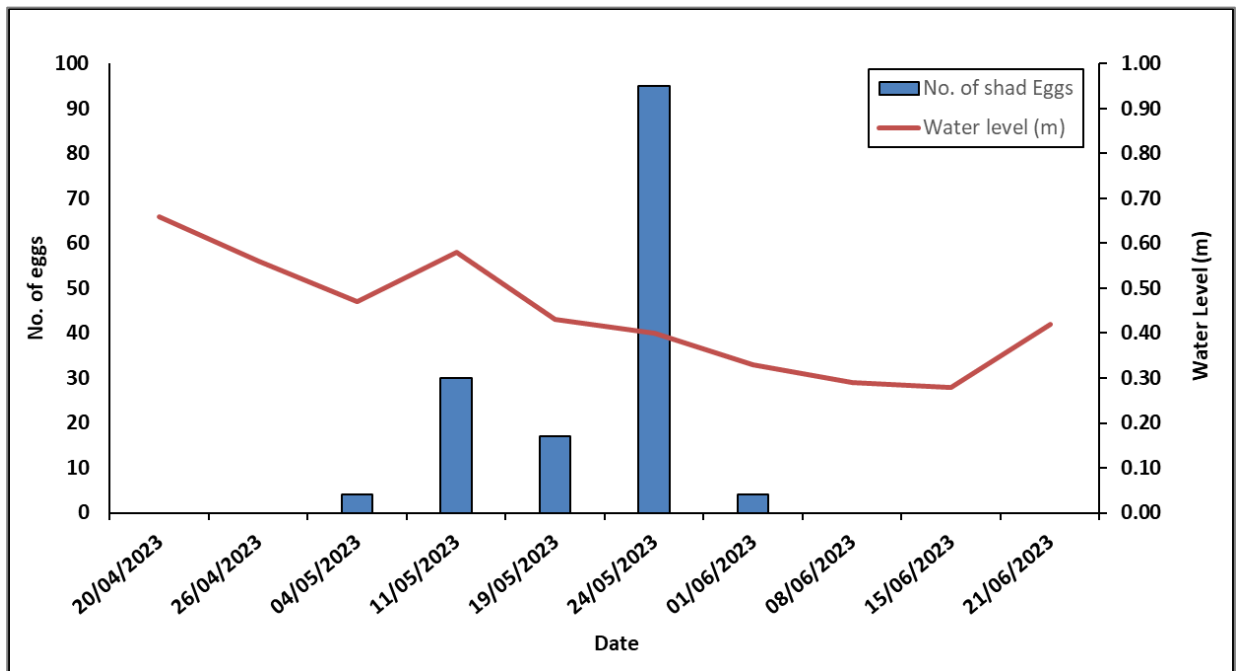


Figure 3.4. No. of shad eggs recorded at River Suir Site in 2023 with accompanying water level data recorded from the OPW station at Clonmel.

3.1.2 Beach seine netting surveys August 2023

As part of IFI's National Bass Conservation Programme, seine netting surveys for juvenile bass (*Dicentrarchus labrax*) were carried out at 3 locations on the Munster Blackwater, Barrow and Slaney estuaries (Figure 3.7 & Table 3.3), all of which are designated SACs for twaite shad. As young-of-the-year shad are often captured as bycatch in these surveys, they give an indication of successful spawning events for this species in a given year.

Table 3.3. Seine netting locations as part of the Bass Conservation Programme in August 2023.

Estuary	Date	Location	No. Hauls	Mean Salinity (ppt)	Mean Water Temp (°C)	No. Shad
Barrow	22/08/2023	Fisherstown	10	7.7	19.2	11
Slaney	23/08/2023	Mary's Point	10	11.7	18.6	0
Munster Blackwater	24/08/2023	Lickey Point	9	11.7	17.6	31

The surveys were conducted between the 22nd and 24th of August 2023. A Collins seine net was used to carry out the survey. This net measured 30.8 m x 2 m with a 14 mm mesh size and a 5 m central panel with a 6.5 mm mesh. This net was deployed by boat in an arc shape and slowly drawn to shore with 30 m warps on each side of the net.



Plate 3.4. Seine-netting survey location on the Barrow estuary at Fisherstown.

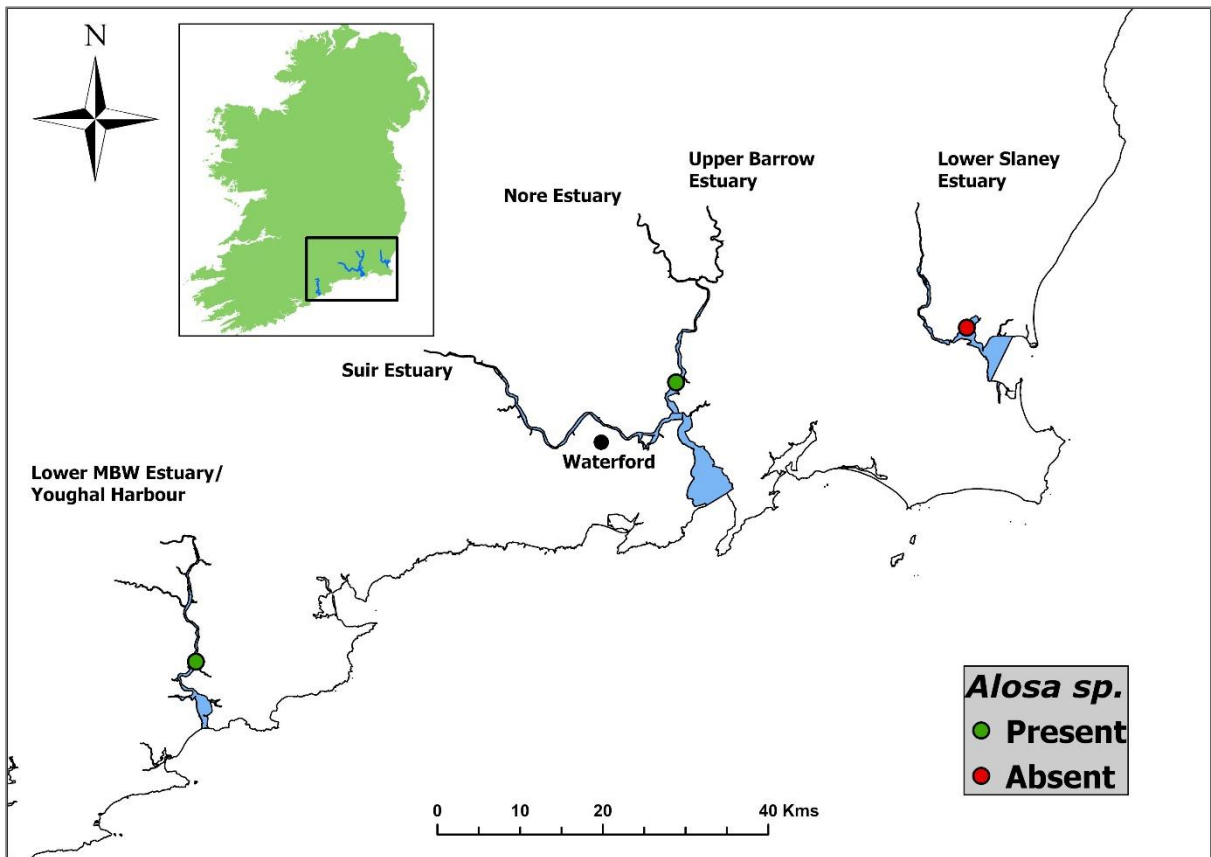


Figure 3.7. Locations of beach seining surveys of estuaries in 2023 as part of IFI’s National Bass Conservation Programme, with presence/absence of juvenile *Alosa* sp.

Seine netting survey of the Lower Munster Blackwater Estuary/Youghal Harbour

Beach seine netting on the Lower Munster Blackwater estuary/Youghal Harbour occurred at Lickey Point on the 24th of August 2023 (Figure 3.7). Nine seine net hauls were taken from the muddy littoral of Lickey Point. The survey was undertaken in neap tide conditions with a mean salinity of 11.7 ppt across the 9 hauls and with a mean water temperature of 17.6°C. Thirty-one shad were captured at Lickey Point with lengths ranging from 59 - 80 mm (total length) (Figure 3.8). These all appear to be young-of-the-year shad, this was the only size class captured. Seven species of fish were recorded at this site in 2023. In previous years, *Alosa* sp. were also recorded at this site: 2022 (n=5), 2021 (n=17), 2020 (n=4), 2019 (n=15) and 2018 (n=3) (Figure 3.9).

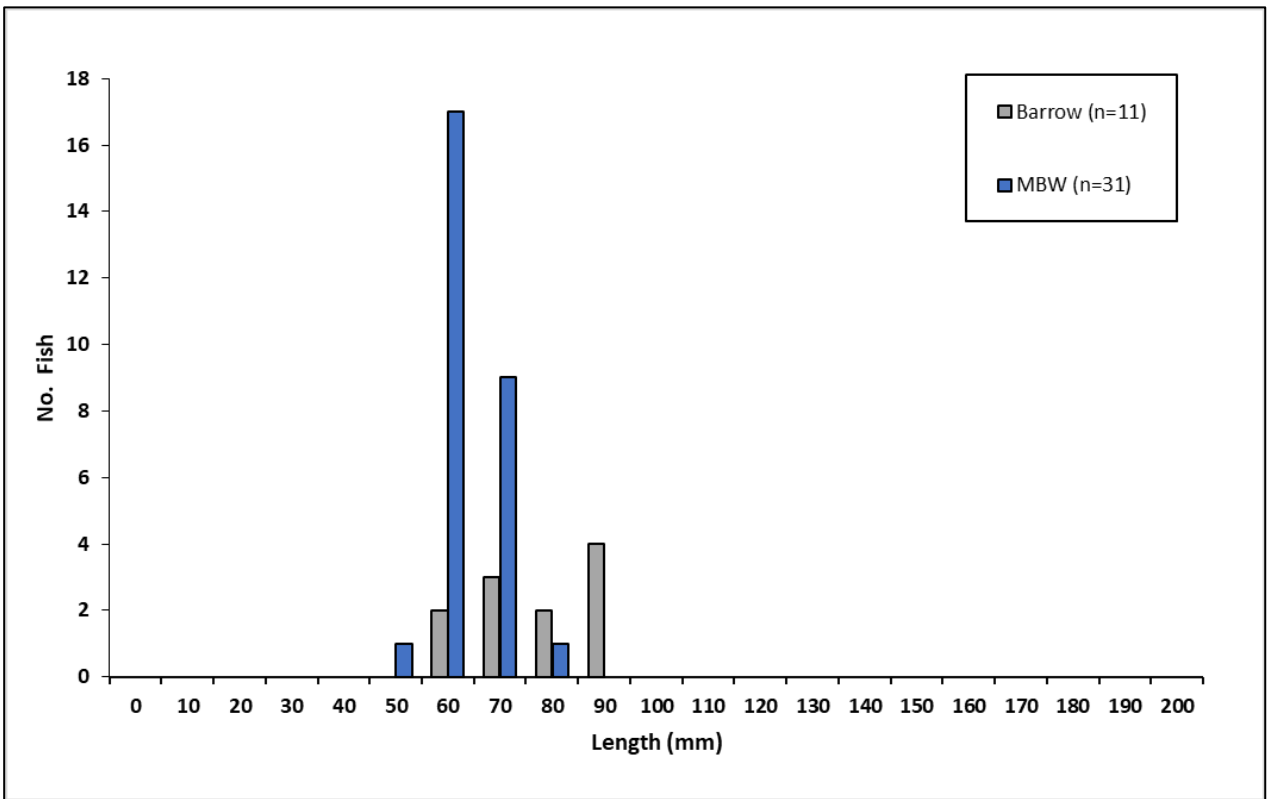


Figure 3.8. Length frequency of juvenile *Alosa* sp. from the River Barrow and Munster Blackwater in the IFI Bass survey programme, August 2023.

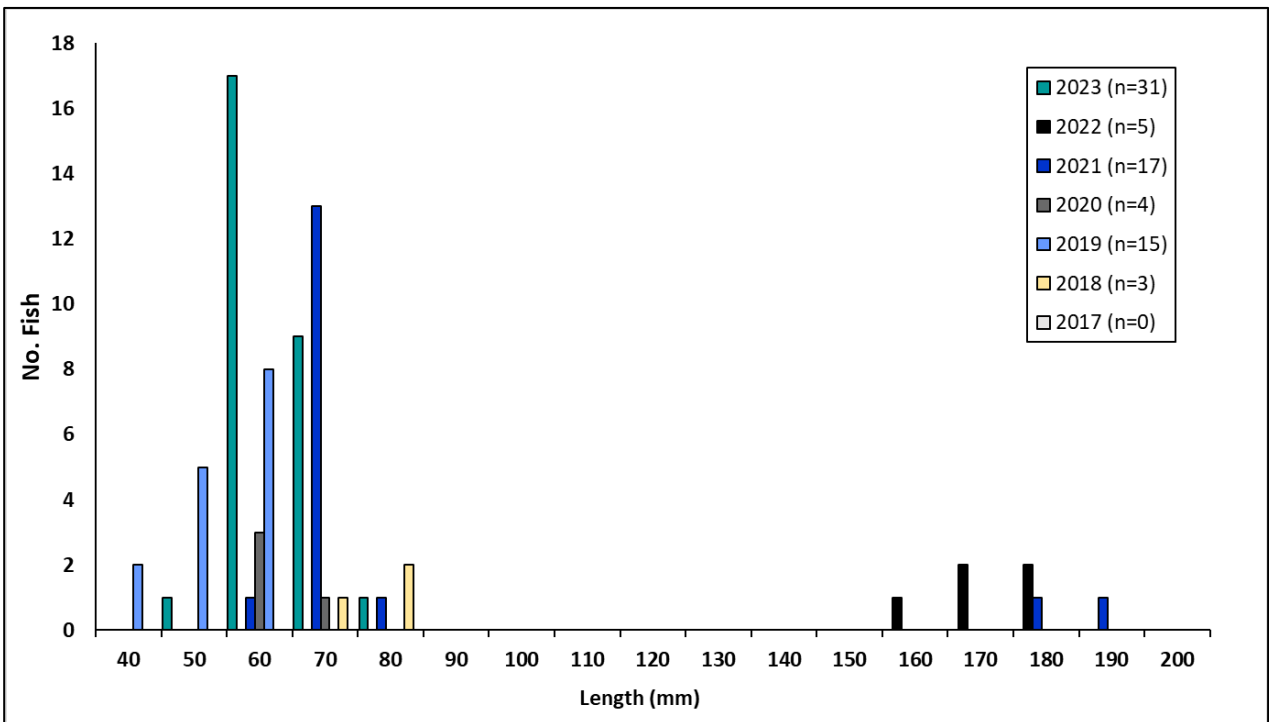


Figure 3.9. Length frequency of juvenile *Alosa* sp. from the Munster Blackwater 2017- 2023.

Seine netting survey of the Barrow/Nore estuary (New Ross Port Waterbody)

Beach seine netting on the Barrow/Nore estuary was carried out at 1 location (Fisherstown) on the 22nd of August 2023. This site is sampled annually by the Bass programme. A total of 9 hauls were undertaken at this location with 7 species of fish recorded. Mean salinity was 7.7 ppt and the mean

water temperature was 19.2°C. Eleven shad in total were captured ranging from 69 mm to 98 mm respectively in total length (Figure 3.10). These shad may have originated from spawning grounds located at the upper tidal limits of the River Barrow at St. Mullins and/or the River Nore at Inistioge. In previous years, *Alosa* sp. were also recorded at this site: 2022 (n=23), 2021 (n=196), 2020 (n=4), 2019 (n=14), 2018 (n=32), 2016 (n=69) and in 2014 (n=7) (Figure 3.10).

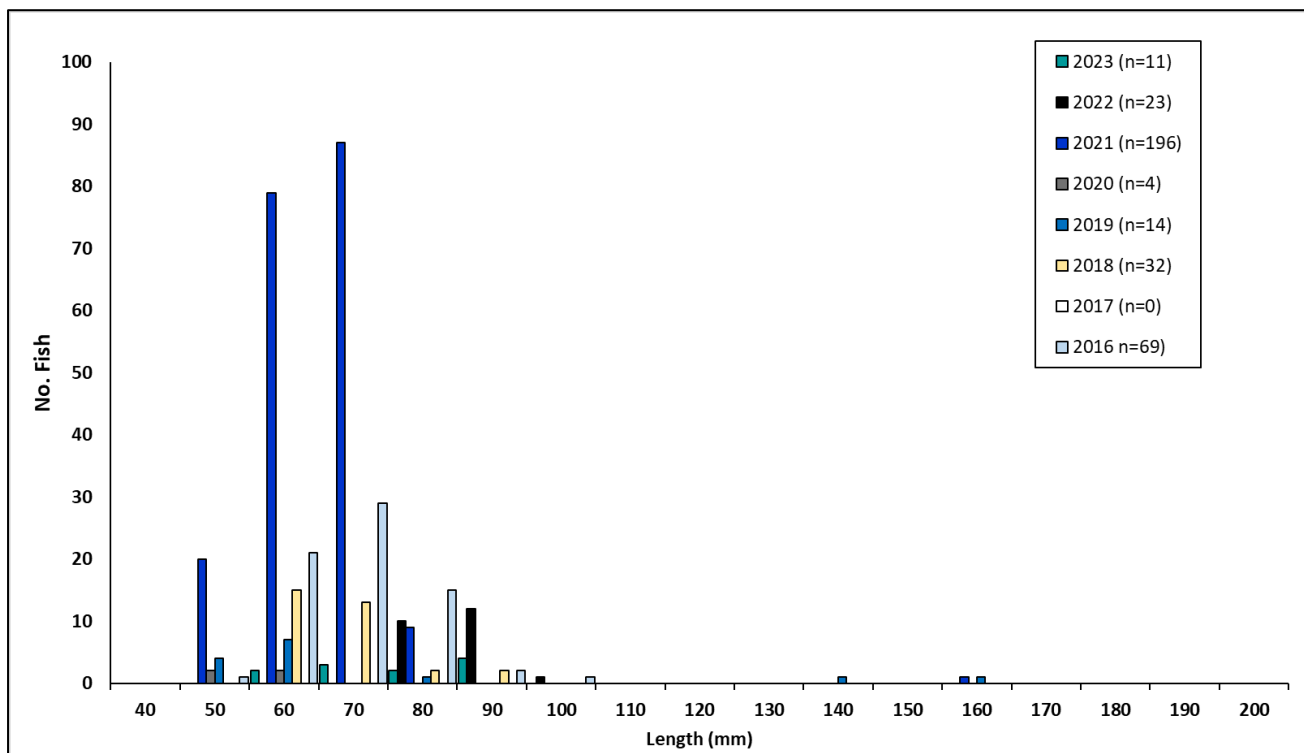


Figure 3.10. Length frequency of juvenile *Alosa* sp. from the River Barrow 2016- 2023.

Seine netting survey of the Lower Slaney Estuary

One location was sampled in the Lower Slaney Estuary in 2023 (Mary’s Point). This location was surveyed on the 23rd of August. Ten seine net hauls were undertaken at this site in 2023. Mean salinity at Mary’s Point was recorded at 11.7 ppt with a mean water temperature of 18.6°C. In total, 11 species of fish were captured. As in previous years however, *Alosa* sp. were captured in the Lower Slaney Estuary in 2023.

3.1.3 Trawling Surveys

The fish communities in 3 Irish estuaries were surveyed via trawled transects in August & September 2023. These surveys are conducted annually primarily to provide data for IFI’s National Bass Programme. Species of interest to the Habitats Directive Monitoring Programme, namely *Alosa* sp, smelt and lampreys, are also occasionally encountered. Repeat surveys for 2023 were undertaken on the Munster Blackwater Estuary, the Barrow-Suir Estuary and the Slaney Estuary from the 28th August - 5th September. Towed transect trawling was undertaken by a commercial trawler and crew with IFI staff also on board to process catches and record data.

Munster Blackwater Trawling Survey

Trawling surveys on the Munster Blackwater took place over two days (August 28th & 29th 2023). A total of 20 trawls were undertaken (Figure 3.11) across both days (average of 11 minutes per trawl, range 5-18 mins). Trawling on 28th August was undertaken on a predominantly flooding tide while trawling on August 29th occurred on an ebbing tide. The trawl locations stretched from the outer mouth of the estuary at Youghal Harbour to Ballinaclash in the mid-tidal section of the river (Figure 3.11). Mean water temperature recorded across the 20 trawls was 16.5°C (range 15.7–17.1°C). Depth of the water column recorded across each trawl varied from 2.3 m to 9.4 m. Mean salinity was recorded as 21.3 ppt (range 6 - 33.3 ppt). One shad was captured during the Munster Blackwater trawl in 2023. This shad was captured at trawl 10 with a length of 380 mm (total length).

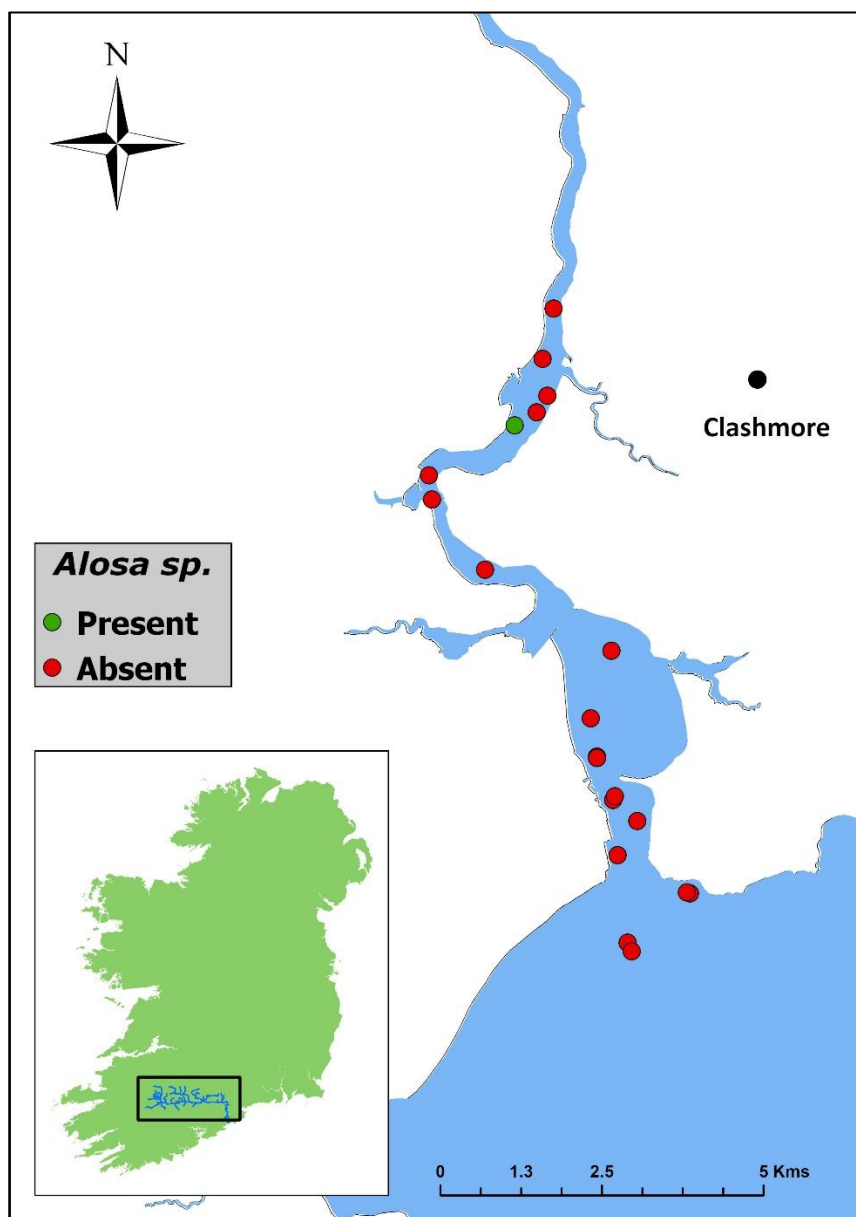


Figure 3.11. Incidence of capture of shad (n=1) during the trawling survey transects (n=20) on the Lower Munster Blackwater Estuary in August 2023.

Barrow-Suir Estuary Trawling Survey

Trawling surveys on the Barrow-Suir Estuary/ Waterford Estuary took place over two days (September 4th & 5th 2023). A total of 18 trawls were undertaken in the lower Barrow and Suir Estuary at locations including Great Island, Passage East and Duncannon (Figure 3.12). Mean water temperature recorded across the 18 trawls was 18.6°C (range 14.9–22.8°C). Depth of the water column recorded across each trawl varied from 1.1 m to 13.5 m with an average of 12 minutes per trawl (range 5-22 mins). Mean salinity was recorded as 24.3 ppt (range 11.3 - 33.1 ppt). Trawling occurred across a mix of flooding and ebbing tides over the two survey days. A total of twenty-two shad with total lengths ranging from 82 mm – 204 mm were captured over both survey days.

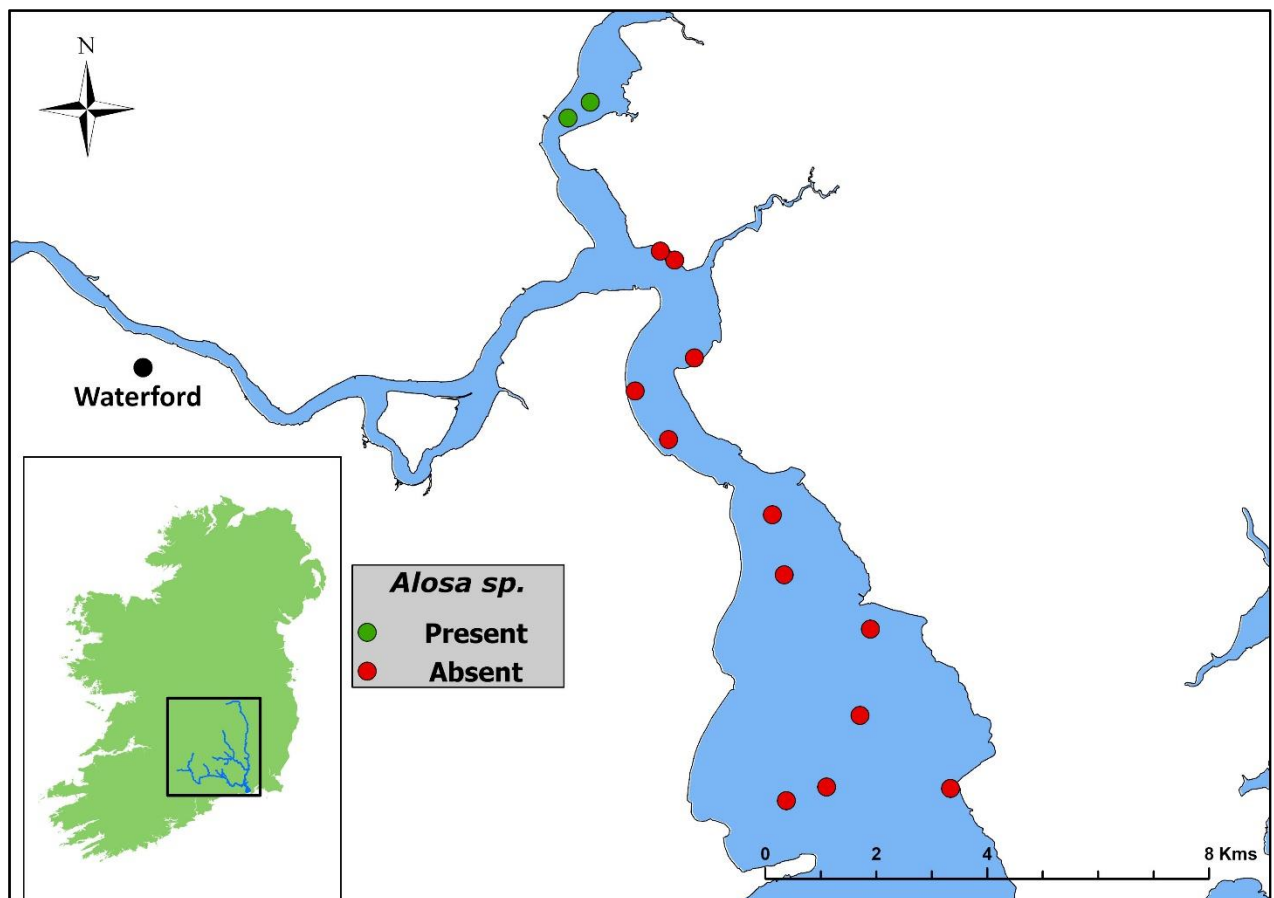


Figure 3.12. Incidence of capture of shad (n=22) during the trawling survey transects (n=18) on the Barrow-Suir/ Waterford Estuary in September 2023.

Lower Slaney Estuary Trawling Survey

Trawling surveys on the Lower Slaney Estuary were undertaken on the 30th and 31st of August 2023. A total of 17 trawls took place over both days (Figure 3.13) with an average of 11 minutes per trawl (range 6-20 mins). Water temperatures ranged from 16.5 - 18.1°C across all 17 trawls with an average of 17.3°C. Depth of the water column across sampling sites varied from 1.1 – 9 m (average 3 m) while trawling occurred across flooding and ebbing tides. No shad were caught over the 2023 Slaney trawling survey (Figure 3.13).

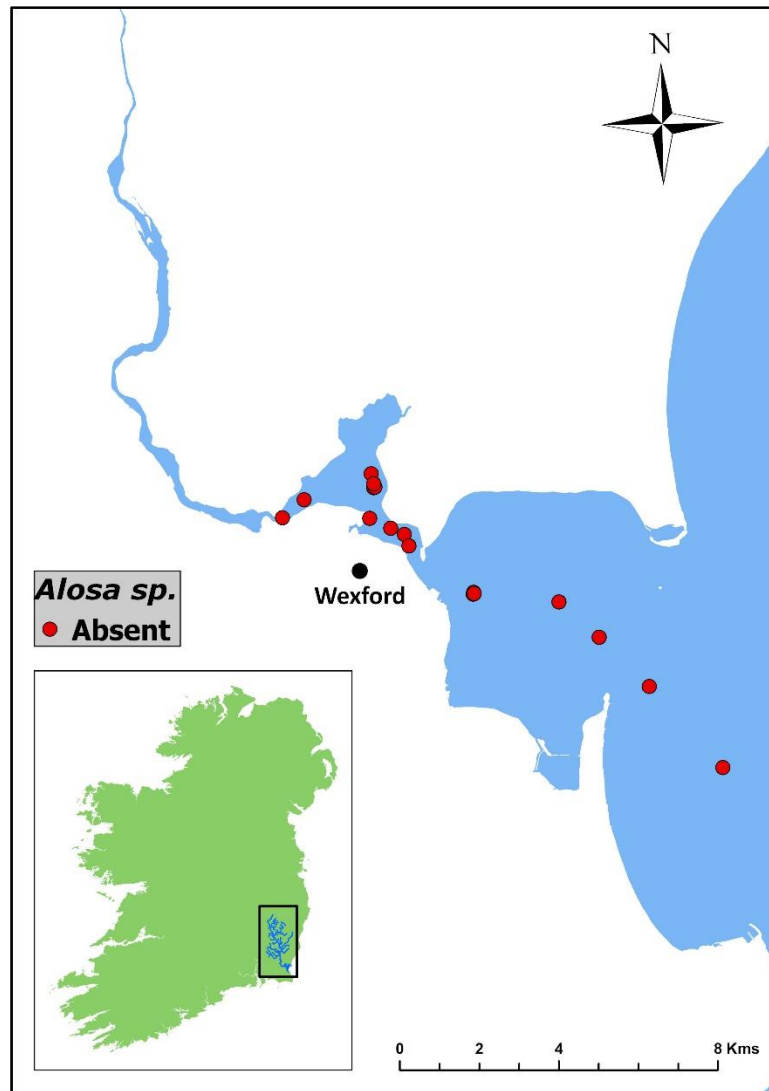


Figure 3.13. Incidence of capture of shad (n=0) during the trawling survey transects (n=17) on the Slaney Estuary in August 2023.



Plate 3.5. The 'Boy River' charter trawler moored in Youghal Harbour during surveying.

4. Smelt Monitoring Programme

4.1 Juvenile Smelt Programme

Seine netting surveys August 2023

Beach seining surveys of the Barrow, Slaney and Munster Blackwater estuaries were carried out by the Bass Conservation Programme in August 2023 (Figure 4.1). European bass (*Dicentrarchus labrax*) were the target species however juvenile smelt (*Osmerus eperlanus*) were also recorded from the Barrow estuary. A Collins seine net was used to carry out the survey. This net measured 30.8 m x 2 m with a 14 mm mesh size and a 5 m central panel with a 6.5 mm mesh. This net was deployed by boat in an arc shape and slowly drawn to shore. All species of fish that were captured were counted and measured on site.

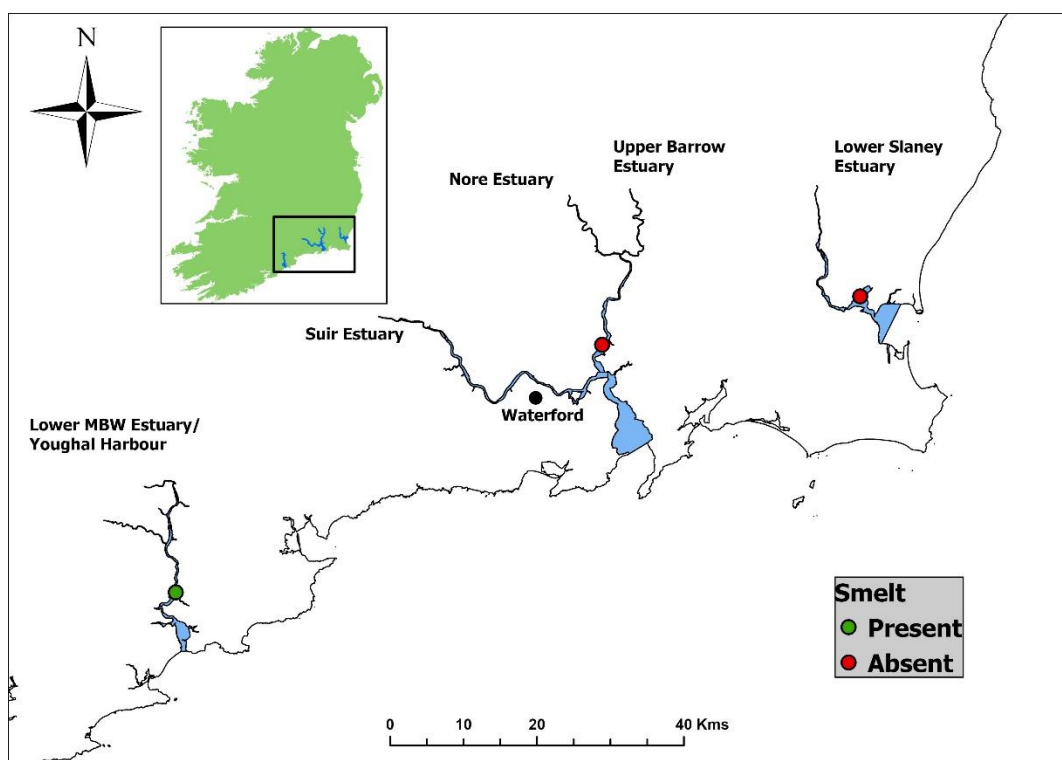


Figure 4.1. Locations of beach seine netting surveys in 2023 as part of IFI's National Bass Conservation Programme, with presence/absence of juvenile smelt.

Ten seine net samples were taken at Fisherstown in the Barrow/Nore Estuary on the 22nd August 2023 (Figure 4.1). Mean salinity was 7.7 ppt with a mean water temperature at 19.2°C across the ten net hauls. This site is surveyed annually by the Bass Programme. No smelt were captured in 2023. This is the first time that no smelt were captured in the Barrow/Nore Estuary since 2016 (Figure 4.2).

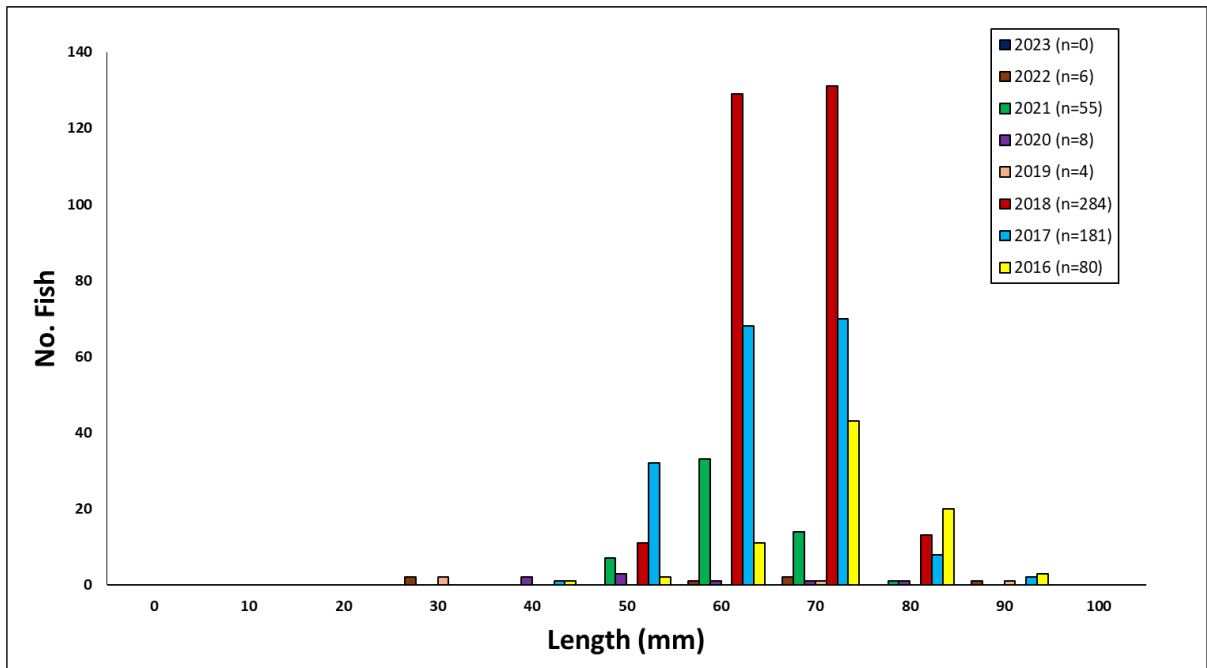


Figure 4.2. Length frequency of juvenile smelt from the Barrow estuary from 2016-2023.

One location (Lickey Point) was surveyed in the Munster Blackwater Estuary on 24th of August 2023. Nine seine net samples were taken at Lickey Point with two juvenile smelt recorded (80 & 81 mm respectively) (Figure 4.3). Mean salinity was 11.7 ppt on the day with a mean water temperature of 17.6°C.

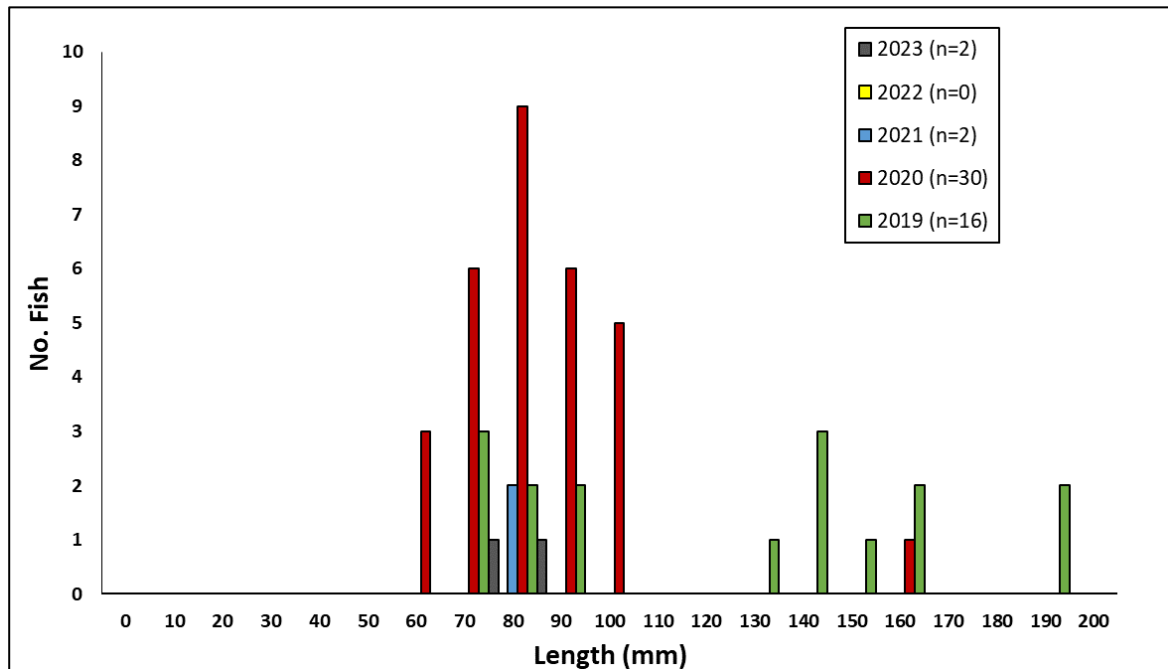


Figure 4.3. Length frequency of measured juvenile smelt from the Munster Blackwater estuary 2019- 2023.

Seine netting survey of the Lower Slaney Estuary

One location was sampled in the Lower Slaney Estuary in 2023 (Mary's Point). This location was surveyed on the 23rd of August. Ten seine net hauls were undertaken at this site in 2023. Mean salinity at Mary's Point was recorded at 11.7 ppt with a mean water temperature of 18.6°C. In total, 10 species of fish were captured. As in previous years however no smelt were captured in the Lower Slaney Estuary in 2023.

Trawling surveys

Smelt were captured during some of the trawling surveys documented previously (Chapter 3). Nine smelt, ranging in total length from 111 – 185 mm (average 159 mm) were captured on the Barrow-Suir Estuary. These were captured in 3 out of the 18 transects that were carried out in the estuary (Figure 4.4). Three smelt were captured at trawl 1, five were captured at trawl 8 and one was captured at trawl 18. No smelt were captured during the trawling surveys on the Munster Blackwater (Figure 4.5) or the Slaney estuary (Figure 4.6) during the 2023 surveys.

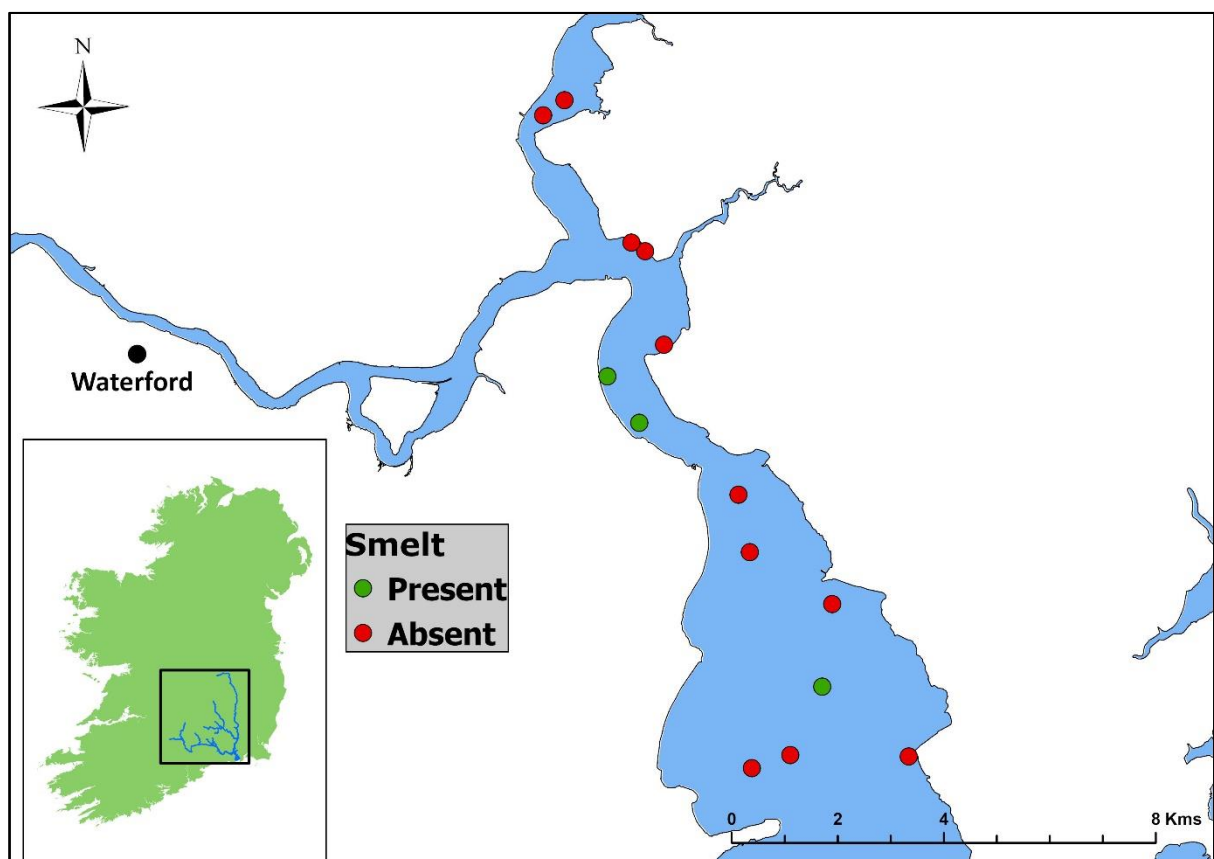


Figure 4.4. Incidence of capture of smelt (n=9) during the trawling survey transects (n=18) on the Barrow-Suir/ Waterford Estuary in September 2023.

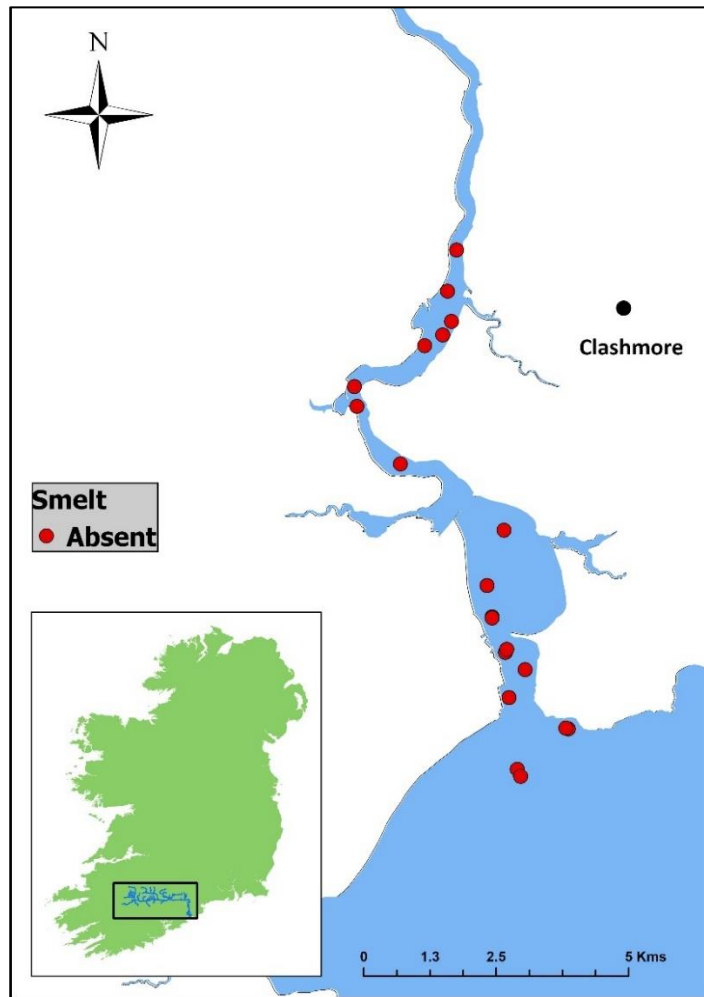


Figure 4.5. Incidence of capture of smelt ($n=0$) during the trawling survey transects ($n=20$) on the lower Munster Blackwater Estuary in August 2023.



Plate 4.1. Processing trawl contents from a transect on Waterford Harbour.

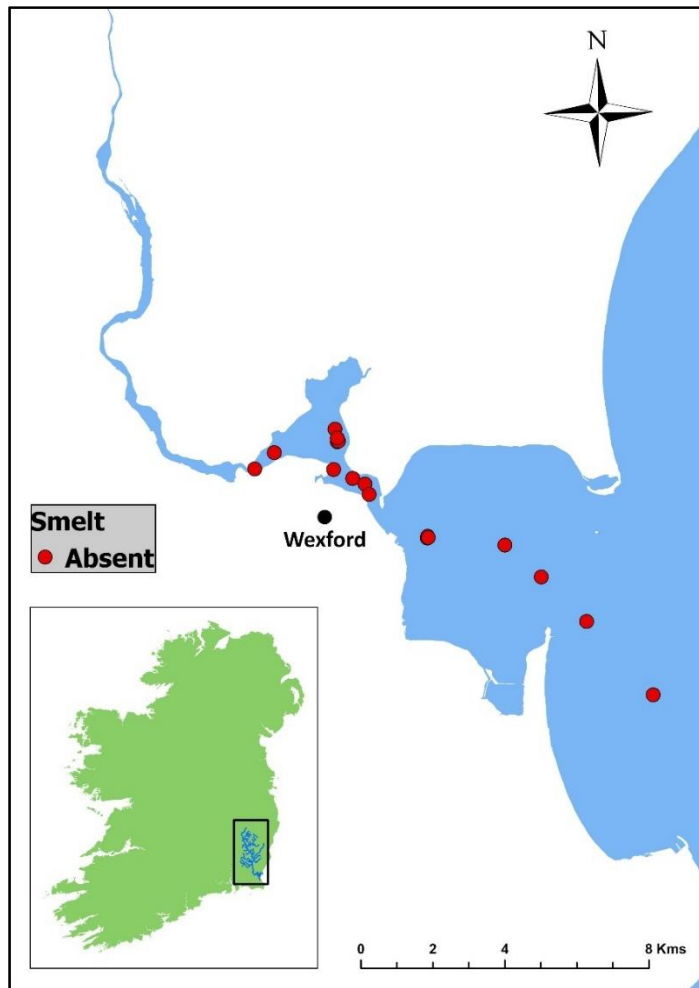


Figure 4.6. Incidence of capture of smelt ($n=0$) during the trawling survey transects ($n=17$) on the Slaney Estuary in August 2023.

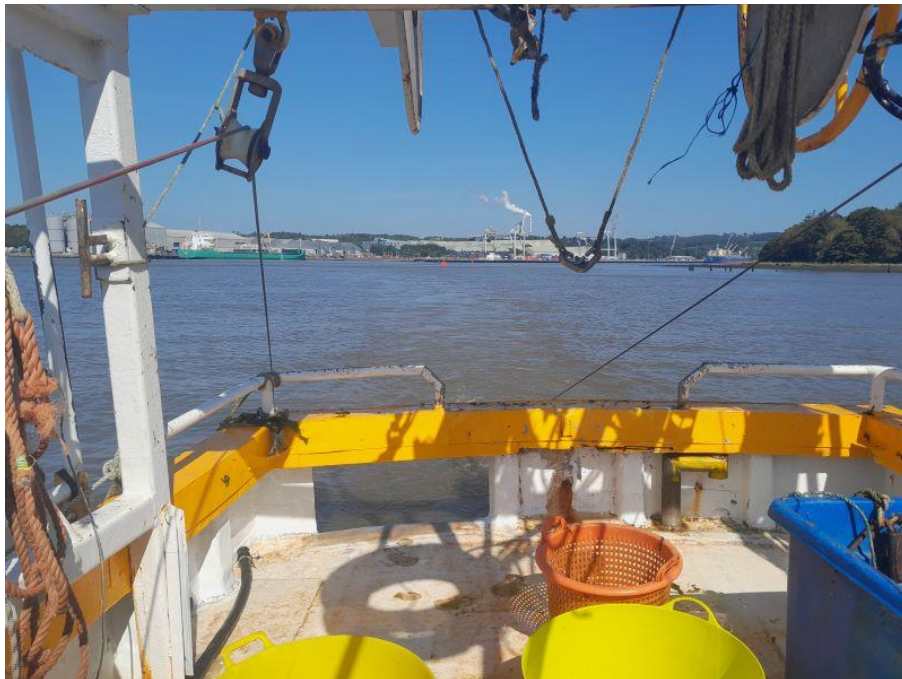


Plate 4.2. A trawling transect underway on the Suir estuary. The Port of Waterford is in the background.

5. Conclusions and Plans for Future Work

The monitoring programmes for lamprey and shad continued in 2023, which represented the fifth year in the six-year Article 17 reporting cycle (2019 – 2024). Notable observations and findings for the current reporting period include:

- Unsettled weather with prolonged heavy rainfall, one of the wettest years on record for Ireland (Copernicus Climate Change Service, 2024), impacted survey work in 2023, particularly river lamprey redd counts (March – May) and larval lamprey electrofishing surveys (August – October).
- River lamprey hotspot surveys showed that redd counts were very low in comparison to previous years (2021 and 2022) and it is possible that high river flows impacted spawning this year.
- An exploratory survey of suitable spawning locations on the Mulkear River revealed that river lamprey spawned at 3 locations upstream of a significant barrier to migration, namely the weir at Annacotty, Co. Limerick.
- Redd count data for sea lamprey indicated a generally stable situation compared with previous years.
- The HD project team had its first record of a sea lamprey juvenile (macrophthalmia) since larval lamprey surveys commenced in 2009. The individual measured 140mm and was captured at a site on the Gearhameen River, a headwater river in the Laune catchment.
- Data from electrofishing surveys of index sites for larval lamprey are used to assess trends in brook lamprey population size. An index site on the River Nore had been physically modified since previously surveyed (2020). Due a deepening of the channel, it could not be surveyed in 2023 and it is likely that all lamprey rearing habitat had been removed.

In addition to the annual surveying and reporting tasks, members of the HD project team attended a lamprey workshop in York and a sea lamprey workshop in Sweden in 2023. The team delivered a presentation entitled 'Sea Lamprey Monitoring and Conservation Status Assessment: An Irish Perspective' at the Swedish workshop. The team also attended IFI's annual River Habitat Forum and delivered a talk on the habitat requirements of Ireland's 3 lamprey species. The objective of this presentation was to inform attendees of the variable habitat types used by spawning lamprey and to emphasise the importance of protecting lamprey rearing habitat.

The HD team developed a Survey123 redd count app for lamprey and salmonids in 2023. Training on lamprey spawning behaviour and on the use of the app was provided to IFI's Seasonal Fisheries Officers in April. The app was also trialled during the winter salmon spawning patrols by IFI staff in

the ERBD and WRBD. Further training will be provided in 2024 during the lamprey and salmonid spawning periods.

The current 6-year monitoring cycle will be completed in 2024 and the main focus next year will be on the assessment and reporting on the conservation status of the Annex II/V fish species for Article 17. Weekly shad egg surveys will continue at St. Mullins and at the spawning site on the River Suir. Data from these surveys will build on the information obtained in the past 2 years on the spawning behaviour of twaite shad. Redd count surveys for river and sea lamprey will continue and, given the challenging flow conditions in 2023, it will be of interest to assess the level of spawning activity at important river lamprey locations in 2024. Larval lamprey electrofishing surveys were curtailed in the current year due to high rainfall and catchments/channels that were not surveyed will be re-scheduled for next year.



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