Central Queens Branch of the PEI Wildlife Federation 2023
West River Redd Survey Summary

Prepared by
Jordan Condon
Project Coordinator
Central Queens Branch of the PEI Wildlife Federation
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Introduction

The Central Queens Branch of the PEI Wildlife Federation (CQWF) has been carrying out redd surveys on an annual basis since 2008. During mid-late November CQWF monitors spawning efforts of Atlantic salmon by walking the reaches of rivers that have a history of spawning and counting redds. Carrying out these surveys provides vital information used for future management decisions. These surveys provide an estimate of returning adults that enter the freshwater habitat to spawn which also helps identify which reaches of habitat are used by spawning adults, all of which CQWF will incorporate into future restoration decisions. Long-term trends from these surveys help indicate critical habitat areas important for protection and other areas that could use enhancement. These surveys can also indicate whether past restoration structures are being utilized and are successful (eg-spawning beds).

One of the most exciting results from a recent redd survey was in 2018 (again in 2019&22) when Atlantic salmon redds were found in a reach of Brookvale. This reach was severely degraded from siltation and dense alder growth and CQWF spent almost a decade repairing and restoring habitat components to the point that salmon began to return and spawn again. Though redds were not found in this area in 2023 CQWF did find redds located nearby just 300m downstream of Rte 13.

Methods

CQWF field crew and volunteers walk the same sections each year to count and determine the spawning efforts of adult Atlantic salmon. Surveyors begin at the lower end of the section and walk upstream to a predetermined location. All major tributaries (Howell's and Quinn's Brook) are surveyed along with the entire main branch of the West River. In total, the minimum distance surveyed is 18 km of river, which includes major tributaries. Additional reaches may be surveyed if the timing is appropriate and additional information is being sought after (eg- brook trout or rainbow trout redds).

An individual redd is counted as an area turned up by an adult salmon with a final depression at the upstream side of the turned-up area. Large areas can be used by multiple salmon or one salmon creating multiple redds. In this case, the individual depressions are identified and counted as one redd as that upstream depression typically indicates the final act of the spawning female as she covers the eggs.

GPS waypoints are dropped at each redd location and notes are taken for each GPS reading to indicate the size of the redd and how many individual redds are at each location. If an area is identified for future restoration actions a piece of flagging tape may be placed on a nearby branch or tree to physically mark the redd location since GPS waypoints can be somewhat inaccurate in the field (up to 5m off sometimes).

2023 Results

A total number of 84 Atlantic salmon redds were counted in 2023. The number of redds in 2023 was below average when compared to recent years' surveys, but there is still a slightly increasing trend since 2008 (Figure 3). Each year the bulk of the recorded records are in the lower 10km of main West River and in 2023 89% of the recorded redds were in this area.

The survey conditions in 2023 were not ideal with wet conditions and a saturated water table for the entire spawning season. When a saturated water table experiences any additional precipitation the river is easily rendered unsurveyable as water levels are too high and visibility conditions become poor. After the 28th of November there was a high water event and a final count could not be carried out on the lower West River below Bolger Park Rd. It would have been expected there to be several new redds created since the previous counted was conducted on November 14th but the water levels did not drop enough to complete these surveys and with additional precipitation means it will not be possible in 2023. CQWF attempted on two dates to finish the lower river surveys but both days the river was still too high and had very poor visibility (December 1st and 8th).

Discussion

Spawning habitat used by Atlantic salmon from 2018 to 2021 is displayed in Fuigure 2. Certain reaches of the West River are utilized year after year for spawning and it is imperative to restoration efforts that such areas are identified. Certain areas are used intermittently for redd creation and are flagged by CQWF for restoration efforts. These habitat areas are targeted for enhancement activities such as raking to reduce substrate embeddedness. By raking these “spawning beds” CQWF can reduce the impacts of sedimentation, and reduce the embeddedness of substrate used for spawning with the goal of increasing embryo survival. By identifying significant spawning areas CQWF can focus in on priority areas for monitoring and enhancement

purposes. Another key aspect that can be pulled from this information are areas of the West River that could use additional spawning habitat work in order to increase redds in new areas and help spread out spawning habitat competition. This will ultimately spread out juvenile competition as redds are displeased throughout the watershed this will also spread the dispersal of juveniles thus reducing competition.

Since 2008 redd surveys indicate a slightly increasing trend, however, this does not imply that the total redd counts are increasing every year (Figure 3). For instances, the redds recorded in 2023 were similar to the 2009-2012 range and though the 2023 redd count was lower than previous years this could be related to cyclic patterns influence by a variety of factors, which can become masking and difficult to relate in one individual variable. A major factor that may greatly influence adult returns is intermittent years of stocking efforts.

CQWF hopes to eventually meet and exceed its egg conservation requirement by continuously working to improve habitat requirements for the freshwater life stages of salmon. This includes ensuring river connectivity to important spawning areas, improving spawning habitat, and providing ideal juvenile-rearing habitat to support robust populations. The strategy to meet these requirements is discussed in CQWF's Atlantic Salmon Habitat Management Strategy.

Future Management Implications

Redd surveys will be conducted on an annual basis and incorporated into future management decisions. CQWF will continue to enhance areas that are continuously used for spawning by raking substrate to "clean" and reduce embeddedness, and in some instances add the preferred sized substrate where it is lacking. CQWF intends on increasing available spawning habitat by altering flow characteristics by installing soft engineered structures (Image 1), and adding proper sized substrate (Nova Scotia river rock). These "soft engineered structures" typically involve using local materials (boulders or logs) to alter flow hydraulics to mimic the crest of a riffle or increase flow velocities over areas that contain high-quality spawning substrates (example Image 2). These management techniques will help ensure salmon are utilizing high-quality spawning habitats and enough of such is available to spread out spawning efforts in order to reduce juvenile competition in nearby rearing habitats. Enhancing spawning habitat is one way CQWF intends on increasing the freshwater production of Atlantic salmon

and increasing population resilience. New areas will be explored in the mid to upper region of the West River since these areas do experience low amounts of redds and could support much more if additional habitat is provided. This concept will be the forefront for CQWF's future restoration efforts.

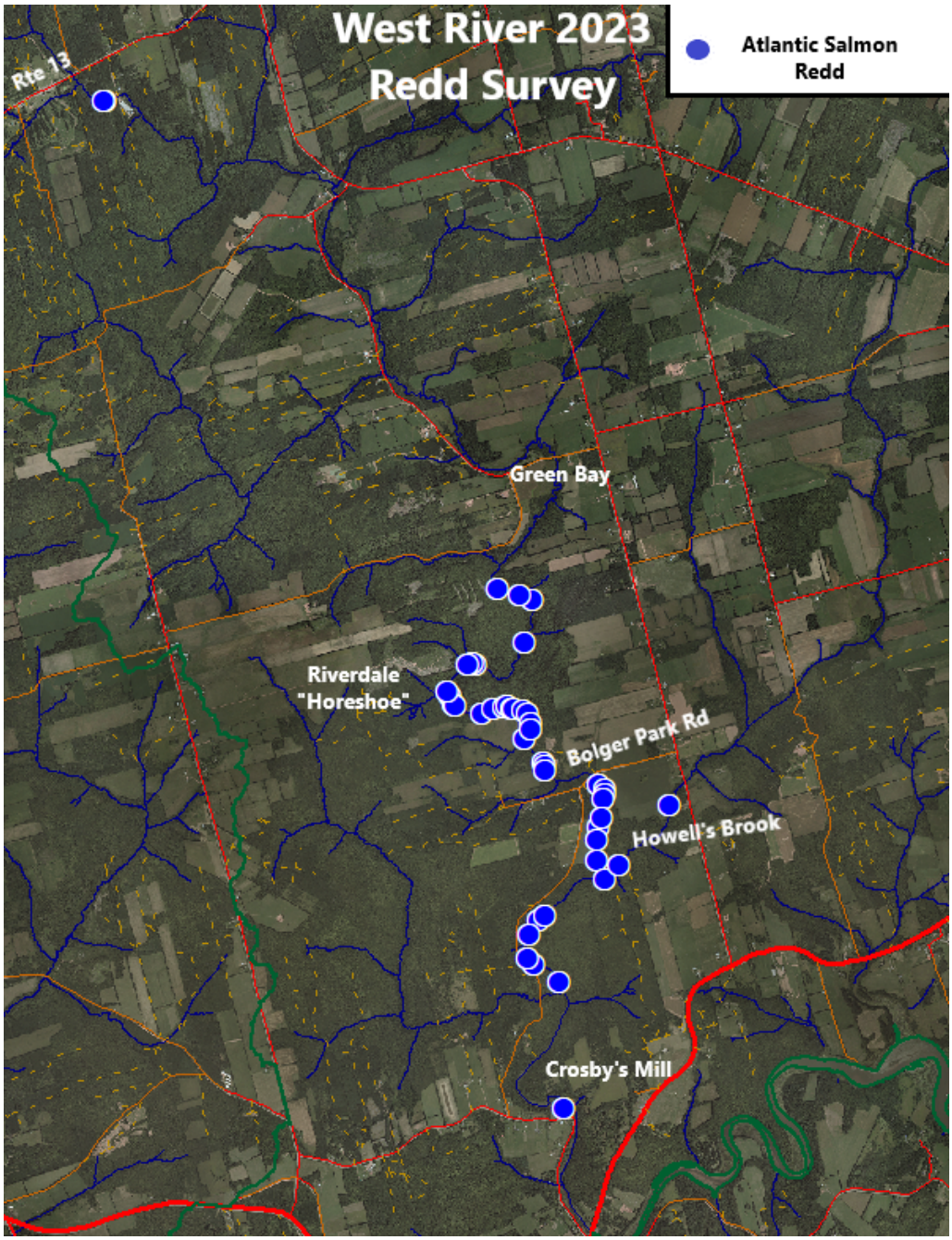

Figure 1. Atlantic salmon redds on the West River in 2023.

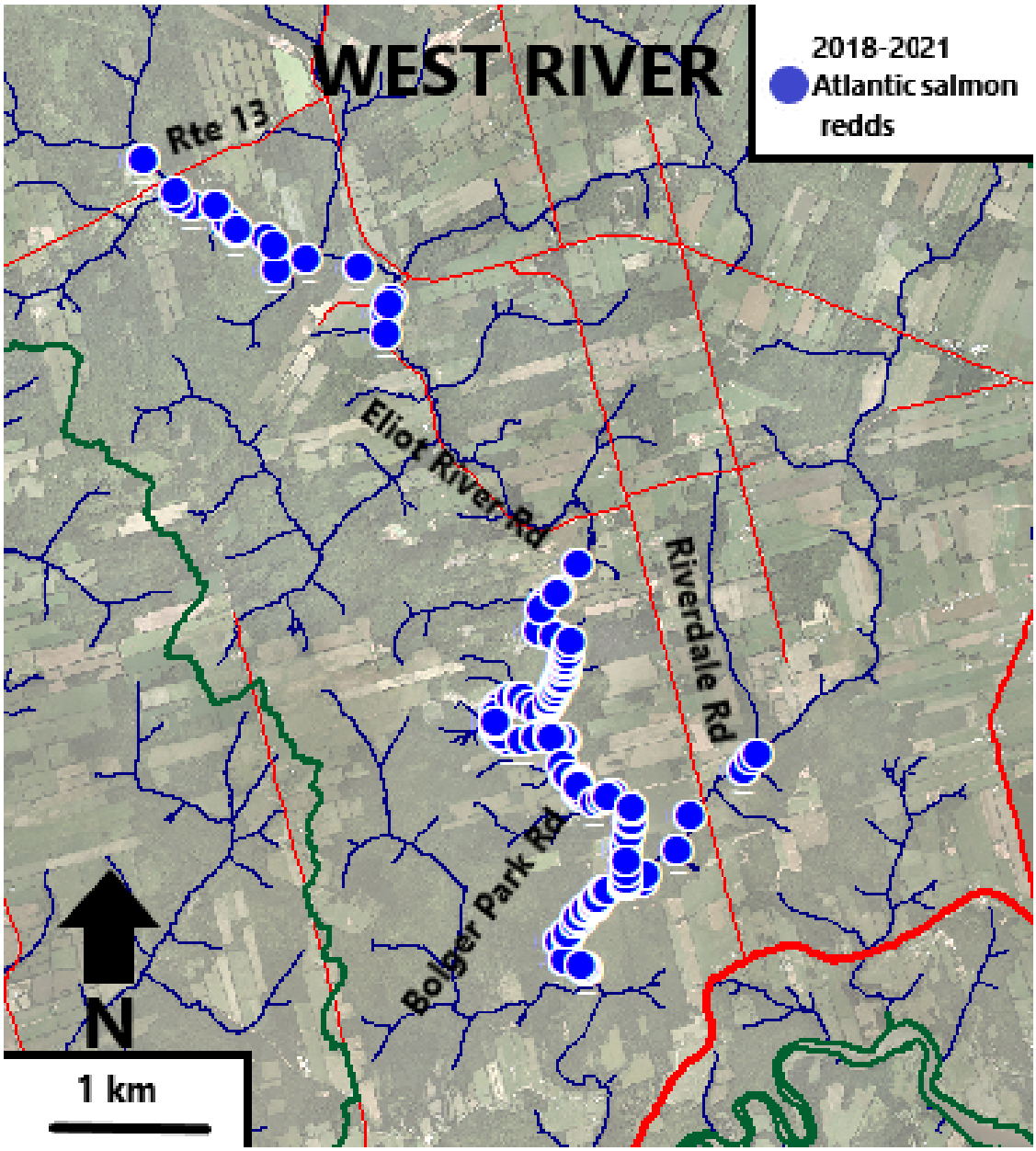

Figure 2. Historic Atlantic salmon redds recorded from 2018-2021 on the West River.

Table 1. An area breakdown for recorded Atlantic salmon redds on the West River. Total numbers with an asterisk next to it indicate incomplete counts.

	Crosby's - Bolger Park Rd	Bolger Park - Eliot River Rd	Elliot River Rd - Mckenna Rd	Mckenna Rd - Rte 13	Above Rte 13	Howell's Brook	Quinn's Brook	TOTAL
2017	53	77	9	6		4		149
2018	58	59	0	3	3	1	0	124
2019	35	56	0	13	1	8	0	113
2020	23	62	10	7	0	0	0	102
2021	20	16	NA	0	0	2	NA	38 **
2022	58	71	6	0	2	4		141
2023	27	48	0	4	0	5	0	84 **

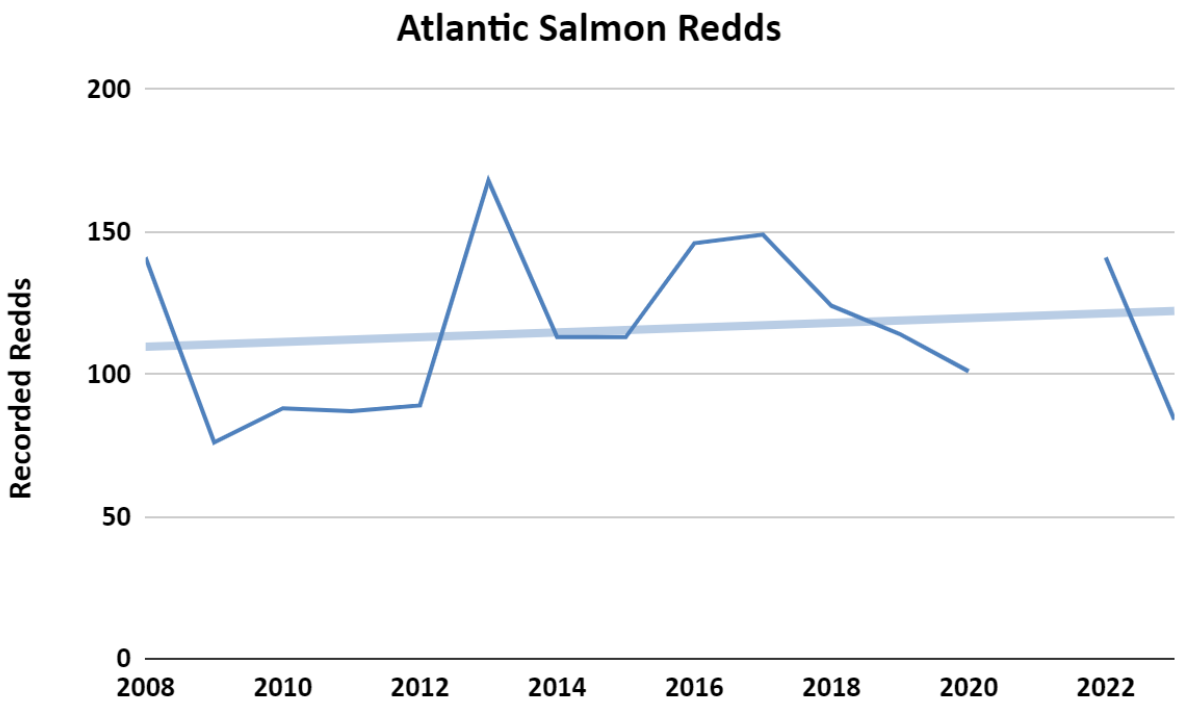

Figure 3. Total counted Atlantic salmon redds from 2008 to 2023. Data from 2021 is not included since it was an incomplete count. A trendline indicates an increasing trend in Atlantic salmon redds on the West River.

Image 1. This image shows a soft engineered structure installed by CQWF to help alter flow characteristics and encourage salmon to spawn over an area with high quality substrate.

Image 2. CQWF field crew conducting redd surveys. This particular redd was placed on a structure installed in 2022 to create new additional spawning habitat.