Central Queens Branch of the PEI Wildlife Federation 2023 Electrofishing Summary on the West and Clyde Rivers

Prepared by
The Central Queens Branch of the PEI Wildlife Federation
Jordan Condon *(Project Coordinator)*
Isaac Arsenault, Knowlton Parkman, Patrick Duguay (*Restoration Technicians)*
December 2023

Funding provided in part by
Atlantic Salmon Conservation Foundation

Introduction

The Central Queens Branch of the PEI Wildlife Federation (CQWF) carried out its annual electrofishing surveys in 2023 to assess juvenile salmonid abundance throughout the West River and Clyde River watersheds. The surveys assessed Atlantic salmon *(Salmo salar*) and brook trout (*Salvelinus fontinalis*) juvenile densities but also rainbow trout (*Oncorhynchus mykiss*), which are considered non-native to PEI.

Surveys targeted juvenile habitats in order to determine spawning success and recruitment from year to year at long-term index sites. These index sites were established in order to help monitor long-term population trends in salmonid communities and are assessed on an annual basis. Index sites are located on major tributaries (2nd and 3rd order streams) and also include sites along the main river (3rd and 4th order streams). Sites were strategically chosen to be representative of stream habitat and cover areas where there have been historic records of Atlantic salmon or brook trout spawning efforts. Site selection typically focuses on juvenile habitat which contains shallow waters (<60cm) with a lack of deep pools (>60cm) and coarse stream bottom substrate.

The main objectives for 2023 electrofishing surveys were to determine local juvenile abundances for salmonid species and also to determine which sections of river habitat are currently being utilized by Atlantic salmon. Another goal during these surveys is to conduct a bioinventory for salmonids present at the sites. This includes monitoring for juvenile brown trout as adults have been recorded on the West and Clyde Rivers by anglers. To date no successful spawning of brown trout have been recorded (ie-production of juveniles).

Methods

A battery-powered Smith-Root LR-24 electrofisher was used to conduct surveys. An electrical current is produced to immobilize fish and a crew is nearby to capture the stunned fish using dip nets. Captured fish are placed in a bucket and held until processed.

In order to measure density, a site is enclosed with barrier nets to prevent any immigration or emigration of fish during the survey. Only one of the 15 sites was surveyed without barrier nets due to difficulties in maintaining the barrier nets on the main West River. Normally 3 sweeps (sometimes 4) are carried out through the entire site to establish a diminishing return of captured fish. Captured fish are identified by species and then measured to

fork length to determine age class. Once all the captured fish are processed they are released back to the stream. Population estimates are produced with the Zippin Three Sample method and in combination with the total area surveyed provides a measurement of fish per unit. The population estimate is used to determine the number of fish per 100m^2 and will be presented in that format for the purpose of this report. Other measurements also taken at each site include water temperature and GPS location.

Results

In 2023, a total of 15 sites were assessed by the CQWF field crew between August 17th - 25th on the West River and Clyde River with an additional site assessed on October 5th. Of the 15 sites, 13 were on the West River and 2 were on the Clyde River (Figures 3 and 4).

During our 2023 electrofishing surveys, brook trout were present at all 15 sites surveyed. Brook trout spawning occurs more frequently on tributaries rather than along the main river and extends into the headwater regions. Abundances ranged from 13.1 to 182.2 fish per 100 m^2 and averaged 69.6 fish per 100 m^2 (Table 1). There did not appear to be a significant relationship between the number of brook trout and other salmonids at any site. Brook trout population densities were significantly higher in 2023 compared to 2022 at 11 of the 14 sites surveyed. The average density went from 45.5 fish per 100m^2 in 2022 to 72.5 per 100m^2 in 2023.

In 2023, Atlantic salmon were present at 12 of the 15 sites surveyed while abundances ranged from 0 to 27.7 per 100 m^2 with an average of 6 salmon per 100 m^2 (Table 1). These results indicate many sites have moderate populations of salmon, 10 sites had 0.1-25 fish/100 m^2, 2 site had 25-50 fish/100 m^2, and 3 sites had 0 fish/100 m^2. The mid river sites on Howell's Brook (Wynn Rd and Mcdonald's) did not have recorded redds nearby in 2022 but low densities of two year old salmon were found. This could be relative to the high quality of habitat and the parrs ability to seek out ideal habitats. W-Main2 and W-Main3 had an increase in young-of-the-year production from 2022, which is encouraging as this indicates salmon are using this area to spawn more regularly as restoration efforts continue in this area. In 2023, no juvenile Atlantic salmon were detected on the Clyde River and they were last recorded on this river in 2012 (Figure 2). Stocking of salmon fry occurred each year from 2015-2022 it did not occur in 2023 resulting in all the young-of-the-year salmon captured being native spawned fish. It is difficult to distinguish if the second age class of parr is native spawned or stocked fish due to

their tendencies to move around. However, it is still important to monitor sites that may have been influenced by stocking efforts in order to determine the survival success of stocked fish. Sites along the West River main branch (W-Main3 and W-Main4) are representative of native-spawned fish and produced the highest densities of salmon found during 2023 surveys (27.7 and 25.9 fish per 100m^2).

Rainbow trout were present at 15 of the 15 sites surveyed. Abundances ranged from 16.7 to 91.9 per 100m^2 and averaged 41.7 fish per 100 m^2 during 2023 electrofishing surveys (Table 1). Rainbow trout are an introduced species and are considered to be nonnative and may compete with Atlantic salmon for habitat usage in tributary areas since both species prefer swift riffle habitats. Rainbow trout were the dominant fish at the Carragher's site on Quinn's Brook (W-Quinn1) and also at two sites on Howell' Brook (W-Howells 2 and 3). Several factors may contribute to the rainbows success in specific reaches such as warmer water temperatures on Quinn's Brook which may reduce the competitive advantage brook trout have with an earlier emergence. Another important factor to consider is placement of large rainbow redds which were recorded on Howell's Brook nearby survey sites and resulted in an abundant number of young-of-the-year fish.

In 2023, the Howell's Junction site (W-Main4) was surveyed to target the spawning efforts by adult salmon and was previously surveyed in 2019 and 2020. Going forward the Howell's junction site will be surveyed annually to help monitor the spawning recruitment of Atlantic salmon as redds are regularly recorded nearby this electrofishing site. No barrier nets were used at this site, therefor the Zippin formula may have inaccuracies as an assumption is there is no immigration or emigration.

General trends indicate that the overall juvenile populations throughout both watershed areas increased significantly from 2022 to 2023 as the average number of fish captured went from 98.7 fish per 100m^2 to 117.2 per 100m^2 and at some sites the total fish per 100m^2 was high as 3 times the previous years densities. The overall populations increased at 9 of the 14 sites surveyed from 2022. It is difficult to make accurate assumptions to the reasons behind these population increases but could be the result from many compounding factors. There was significantly more woody debris in many of the sites in 2023 from the aftermath of Hurricane Fiona which occurred in the fall of 2022 and provided fish populations more holding habitat. Another trend worth noting is at the site with the lowest densities recorded in Brookvale

(W-Bvale4). This site was negatively impacted from the Canada Games construction in fall of 2021 which resulted in metric tonnes of silt entering the brook and will have long term effects for local populations. Another factor for this site is the proximity to the Brookvale Hatchery which also poses a long array of potential unknown factors that could be significantly reducing the habitat's productivity.

Recommendations

Moving forward, additional index sites along the main branch may be considered to be monitored in future endeavors to better represent the spawning population due to the bulk of spawning efforts being located along the main branch of the West River. It would be beneficial to have these index sites away from areas that are influenced by stocking efforts to have an adequate representation of population trends on the main West River. CQWF followed this recommendation in 2023 as it surveyed a site established in 2019 for a UPEI research study and will continue to do so as it serves as an important Atlantic salmon index site.

Additional recommendations include consulting with PEI biologists in order to standardize methods to monitor main branch sites without barrier nets. Main branch sites pose difficulties as the flow volume makes it difficult to maintain barrier nets during surveys. A standardized method approach will ease the process of monitoring main branch sites and increase our ability to monitor several sites.

Table 1. Juvenile salmonid abundance calculations as fish per 100m^2 for 15 sites electrofished in 2023 by CQWF.

Site Location	Site Category	Brook Trout	Rainbow Trout	Atlantic Salmon	Total 2023
Brookvale (Main branch)	W-Main1	50.3	40.5	4.6	95.4 ↑
Cudmores (Main River)	W-Main2	58.4	34.6	8.6	101.6 ↓
Bolger Park Rd (Main River)	W-Main3	78.4	35.6	27.7	141.7 ↑
Howells Junction (Main branch)	W-Main 4	28.6	16.7	25.9	71.2
Curleys (Brookvale)	W-Bvale1	122.0	37.9	11.8	171.7 ↓
Patsy Arsenaults (Brookvale)	W-Bvale2	45.3	26.2	2.1	73.7 ↑
Skye Bk (Brookvale)	W-Bvale3	67.9	17.3	0.5	85.8 ↑
Below Hatchery (Brookvale)	W-Bvale4	13.1	27.5	1.2	41.7 ↓
Carraghers (Quinn's Brook)	W-Quinns1	41.4	57.9	2.0	101.3 ↓
Riverdale Rd (Howell's Brook)	W-Howells1	70.9	67.0	2.8	140.7 ↑
MacDonald's (Howell's Brook)	W-Howells2	52.5	91.9	0.6	145.0 ↑
Wynn Road (Howell's Brook)	W-Howells3	64.5	69.4	2.3	136.2 ↓
Quinn Road (Howell's Brook)	W-Howells4	93.8	16.2	0.0	110.1 ↓
Dixon's Dam (Clyde River)	C-Main	182.2	28.5	0.0	210.7 ↑
Alex Dixon's (Clyde River)	C-North	74.1	57.7	0.0	131.8 ↑

Table 2. Range densities for salmonids captured during electrofishing surveys.

0	
0.1 - 24.9	
25-49.9	
50-70	
>70	

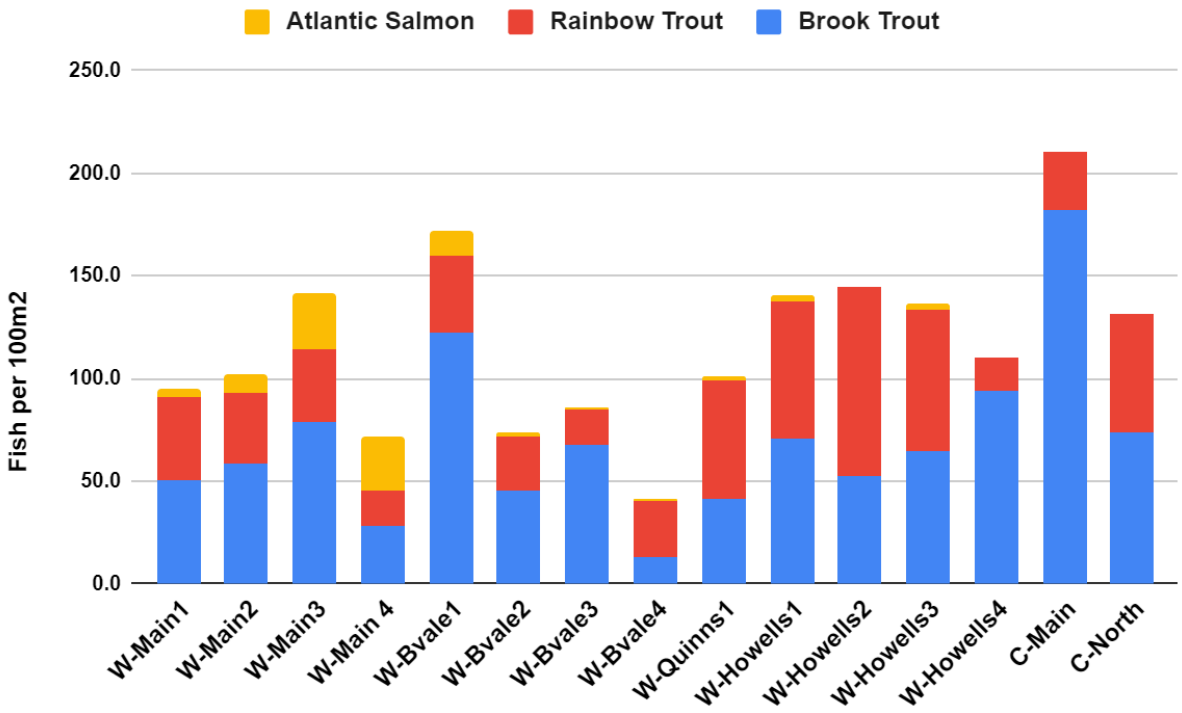

Figure 1. Electrofishing results from 2023 West River and Clyde River sites with fish captured calculated fish/100 m^2.

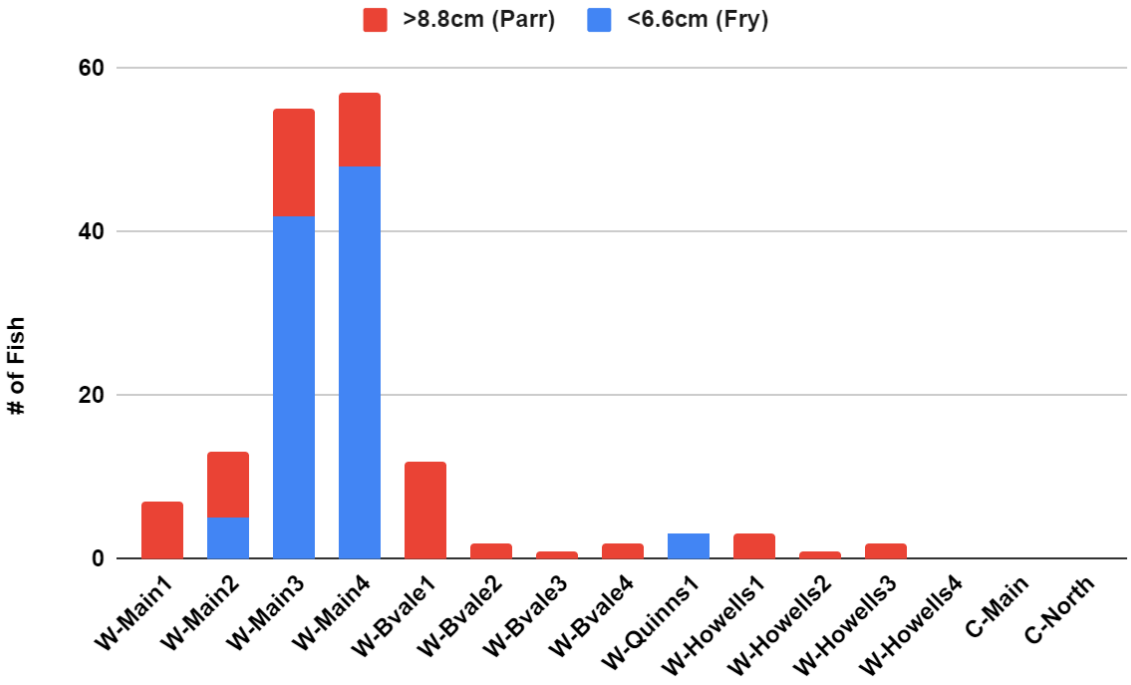

Figure 2. Age class distribution of Atlantic salmon for electrofishing sites surveyed in 2023.

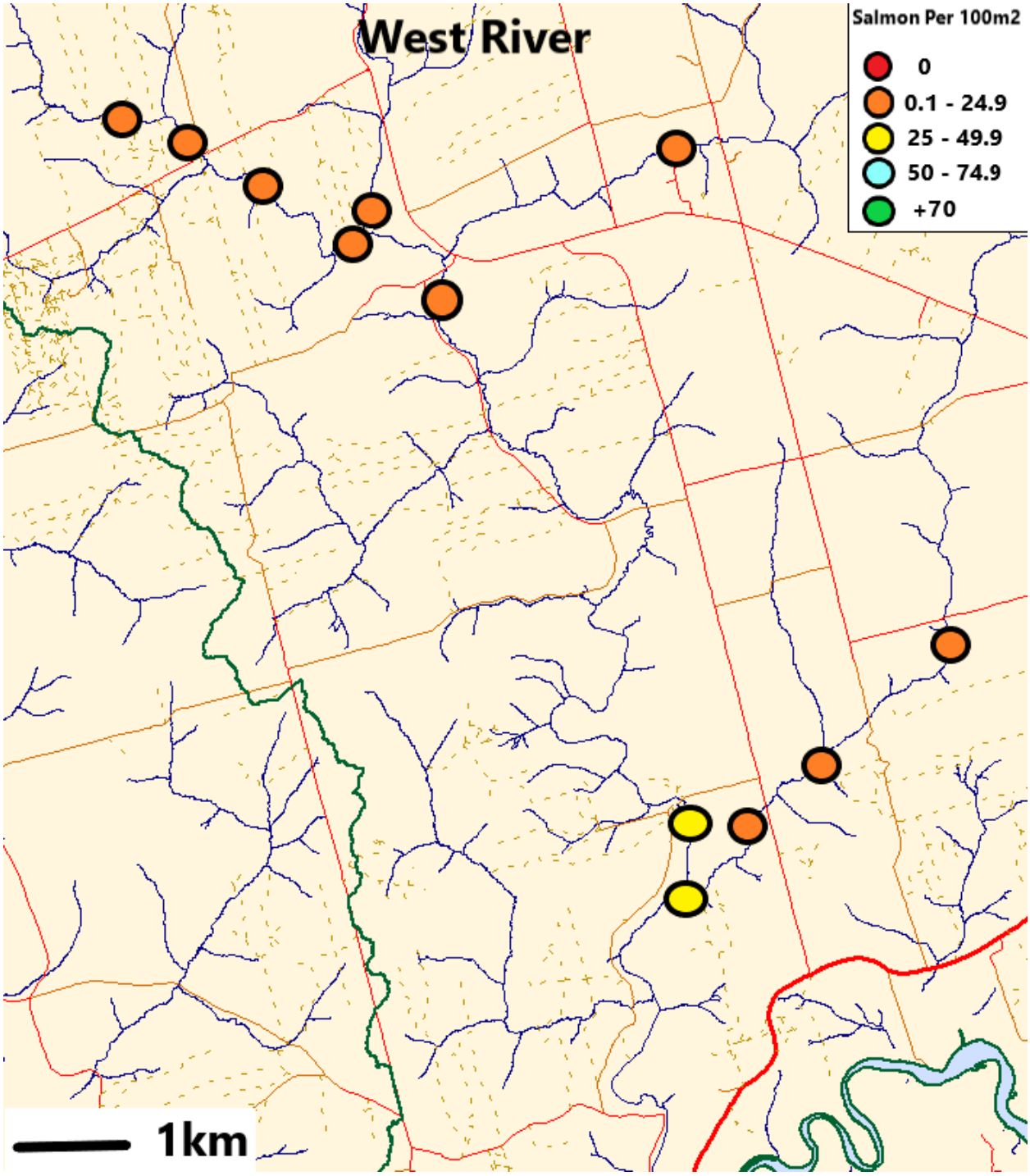

Figure 3. West River 2023 electrofishing survey sites with Atlantic salmon densities.