RIVER NITH
ANNUAL REPORT

COMBINED ANNUAL REPORT OF THE
NITH DISTRICT SALMON FISHERY BOARD
AND THE NITH CATCHMENT FISHERY TRUST

2021

37 George Street, Dumfries, DG1 1EB 01387 740 043
board@river-nith.com trust@river-nith.com www.river-nith.com

Nith District SALMON Fishery Board

The Nith District Salmon Fishery Board is constituted under the Salmon Fisheries Legislation commencing in the 1860s as subsequently amended and presently stated in the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 as amended. The Nith Board is empowered under fisheries legislation to do such Acts as it considers expedient for the protection, enhancement and conservation of stocks of salmon and sea trout and the general protection and enhancement of the fishery itself.

The Nith Board's principal objectives are therefore to preserve, protect and enhance stocks of migratory salmonids in the Nith catchment and to preserve, protect and enhance the fishery. Its main areas of jurisdiction comprise the principal River System of the River Nith and all its tributaries including parts of the Solway Firth.

The Board financial year runs from 1st December to 30th November in any given year. Tri-annual elections were held on 30th June 2021.

The Nith Board for the year comprised: -

Chairman	Percy Weatherall	
Lower Proprietors	Robbie Cowan	Caerlaverock Estate
	John Charteris	Dumfries and Galloway Council
	Peter Hutchinson	Douglas Hall Fishery
	Tom Brown	Drumburn Estate
Upper Proprietors	Peter Landale	Dalswinton Estate
	Nick Wright	Closeburn Castle Fishing
	Anna Fergusson	Buccleuch Estates Limited
	David Kempsell	D & G Angling Association
	Richard Gladwin	Blackwood Estate
Upper Co-optees	Thomas Florey	Angling Representative
	Raymond Mundle	Angling Representative

Invitees
In addition to the elected Chairman, lower proprietors and upper proprietors, the Nith Board has invited representatives from the Scottish Environmental Agency (SEPA) and NatureScot however in recent years SEPA and NatureScot no longer have officer time available to fulfil these invitations.

Staff
Mr Jim Henderson – Fishery Director
Mr David McMichael – Water Bailiff

The Nith Board met on: -
19th January 2021 – Board meeting (virtual)
30th March 2021 – Annual Qualified Proprietors meeting followed by Board meeting (virtual)
30th June 2021 – Annual Public Meeting and Tri-annual elections followed by Board meeting
24th September 2021 – Board meeting

Minutes from these meetings can be found on the Board website - NDSFB meeting agendas (river-nith.com)
Attendance rate for those meeting are:

Nith Board Meeting Dates	No. Board Members Attended	Attendance Rate (%)	Members of the public
19th January 2021	11 (max 15)	73%	0
30th March 2021 (AQPM)	9 (max 15)	60%	0
30th June 2021 (APM)	10 (max 15)	67%	0
24th September 2021	10 (max 15)	67%	0

Complaints
There were no complaints received during year 1st December 2020 to 30th November 2021.

Nith Catchment Fishery Trust (NCFT) is a Scottish registered Charity which was formed in late 2009 to conserve and enhance all native freshwater fish and their habitats located within the inland and coastal waters of the River Nith catchment and the jurisdictional area of the Nith District Salmon Fishery Board.

The aims of the Nith Catchment Fishery Trust are:

- To advance environmental protection and improvement by conserving and enhancing all species of freshwater fish and their environs within the River Nith catchment, for public benefit.
- To advance the education of the general public through raising awareness of aquatic ecosystems including their fauna, flora and economic activity within the River Nith catchment.

The Trust financial year runs from 1st January to 31st December in any given year.

Trust Directors
Mr E P K Weatherall - Chairman
Mr J Henderson
Mr P Hutchison
Mrs C Carson
Mr S Cameron
Mr R Mundle
Miss F McCormick
Mr G Kerr
Mr K Corder

Staff
Ms Debbie Parke - Operations Manager/Biologist
Mr Andrew Gillan – Fishery Assistant

The Trust Directors met on: -
14th January 2021 – Trustee meeting (virtual)
29th March 2021 – Trustee meeting
29th June 2021 – Annual General Meeting followed by Trustee meeting
23rd September – Trustee meeting

The work of the Nith Catchment Fishery Trust is part funded by: -

& Misses Robinson's Charitable Trust

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board@river-nith.com trust@river-nith.com www.river-nith.com

Chairman's Foreword

There is no escaping the fact that 2021 was a rotten year for the River Nith. The combination of a sharp covid-driven reduction in fishing effort and a prolonged drought led to very disappointing fishing returns. Good numbers of fish were seen in the estuary ebbing and flowing with the tide but they were unwilling to take on the stale water upstream of the Caul. The season, to use a counter-intuitive simile, was a wash-out.

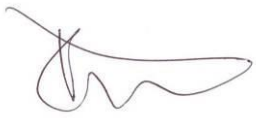
On a more positive note, the River Nith participated in the "West Coast Tracking Project" during 2021. This project, co-ordinated by the Atlantic Salmon Trust, sought to track smolts in the Nith and other west coast rivers, on their journey's down river to the sea and then out across the Solway and up through the North Channel. Smolts were successfully trapped at two locations (Blackwood and Crawick) and a total of 100 were surgically fitted with transponders that allowed their passage downstream to be electronically monitored by 8 receiving stations. Once out of the river listening arrays between the Mull of Galloway and Ireland recorded their progress at sea.

In broad terms this project has been a great success. New hard scientific data has been gathered on the behaviour of our salmon. This data is still being evaluated but it is sure to add greatly to our understanding of how our fish behave during this all important phase of their lives. It is also giving us new insights into the predation they suffer and consequent mortality. One very encouraging aspect of the trapping exercise was that it revealed a healthy population of smolts that were bigger and better than those trapped in other participating rivers. We must all hope that the smolts that made it through the Irish Sea will return in due course to provide sport for our anglers.

During the year your Board continued to pursue all of its normal objectives: enforcing the law, suppressing predators and invasive non-natives, improving watercourses, monitoring mines, hydro-schemes and wind farms. Jim Henderson (Fishery Director), Debbie Parke (Biologist) and Davey McMichael (Bailiff) continue to work tirelessly to keep your river in good order. Our thanks should also go to Roddy Styles (Clerk) who ensures, notwithstanding the complications thrown up by Covid, that we remain legally compliant in all our activities.

Our 2022 fishing season opened on the 25th of February with a well-attended ceremony at Friars Carse. Covid is, happily, broadly behind us and life is returning to welcome normality. One or two springers have sprung and our river looks to be in good shape. What we need now is a year of average rainfall and a decent return of fish from the sea.

Good luck to us all.



E.P.K. Weatherall
Chairman

Fishery Directors report

2021 presented challenges for us all working on the river. Keeping our staff safe through Covid whilst still achieving our objectives was a daily task. We had to adapt our working practises to suit specific situations as they presented themselves. For example, we used separate cars to access sites to comply with individual company's policies and in addition we had to adhere at all times with the law relating to Covid in Scotland. The nature of our work dictates that we often work in remote rural areas and do not mix much with the public hence we did still manage to conduct all planned work and fulfilled our commitments to the river and management policies.

During late 2020, our Board and Trust was asked by the Atlantic Salmon Trust to participate in the West Coast Salmon Tracking Project and once committed to that project our staff undertook the necessary qualifications and training to enable them to complete the work. The project is coordinated by the Atlantic Salmon Trust and licenced through Glasgow University. For our staff this was an exciting new area of research work, trapping and tagging salmon smolts and for our river management, we stood to gain valuable knowledge about our salmon's life cycle. The results for the first year's trapping have been disseminated and they reveal fascinating facts about our smolts and their migrations through the river and out to sea. We were able to dispel some popular riverbank theories about our smolt numbers and size. However, we have found to the contrary, that the Nith smolts are large in stature and their numbers are plentiful. More detailed analysis will be discussed later in this report.

Despite the difficulties posed by the Covid restrictions, as the countryside started to get back to some form of normality, we were able to run the "Fishing for the Future" project, albeit under strict conditions. We were inundated with applicants to join our "Nith young Anglers" club and the adapted casting lessons in school playing fields proved very popular with all who took part. There is a healthy interest in angling as a hobby/sport within our younger generations and this bodes well for the future of our sport.

Our river and fish migrations upstream, were severely impacted adversely by the drought conditions which prevailed throughout Scotland during 2021. As a consequence, anglers on the riverbank were few and far between. Fish catches were very poor and when the water came, salmon and sea trout ascended the river with haste offering sparse opportunities for angling. It is a fact that despite all our best efforts, we are all at the mercy of the weather when it comes to fishing. Here's hoping for more conducive angling conditions during 2022.

Jim Henderson
Fishery Director

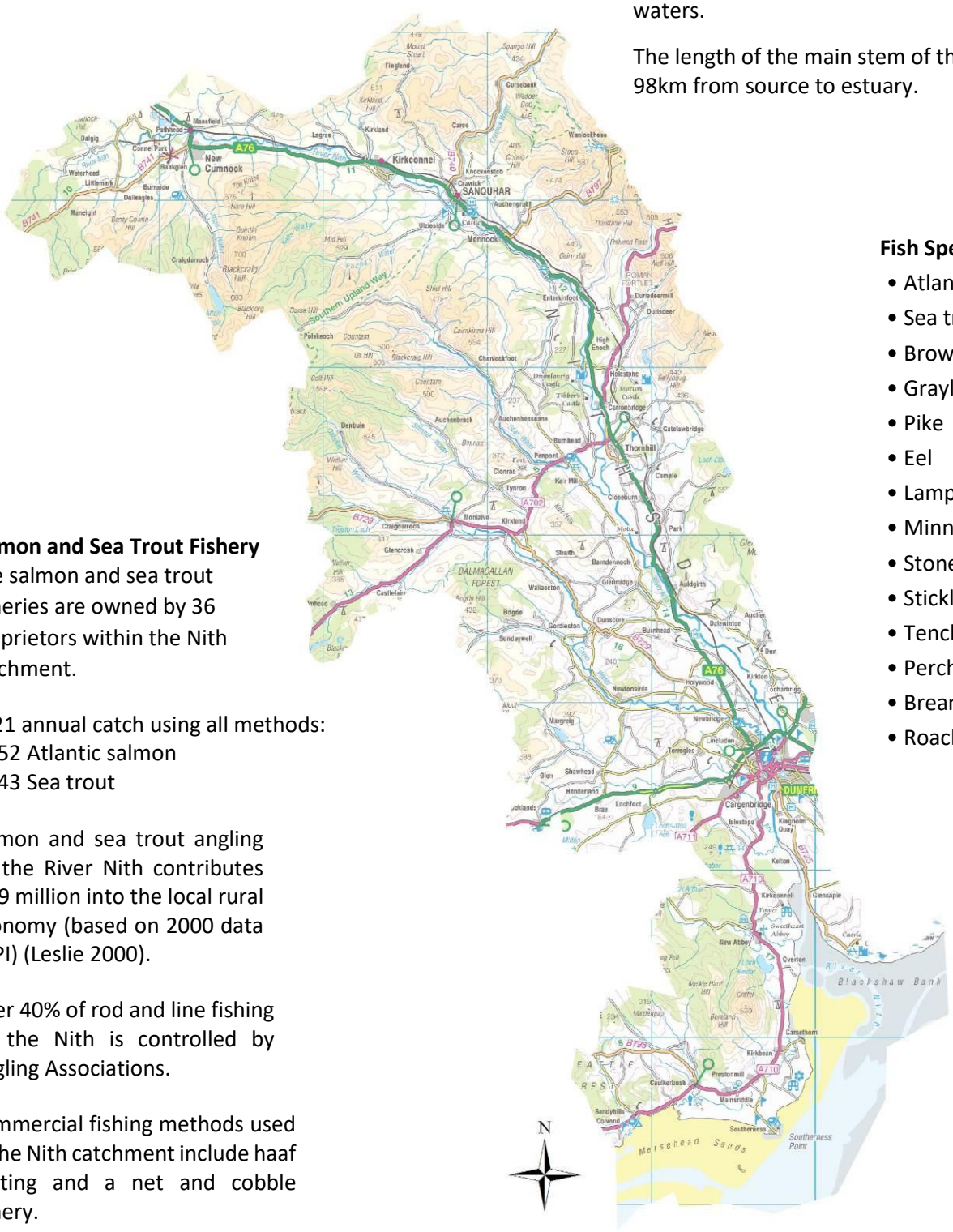
Contents

The River Nith Catchment

Vital Statistics

The total catchment area is 1596km^2 which includes the main stem River Nith, its tributaries, coastal burns and connected still waters.

The length of the main stem of the River Nith is 98km from source to estuary.



Fish Species Present

- Atlantic salmon
- Sea trout
- Brown trout
- Grayling
- Pike
- Eel
- Lamprey
- Minnow
- Stone loach
- Stickleback
- Tench
- Perch
- Bream
- Roach

Salmon and Sea Trout Fishery

The salmon and sea trout fisheries are owned by 36 proprietors within the Nith catchment.

2021 annual catch using all methods:

- 252 Atlantic salmon
- 543 Sea trout

Salmon and sea trout angling on the River Nith contributes £2.9 million into the local rural economy (based on 2000 data +RPI) (Leslie 2000).

Over 40% of rod and line fishing on the Nith is controlled by Angling Associations.

Commercial fishing methods used in the Nith catchment include haaf netting and a net and cobble fishery.

Other Fisheries

The Nith also has healthy brown trout and grayling fisheries which are owned by landowners throughout the catchment. There are also a number of still water trout and coarse fisheries within the catchment. Sea fishing is popular at the quay at Glencaple and off the coast.

Overview of Fisheries Management work carried out during 2021

Enforcement

- Bailiff team comprised 3 employed warranted bailiffs and 2 volunteer warranted water bailiffs
- 5 incidents dealt with by enforcement staff
- Overt and covert patrols of fishing beats
- Managed all fishing enquires
- Night patrols of spawning tributaries
- Participated in enforcement film with FMS
- Catchment wide permission checks
- Coastal patrols of vulnerable fish in estuary

Exploitation

- Collated 2021 Catch return data from proprietors and published on website
- Spoke to D&G Council regarding permit regulations
- Distributed the Nith Fish Conservation grading categorization and published Conservation code for 2021
- Continued to police Salmon conservation regulations

Engineering and Forestry

- Attended Technical Working Group meetings regarding restoration of the open cast coal site for House of Water and Greenburn.
- Performed 13 fish rescues in relation to construction work
- Full electrofishing surveys carried out in connection with 7 engineering projects
- Attended meeting with Scottish Water to discuss future works at Kettleton Reservoir
- Met with forestry representatives regarding new forestry installation
- Responded to FLS regarding culvert installation
- Advised on phase 2 of New Cumnock flood defense project for East Ayrshire Council
- Met with SEPA and contractors regarding the Upper Nith Restoration Project

Water Quality

- Reported 5 incidents of to SEPA including pollution incidents on the Polbower Burn, the Cairn at Jardinton, Carron water, Dalgig Burn, Polneul Burn, the damning of the Muirfoot Burn and the dredging of the Lake Burn at Auldgirth.
- Responded to reports of in-river works near Crawickfoot. Followed up with SEPA
- Assisted SEPA with Sandy Knowe wind farm incident where a temporary bridge had failed
- Assisted SEPA with pollution incident at Terreagles
- Numerous aquatic invertebrate surveys completed

Planning and consultation

- Planning lists checked on a weekly basis and responses made where appropriate to Dumfries and Galloway Council and East Ayrshire Council
- Responded to 2 forestry plans
- Responded to 2 wind farm planning applications, 1 pumped hydro planning application, 1 road proposal and to Scottish Water proposals.

Habitat

- Scrub clearance on Burgh Water to provide angler access
- Responded to Riverwood proposals and attended Riverwood workshop regarding riparian woodland creation
- Conducted repairs on Crawick and Wanloch Habitat schemes
- Planted willow whips on Wanloch Habitat scheme and removed old shelter frames
- Checked habitat schemes for winter damage

Renewables

- Full aquatic surveys (electrofishing, invertebrate and Freshwater Pearl Mussel surveys) carried out in connection with 10 renewables projects
- Met with consultants regarding Glenmuckloch Pumped Storage Hydro
- Responded to 5 wind farm consultations

Hatchery

- 40,000 fry stocked to licenced sites
- Post stocking electrofishing surveys carried out
- Brood stock captured for fry production for 2022
- Hatchery maintained including repair to sump and value in hatchery.

Fish stocks and monitoring

- 2020 catch data collected and reported on website
- Provided eel data to SFCC
- NCFT/NDSFB conducted electrofishing at approximately 150 sites throughout the catchment
- 10 annual electrofishing sites surveyed
- All electrofishing data inputted to SFCC database
- Salmon smolts trapping and tracking conducted on Crawick Water and mainstem River Nith
- Attended National Electrofishing Project Scotland meeting and inputted to design for 2021
- Completed surveying of 27 sites in relation to National Electrofishing Programme Scotland (NEPS) and submitted data to Marine Scotland
- Survey of adult salmon as part of Adult Salmon Condition monitoring project and submitted data to Marine Scotland

Governance

- Attended the following courses, workshops and conferences:
    - GDPR course
    - FMS 2021 conference
    - SFCC members meeting
    - SFCC drone workshop
    - CSCS training
    - Side by side ATV training
    - Electrofishing Team Leader training
- Completed year end accounts for Nith Catchment Fishery Trust
- Completed all funder reporting requirements
- Met with Holywood Trust representative to discuss Fishing for the Future project grant application
- Applied and gained for funding for Fishing for the Future project 2021/22 and employed staff member to deliver project
- Completed additional work on Salmon Pressures Tool
- Attended all Board and Trust meetings
- PAT testing of all electrical equipment

Marine survival

- Completed Home Office licence training to enable tagging of smolts
- Tagged 50 smolts as part of Nith Smolt Tracking Project and 130 salmon smolts as part of the West Coast Salmon Smolt Tracking project
- Removed acoustic receivers from river and returned data to AST for analysis
- Met with AST staff to discuss preliminary findings from smolt tracking projects
- Secured funding for and ordered additional acoustic tags for 2022 smolt run.

Predation

- Licenses applied for and gained to prevent serious damage to wild stocks of salmon/sea trout by cormorants and goosanders.
- License returns completed
- 19 mink trapped
- Commented on draft paper regarding results from the Scottish Piscivorous birds research project
- Applied for a seal licence under new scheme – licence rejected
- Meeting attended with FMS regarding seal licencing.

Biosecurity

- Continue to highlight biosecurity issues on all planning responses
- Conducted invasive weed control JK at a number of locations on a commercial basis
- Treated all Giant hogweed along River Nith and Scaur Water
- Monitored crayfish in Cargen Water and the River Nith at Dumfries – crayfish present
- Surveyed for crayfish at Kindar Water – none found

Access

- Conducted electrofishing upstream of Dalswinton Mill to access effectiveness of barrier easement
- Conducted survey on culvert on Sanquhar II wind farm to access effectiveness of culvert modifications
- Woody debris obstruction removed at mouth of Ballochan Burn mouth

Outreach

- Ran Fishing for the Future project in a reduced capacity by delivering virtual sessions and outdoor session to schools. Delivered 27 school sessions, 3 angling taster days and five Nith Young Anglers sessions
- Provided media interview in relation to salmon smolt tracking projects.
- Continued to provide information to anglers wishing to fish the Nith
- Ran three coastal community events and part of the Nith Smolt Tracking Project
- Contributed to FMS film on aspects relating to the work of the NDSFB and NCFT

Conservation Regulations 2021

All Scottish salmon rivers are now assigned a Conservation Categorisation grading from 1 to 3. The definition of these Categorisations is provided in the box below. The River Nith was assigned a category 3 status for 2021 which means that all salmon must be released.

Category (Grade) 1	At least an 80% mean probability of conservation limits (CL) being met in the last 5 years. Exploitation is sustainable and therefore no additional management action is currently required.
Category (Grade) 2	60-80% mean probability of CL being met in the last 5 years. Management action is necessary to reduce exploitation; mandatory catch and release will not be required in the first instance, but this will be reviewed annually. Where a Board does not exist, assistance in plan formulation will be offered to those responsible for local management.
Category (Grade) 3	Less than 60% mean probability of CL being met in the last 5 years. Exploitation is unsustainable and mandatory catch and release (all methods) for 1 year will be required. Management action is necessary to reduce exploitation.

Opening of the River Nith 2021 Salmon Fishing Season

Due to the Covid restrictions which were in place at the time of the opening of the Salmon fishing season on the River Nith in 2021 the river management considered it inappropriate to congregate members of our angling community in one area to celebrate the start of the season. However, we were able to mark the occasion at Cowhill where our Chairman Mr Percy Weatherall made the first cast and offered a toast to the salmon.

The video can be watched here -
Opening of the River Nith salmon fishing season - video

A Nith salmon

Percy Weatherall opening the 2021 season

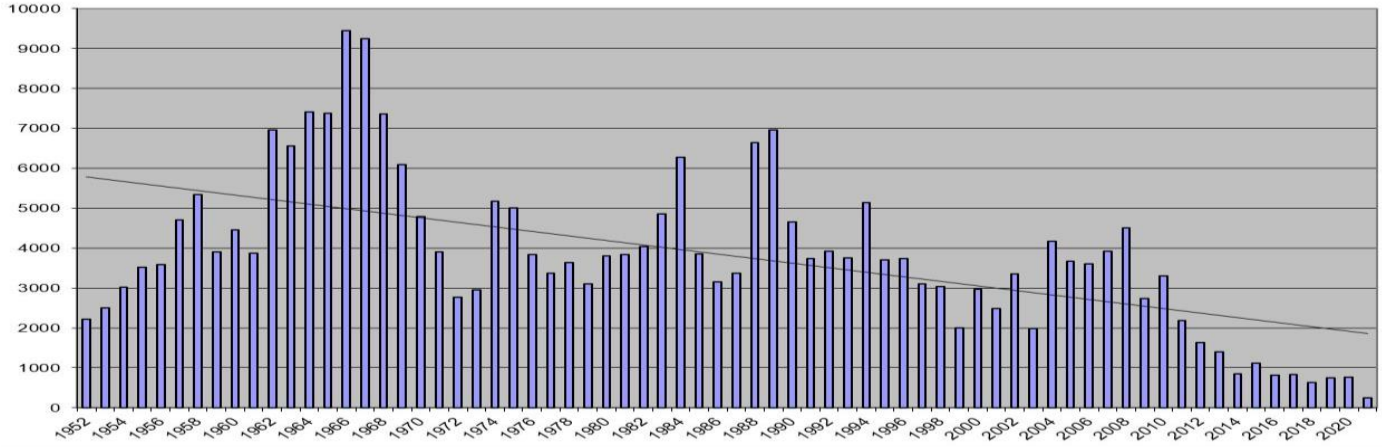
STOCK ASSESSMENT

Salmon and Sea trout catch data for 2021

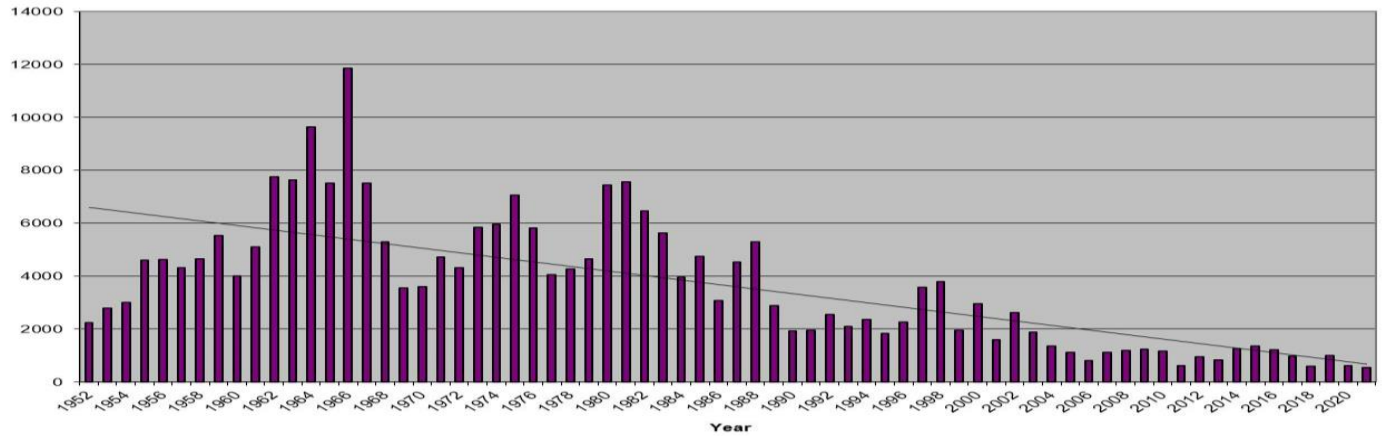
The 2021 salmon fishing season proved to be a disappointment after the improved catches experienced in 2020. Drought conditions prevailed through most of the summer until late September, making fishing extremely challenging. The very low water levels meant that salmon were unable to run the river as normal and were held back in the lower river, where they waited for rain to come. The rains eventually came in late September and the salmon ran the river quickly, resulting in limited opportunities for anglers to catch them. This is reflected in the catch data received from salmon fishing proprietors with 181 salmon caught by rod and 71 salmon caught by the nets. Sea trout catches were slightly down on 2020's with 418 by rod and 125 by net.

	Salmon and Grilse				Sea trout and Herling			
Year	Rods (C&R%)	Nets (C&R%)	Total	5 year average	Rods (C&R%)	Nets (C&R%)	Total	5 year average
2012	1283 (40%)	352 (0%)	1635	2873	782 (55%)	163 (1%)	945	1025
2013	940 (59%)	465 (0%)	1405	2253	671 (62%)	170 (8%)	841	958
2014	520 (64%)	331 (1%)	851	1876	1119 (87%)	132 (8%)	1251	960
2015	702 (63%)	417 (0.5%)	1119	1438	1063 (80%)	283 (4%)	1346	998
2016	655 (100%)	163 (100%)	818	1166	866 (78%)	348 (40%)	1214	1119
2017	695 (89%)	133 (70%)	828	1004	768 (83%)	214 (12%)	982	1127
2018	520 (91%)	110 (54%)	630	849	479 (78%)	111 (26%)	590	1077
2019	586 (93%)	158 (73%)	744	828	845 (83%)	157 (31%)	1002	1027
2020	764 (100%)	63 (100%)	827	769	557 (81%)	68 (40%)	625	883
2021	181 (100%)	71 (100%)	252	656	418 (89%)	125 (36%)	543	748

Salmon caught by all methods 1952 - 2021



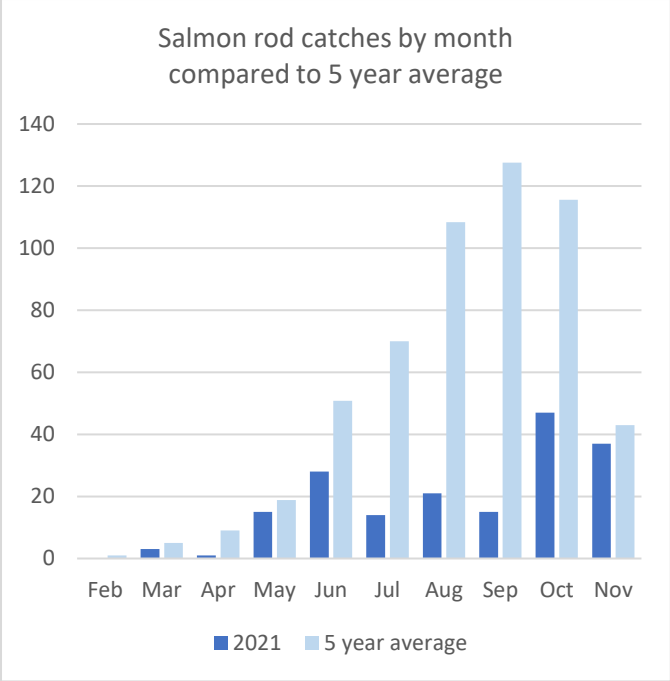
Sea trout caught by all methods 1952 - 2021

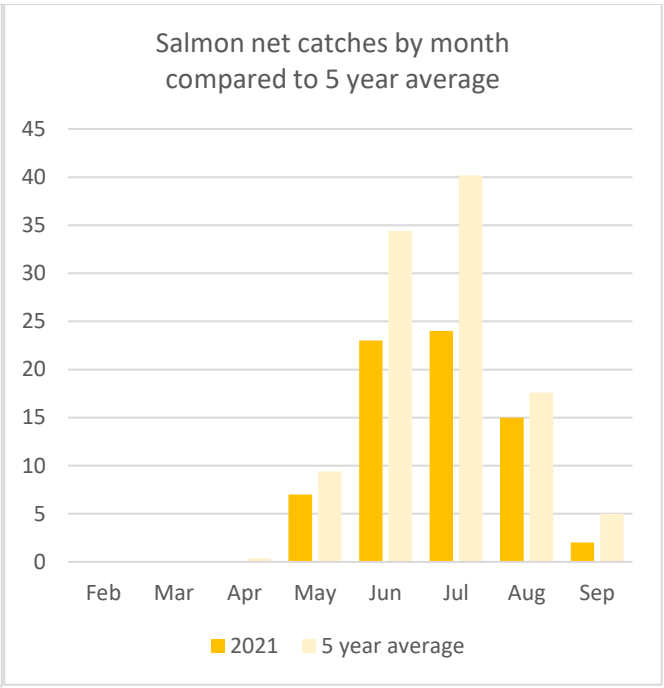


STOCK ASSESSMENT

Salmon and grilse catches in 2021

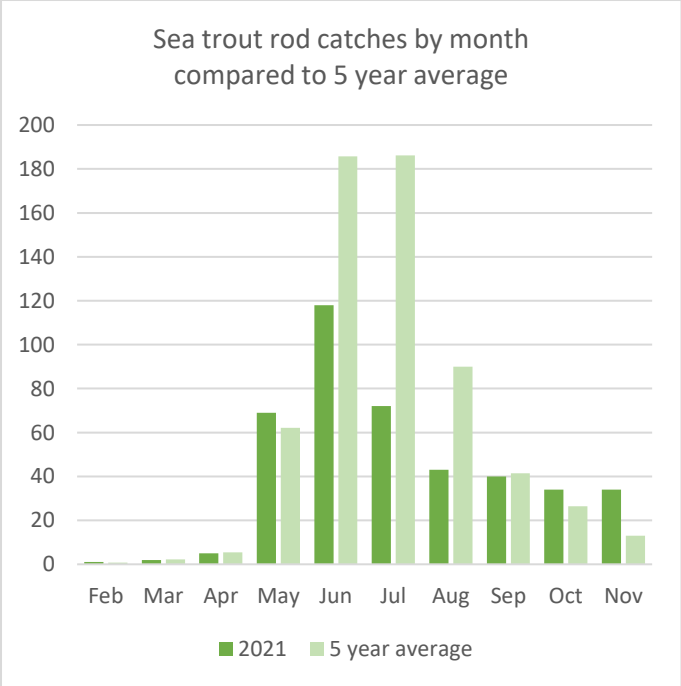
The River Nith was a category 3 river in 2021 which meant that it was 100% catch and release for salmon and grilse. Low water conditions limited the number of salmon caught by rod and line between June and September with the highest numbers of salmon being caught in October and November when river levels returned to normal. However, this was still well below the five year average for catches in those months. The peak months for catching salmon in the nets were in June and July, allbeit in lower numbers. In total, 252 salmon and grilse were caught by rods and nets in 2021.

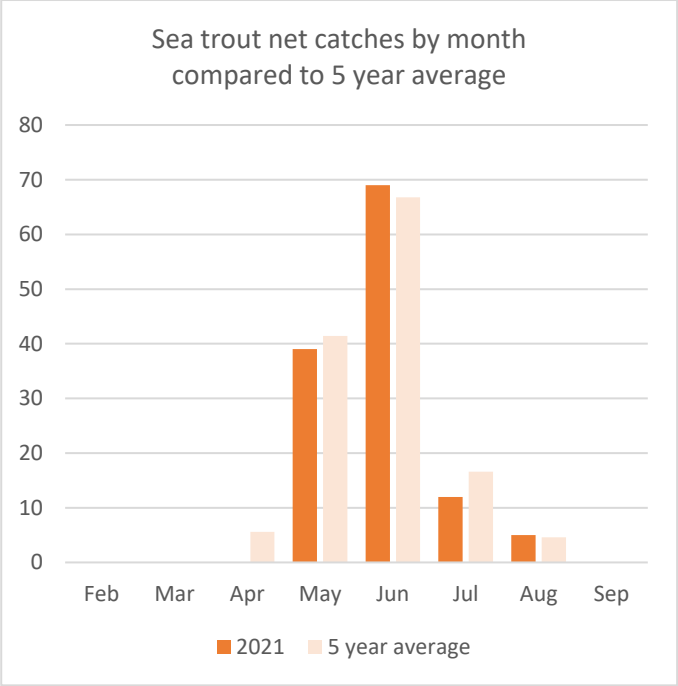




Sea trout catches in 2021

The sea trout catches were much reduced in June, July and August compared to the five-year average. The low summer water levels appeared to have also impacted the number of sea trout being caught. It is possible that this was due to the reduced angling pressure on the river during the drought conditions as sea trout catches by nets were comparable to the five-year average.





STOCK ASSESSMENT

Juvenile salmonid surveys 2021

Every summer, between May and September, fishery staff conduct electrofishing surveys throughout the entire Nith catchment to assess the status of juvenile salmonid populations. This is an important aspect of the work of the Board and the Trust as the resulting data can provide us with an insight into the productivity of the River Nith and identifies any areas where there may be issues such as pollution, lack of habitat or barriers impacting the number of salmonids. In 2021, 148 sites were surveyed and additional 27 sites were surveyed as part of NEPS. Some of these sites are repeated on a regular basis whilst others provide us with new information on watercourses that have never previously been surveyed. Overall, this provides us with a temporal and spatial overview of the health of the catchment.

To compare year to year performance, 10 sites throughout the catchment were selected in 2014 to be surveyed annually using full-quantitative, three run survey techniques. These sites are located on the mainstream River Nith and its main tributaries. The ten sites are sampled annually to allow long term trends to be observed. The intention here is to detect any issues specific to individual areas of the catchment and enable managers to address those issues timeously.

In 2021, the average densities of salmon fry across the ten sites surveyed averaged 155 fry per 100m^2 which is classified as excellent. The average densities of salmon parr and juvenile trout were classified as good. Salmon fry densities in 2021 are comparable with those found in the 2018 set of electrofishing surveys and are the highest salmon fry densities recorded since we started surveying these sites in 2014. It is likely that the drought conditions experienced in 2021 were responsible for the elevated fry densities, as similar drought conditions were experienced in 2018.

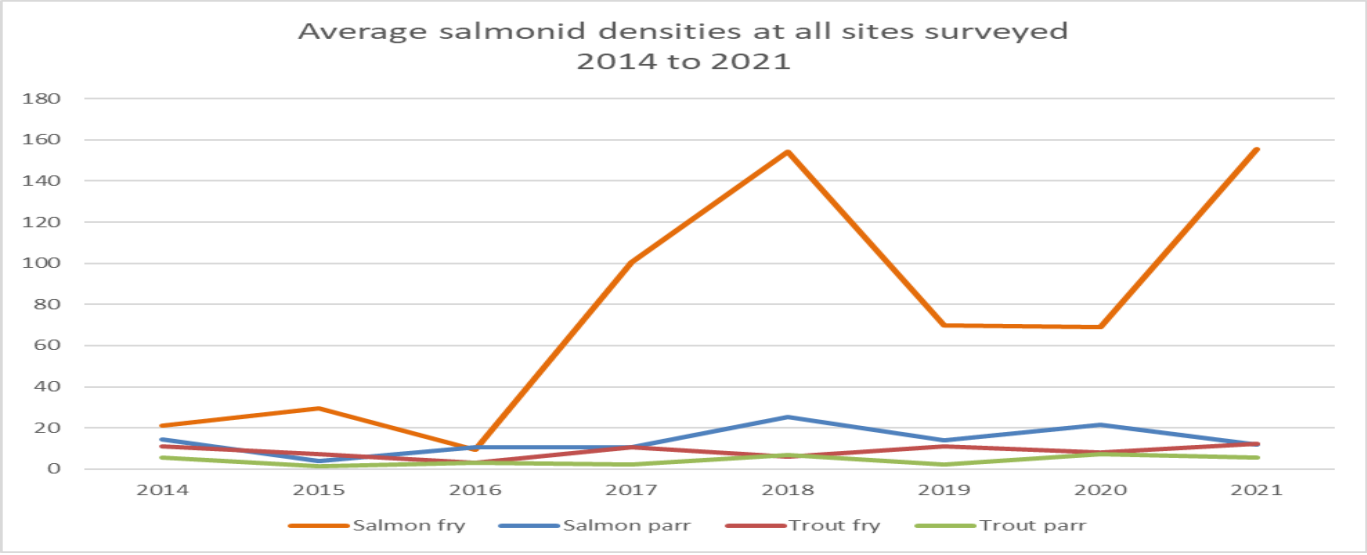
Electrofishing results for the Annual sites in 2021

Watercourse	Site code	Location	Salmon fry (/100m^2)	Salmon parr (/100m^2)	Trout fry (/100m^2)	Trout parr (/100m^2)	Other species
River Nith	Nith001	Downstream of Nith Lodge, New Cumnock	148.081*	13.104*	0.00	3.87*	SL
River Nith	Nith053	Downstream of Boig Road Bridge, New Cumnock	0.00	9.524	0.00	11.905	M, SL, E
River Nith	Nith027	Upstream of Guildhall Bridge, Kirkconnel	149.247*	12.215*	12.205*	0.00	SL, G, E
River Nith	Nith010	At Auldgirth New Bridge	16.667	11.111	0.00	0.00	SL, E
Afton Water	Aftn001	Upstream of Blackcraig Bridge	179.749*	34.757*	9.77*	2.574	-
Crawick Water	Craw001	Downstream of Spango Bridge	33.518*	1.099	2.198	0.00	-
Mennock Water	Menn001	Upstream of confluence with Glenim Burn	280.727*	9.065*	82.788*	9.508*	-
Scaur Water	Scar001	Downstream or Bridge at Glenwhargen	84.955*	21.701*	0.00	1.089	-
Cample Water	Camp001	Downstream of bridge at Kirkbog Farm	653.126*	0.00	14.643*	0.00	SL
Dalwhat Water	Dlwt001	Upstream of Bailwood Plantation	7.864*	5.115	2.558	28.527*	-
		Average of all sites:	***155.39***	***11.77***	***12.42***	***5.75***	

Key to other species: E – Eel, M – Minnow, SL - Stone Loach, L – Lamprey, SB – Stickleback, G – Grayling, F – Flounder, P – Pike.

Key to classification of salmonids per 100m^2

absent	very poor	poor	moderate	good	excellent



STOCK ASSESSMENT

Tracking Salmon Smolts in the Nith and out to sea

In 2021, the Nith Catchment Fishery Trust ran a project called the Nith Salmon Smolt Tracking Project. The project entailed trapping 50 salmon smolts from the Upper Nith, in the Crawick and Mennock Waters, and fitting them with acoustic tags. Eight acoustic receivers were positioned down the length of the River Nith which meant that the salmon smolts could be tracked as they migrated down the River Nith and out into the Solway. (Fig. 1)

Rotary Screw trap on the River Nith near Auldgirth

The Nith Salmon Smolt Tracking Project took place alongside the Atlantic Salmon Trust's West Coast Salmon Smolt Tracking project. This was a larger national project that tagged salmon smolts from across nine rivers along the West Coast of Scotland and aimed to understand the broad migration routes taken by salmon smolts up the west coast. To achieve this, 224 acoustic receivers were deployed in arrays in likely migration routes up the west coast of Scotland (Fig. 2). On the mainstem Nith at Auldgirth, 130 salmon smolts were acoustically tagged and released. These smolts passed four of the lower receivers before entering the Solway and starting their migration up the west coast.

Of the 50 salmon smolts tagged on the Crawick and Mennock Waters, 48% of them were detected leaving the River Nith at Kingholm Quay. They took an average of 17.78 days to migrate down the river from the release site to the last receiver at Kingholm Quay, a distance of 56kms. The slowest part of the journey was between the release site and the first receiver, located below Sanquhar. This was also the part of the journey where the highest drop in detections occurred. The fastest section of the smolts journey down the Nith was between receivers Ar3 and Ar4, between Thornhill and Auldgirth. Most salmon smolts migrated during the hours of darkness. The salmon smolts then reduced their speed once they reached the tidal waters at Kingholm Quay, where they stayed in proximity to receiver Ar8 for 11-77 minutes. Once at sea it is not possible to gauge survival rates as the arrays of receivers are "leaky" meaning that not all salmon smolts will be picked up on these receivers (Fig. 2). Three of the Crawick salmon smolts were detected on the COMPASS array (between Larne and Stranraer) and one Crawick salmon was detected in the Sea Monitor array (between Malin Head and Islay). The smolt detected on the Sea Monitor array had not been detected on the COMPASS array.

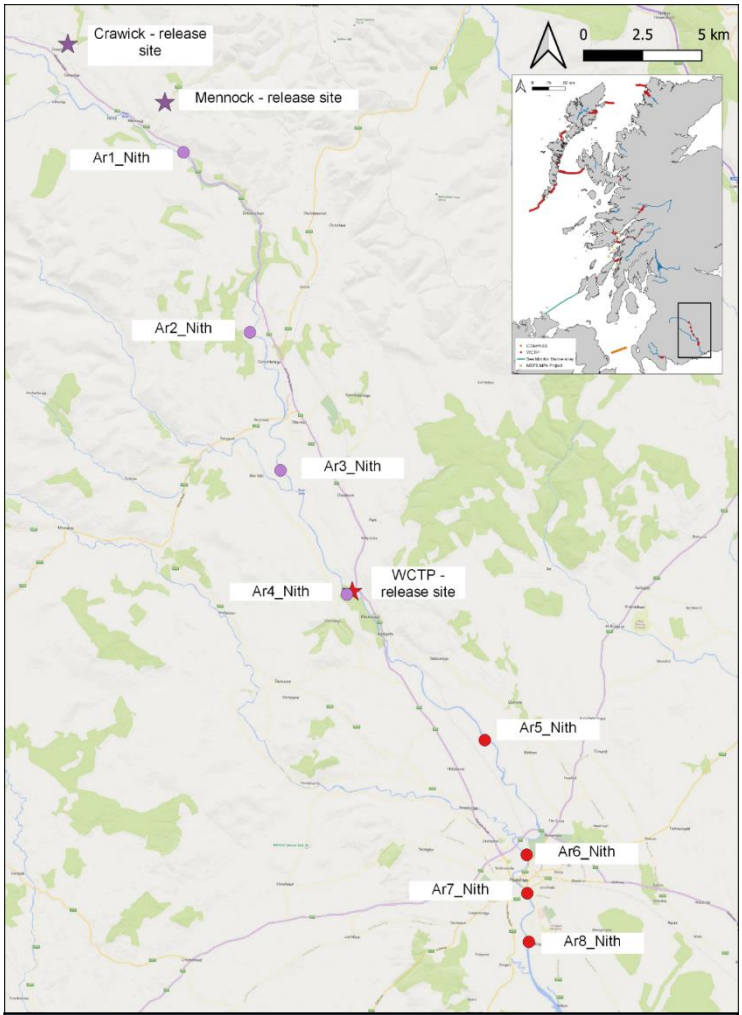


Fig. 1 Geographic locations of freshwater receivers in the river Nith (red dots – West Coast tracking project; purple dots – Nith Smolt Tracking Project). The WCTP release site is marked by a red star, the Nith smolt tracking project release sites are marked by purple stars.

Of the 130 salmon smolts that were tagged at the AST trap at Blackwood, 50.77% made it to the Solway. Overall, the percentage loss was 2.22% fish per km. It took them an average of 8 days to migrate from the tagging site to receiver Ar8 at Kingholm Quay, a distance of 22kms. As with the

STOCK ASSESSMENT

Crawick smolts, the Nith smolts travelled mainly during the hours of darkness. Interestingly, 31 of the 130 fish tagged swam upstream after release and stayed in the pool where receiver Ar4 was located. This is likely to be a result of the handling process and may contribute to the higher percentage losses experienced between the release site and the first receiver for both projects. Thirteen of the Nith salmon smolts were detected on the COMPASS array (between Larne and Stranraer) and three of the Nith salmon were detected in the Sea Monitor array (between Malin Head and Islay). No smolts were detected on any of the arrays between the Outer Hebrides and mainland Scotland so it is possible that they are migrating on the seaward side of the Outer Hebrides.

When we first proposed the Nith Salmon Smolt Tracking project, one of the parts of the river identified as a potential high-risk area for the smolts was the Cauld at Dumfries. The high number of predators observed at this location taking fish has always been of concern to fishery managers and anglers. However, the results from this study show that of the 96 smolts that were detected directly upstream of the Cauld, 91% of them were detected at the receiver Ar8, at Kingholm Quay. Only 8 smolts were lost whilst migrating through this section. This is similar, if not better, to the percentage losses experienced in other sections of the river.

The data discussed in this summary report were taken from a report compiled by Jessica Rogers from the Atlantic Salmon Trust who very kindly analysed our data along with the AST data and provided all the information about the seaward leg of our smolts journeys.

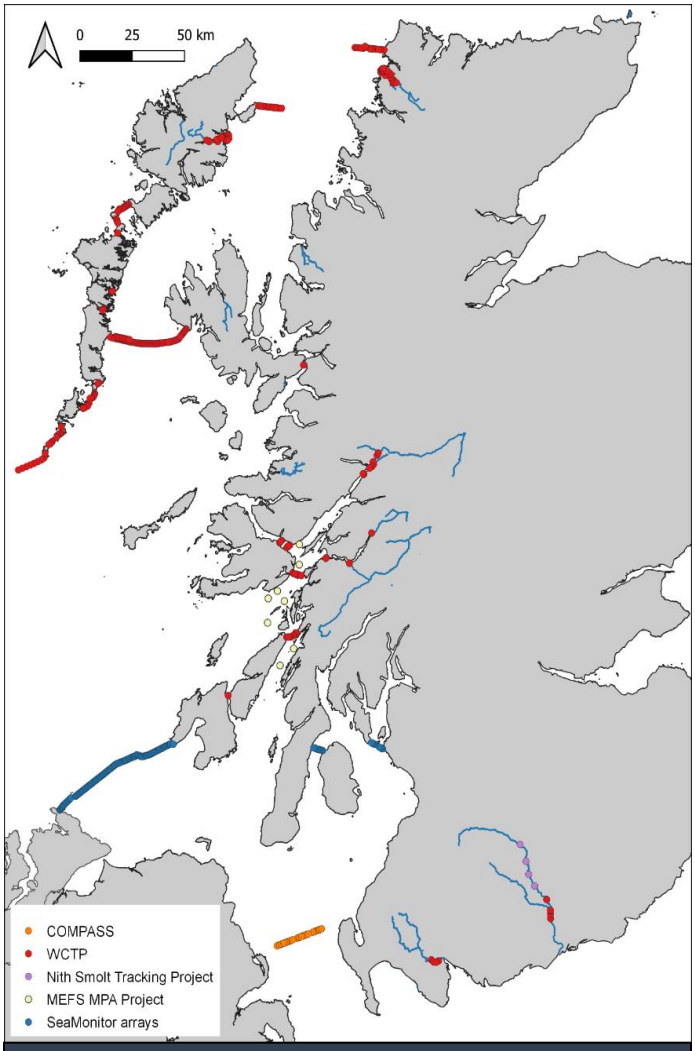


Fig 2. Geographic locations of where acoustic receivers were deployed for the West Coast Tracking Project 2021. The red dots are acoustic receivers which were deployed for the West Coast Tracking Project. There were a few other projects which were running simultaneously on the west coast which include COMPASS (orange dots), Sea Monitor (blue dots) and MEFS MPA project (yellow dots) and the Nith Smolt Tracking Project (purple dots).

Example journey of one of the Nith salmon smolts

Tag number:	43950
Tagged by:	Jim Henderson
Length	151mm
Weight	32g
Date tagged:	23rd April 2021
Sanquhar	4th May at 01:09 hrs
Drumlanrig	4th May at 04:19 hrs
Thornhill	4th May at 22:23 hrs
Blackwood Estate	4th May at 23:59 hrs
Cowhill Estate	5th May at 02:28 hrs
Nunholm Road	5th May at 21:26 hrs
St Michael's Bridge	5th May at 22:27 hrs
Kingholm Quay	5th May at 23:13 hrs
COMPASS array	Not detected
SeaMonitor array	6th June

Thanks to our funders and those organisations that have supplied information to enable this project to take place.

STOCK ASSESSMENT

National Adult Salmon Sampling Project

The River Nith is one of a number of Scottish rivers which participated in the National Adult Salmon Sampling project in 2021. Sampling adult salmon is one measure to assess the quality of our salmon populations. The project sought to record information on the length, weight, sex, age, condition and disease status of adult salmon fish. Information on fish sex/length/weight/age feeds directly into the assessment of conservation status of Scottish salmon stocks, determining whether or not rod fisheries are allowed to remove salmon. Scale samples were also taken to enable growth to be assessed and to provide genetic information on stocks.

This project proved difficult in Scotland during 2021 due to the drought conditions that persisted during the sampling window as prescribed in the sampling protocol. It is anticipated that the project will be repeated in future years.

Sampling of adult salmon

National Electrofishing Programme Scotland

The National Electrofishing Programme Scotland restarted in 2021 after a pause due to Covid in 2020. The River Nith was assigned 27 electrofishing sites throughout the catchment. Three run, fully quantitative electrofishing was conducted at these sites according to the NEPS protocol. The gathering of this data enables a bigger picture to be viewed on juvenile salmon population dynamics across Scotland. It also allows individual river catchments to compare their electrofishing data against the threshold developed and used by Marine Scotland. The results from 2021's surveying programme will be available in 2022.

Electrofishing surveying for NEPS 2021

WORKING WITH INDUSTRY

Railway/Road Infrastructure

The River Nith has two major transport links which essentially follow the line of the river from Dumfries to New Cumnock. One is the A76 trunk road from Kilmarnock to Dumfries and the other is the railway line from Glasgow to Carlisle. Both of these structures have an interaction with the River Nith. They interact in two ways, one is via unplanned incidents such as the railway landslide at Dalswinton or the lorry crash at Enterkinfoot involving a tanker full of glue. The second way these transport systems can interact with the river is via maintenance of the structures.

The Polbower Burn being over-pumped to allow engineering works

During 2021 the section of railway line between New Cumnock and Sanquhar underwent a major program of maintenance of bridges and culverts. There are many small watercourse which convey water under the railway line in this section and many of the structures had been assessed as requiring upgrading. The Nith Board holds fisheries data on many of the minor watercourses in this part of the Nith catchment and accordingly are consulted for input to the construction methods to be employed to ensure that fish populations are not adversely impacted by the construction works.

Water outflow being safely discharged onto the riverbank to prevent scouring.

Eight fish rescues and associated surveys were conducted in small watercourses all associated with railway maintenance during 2021. Prior to machinery entering the watercourse, all fish are removed to a place of safety. Once all construction activity is complete then the fish are allowed to repopulate the bridge/culvert structure. Often during construction works of this nature we suggest minor tweaks to the planned works which will benefit fish populations in the long term.

Glenmuckloch Pumped Storage Hydro

The former surface coal mine at Glenmuckloch in upper Nithsdale has undergone restoration over much of its former land footprint. There still exists two large voids within the site boundaries. Nith District Salmon Fishery Board (NDSFB) has had a long association with the Glenmuckloch site due to its proximity to the River Nith and the many small watercourses which drain the site. Over the years NDSFB have conducted aquatic monitoring to support the environmental measures applied to protect the site. All tributaries and mainstem sites within the River Nith have been surveyed for fish and aquatic invertebrates to enable the owners, operators of the site and NDSFB to be able to determine if the mine site was influencing the aquatic environment and the species within.

WORKING WITH INDUSTRY

House of Water

The Board and Trust have for many years been commissioned to conduct fisheries surveys in the watercourses within the vicinity of the House of Water surface coal mine. These surveys were designed to monitor the fish populations in that part of the upper Nith catchment and any influences on them resulting from the mining operations and the associated discharges from the site discharge lagoons. These surveys continue now despite the cessation of mining, to monitor the restoration works which includes the spreading of sewage sludge on the site to provide additional nutrient to the impoverished reinstated soils. Indeed, the fish surveys have been augmented by the inclusion of aquatic invertebrate surveys which are a more immediate measure of the aquatic environment. To date, no adverse influence on the aquatic environment at House of Water has been detected.

Conducting kick sampling at House of Water

New Cumnock Flood Alleviation Scheme

The River Nith's fishery interests have been afforded a high priority during Ayrshire Roads Alliance's project to construct a flood alleviation scheme at New Cumnock. Our fishery staff have worked with Ayrshire Roads Alliance staff and their contractors to ensure that this construction project is conducted in accordance with fisheries legislation. The construction works, by their nature, take place in potentially sensitive locations in proximity to fish habitats. Fishery staff have advised on appropriate times of the year to conduct these works and performed fish rescues to avoid adverse impacts. The fish rescues were conducted immediately prior to any in-river works taking place.

Sandbags being placed in-river prior to works commencing

It was good to find some trout of decent sizes residing in some of the pools. Juvenile salmon and trout were also moved down stream out of the works, along with large numbers of minnow, stone loach and quite a few eels.

This is a multi-year project and the NDSFB will continue to work with contractors on the ground during the next phase of works in 2022.

Adult trout captured during one of the fish rescues

HABITAT

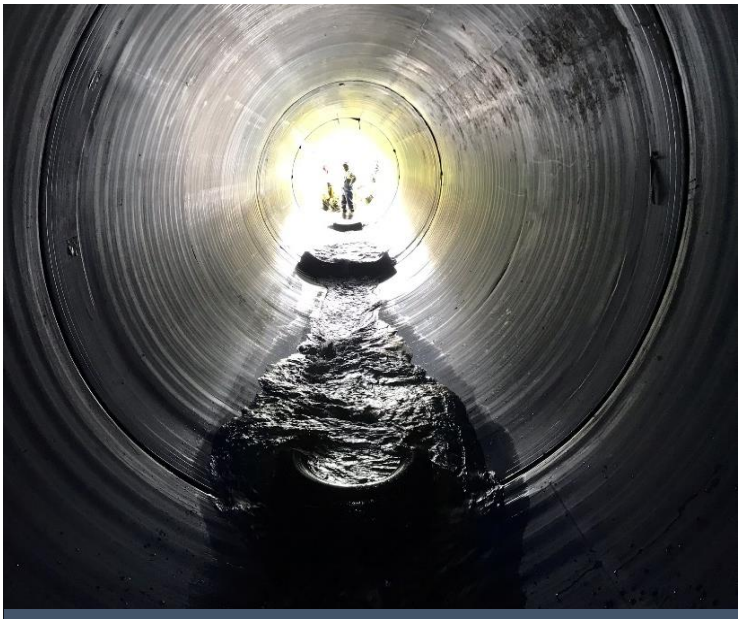
Habitat Works At Crawick

Metal posts being installed for the watergate by C & K Harvey

For many years the Board has recognised the importance of the Crawick water as a salmon/sea trout nursery and spawning tributary of the River Nith and, as a result, undertook habitat improvement initiatives on the two main tributaries, the Spango Water and the Wanlock Water, both of which converge to form the Crawick Water at Spango Bridge. Riparian habitat schemes can be challenging in this remote part of the Nith catchment for a number of reasons. Both tributaries are located in areas of high altitude and accordingly tree growth is slow and takes continued replanting of failures. The Crawick Water is located at much lower altitude but around the Spango Bridge area is favoured by wild campers and day trippers. Many of these visitors come and enjoy the area but unfortunately some light barbeques and fires, choosing to use the agricultural fencing as fuel. To combat this antisocial behaviour, the Board has had to construct some of the habitat fencing in steel. This has been a lasting solution to the water gate longevity issues.

Culvert Fish Pass

Community Windpower Limited constructed Sanquhar 1 wind farm near to the town of Sanquhar in southwest Scotland. The Board conducted all necessary fish surveys associated with the wind farm. The results obtained during the completion surveys revealed that a culvert was presenting a barrier to migration for trout. The 2m plastic culvert pipe was seated on bedrock in such a way that the discharge was elevated above the normal water levels. During high flows, the discharge was submerged but the velocity was so great that fish would struggle to migrate through the culvert.


Baffles installed inside the culvert

The Board were commissioned to make the culvert passable to migrating trout. The challenge was to come up with a retro fit solution which could be installed within the culvert. Having considered many options, the Fishery Director came up with the idea of cutting car tyres in half and bolting them to the floor of the plastic culvert pipe. The rubber tyres were sufficiently flexible to fit the curvature of the pipe with the open-ended C shapes facing upstream to arrest the flow. The rubber structures created small dams within which riverine substrate has held. The water has pooled allowing fish to rest during their migration through the pipe. At the discharge end of the culvert, some of the large boulders were manipulated to create a pool which has resulted in reducing the distance that fish have to travel through the culvert. During 2021, the Board returned to the site to determine if fish passage had been facilitated by the work. Electrofishing upstream of the culvert pipe proved positive with a recordable presence of trout again in the tributary above the culvert. Success!

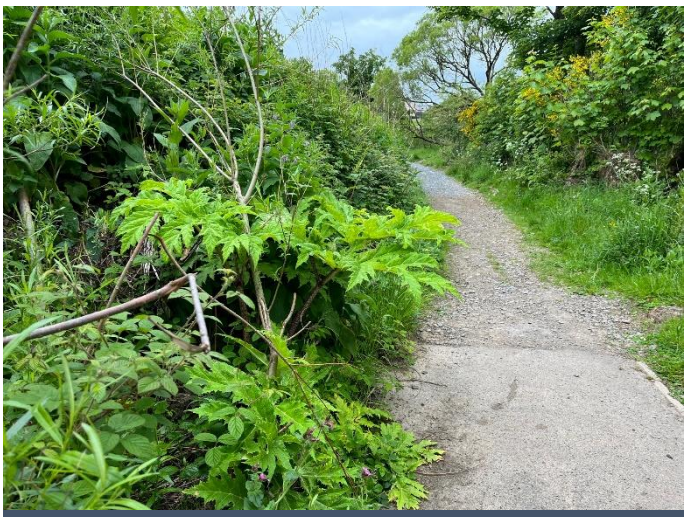
HABITAT

Invasive Non-Native Species

Invasive Non-Native Species (INNS) are animals and plants that have been introduced into Britain at some point in the past and become established to the point that they have taken over, outcompeting other native species of fauna and flora and reducing our native biodiversity. In some cases, such as Giant hogweed, they can even pose a public health risk. One commonality amongst most of these invasive species, is that they are extremely difficult to get rid of and can require many years of persistent treatment to prevent them from re-colonising again.

Over the last 12 years, the Trust and Board have concentrated their efforts on the following invasive species within the catchment; Japanese knotweed, Giant hogweed, Himalayan balsam, Skunk cabbage, American signal crayfish and Mink.

Whilst it is easy to take the view that once invasive species are in the catchment then there is nothing that can be done, the Board and Trust prefer to do everything possible to either control or to prevent the spread of INNS in the River Nith catchment. Education is an important part of preventing the spread of invasive species.



May/June – The river banks are walked and all Giant Hogweed plants are treated prior to seed heads forming. Each seed head can produce 20,000 and each of those seeds can stay dormant in the soli for nearly 20 years. Plants can cause burns if touched accidently.

September/October - Stands of Japanese Knotweed are treated by stem injection methods. This is currently only done on a commercial basis due to funding issues.

January to April – American mink are trapped prior to them breeding to reduce the pressure that they place on our native species. They will predate on juvenile salmonids including smolts during the smolt run.

June to August - North American Signal Crayfish monitoring traps are set to enable fishery staff to plot the spread of this species in areas where they are known to be present. Stopping their introduction is the only way to protect our waters.

EDUCATION

Fishing for the Future project

During 2021, the normal delivery of the Fishing for the Future project was again disrupted due to the pandemic and the nationwide lockdown over the winter period. During this time staff continued to work, albeit mostly from home, using the time to upgrade the hand washing facilities at the base near Auldgirth and develop digital education material suitable for delivering to school pupils remotely.

Once schools started to open back up, remote presentations were delivered to six primary schools throughout Nithsdale. These sessions were streamed using Microsoft Teams and enabled engagement with the pupils, providing them with all the background information that would normally have delivered in person. The following classes were involved with the sessions: Kelloholm Primary 4, Wallace Hall Primary 5, Duncow Primaries 1-7, St. Michael's Primary 4, Wallace Hall Academy S3 and Sanquhar Academy S1. Four remote sessions and two outdoor sessions were delivered to each schools.

The outdoor sessions took place on the riverbank or in the playground, in accordance with Covid-19 policies. In total, 151 school pupils took part in the Fishing for the Future project, which is pleasing considering the constraints that were in place.

In a normal year, free from pandemic constraints, Trust and Board staff would run Nith Young Angling fishing days over the course of the entire year. However, during the summer 2021 period, it was more appropriate to compress the Nith Young Angling days into the summer and autumn holidays. This meant that volunteers, who assist with the tuition on the days, were able to attend. Over the seven angling days that were run, 28 young anglers and their parents attended to learn about sea, coarse, pike, salmon and trout fishing. There were a number of new participants on the programme and it was pleasing to see the level of family involvement. DGAA kindly donated Junior Fishing permits to the Nith Young Anglers. They were gratefully received, thank you.

The angling taster days were very successful this year with increased numbers of applicants. This is an important aspect of the project as ultimately it is the taster days which provide the new recruits for the Nith Young Anglers
Club.

From top: Virtual session with St. Michael's Primary, River survey with Wallace Hall Academy students, Electrofishing at the cauld in Dumfries, Young Anglers fascinated by the first

Unfortunately, 2021 was the last year that the Board and Trust will be working with Borderlines staff, who have provided invaluable contribution of both time, fishing tackle, funds and equipment during their involvement in the Fishing for the Future Project, as they have made the decision to retire. Very grateful thanks is extended to Derek, Glyn, Clive, Chris and Roger for all of the days of fishing instruction they have provided over the years to the young people on the Nith and for the generous donation of fishing tackle and funds to assist with the running of the project into the future. The Board and the Trust and all staff wish them a peaceful retirement and tight lines!