



Wellman Lake Walleye Recruitment Surveys 2021

In part of reporting for FES Project 20-040
SVSFE Recreational Angling Initiatives 2021

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January 2022

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Executive Summary

A combination of logistical issues, breakdowns, and bad luck can be used to describe 2021 Wellman Lake recruitment surveys. In 2021, reef guzzling results were influenced by faulty gear. The catch per unit effort of 5.9 live eggs/minutes was the lowest recorded since the reef was enhanced in 2017. As for OTC analysis, efficacy trials were a failure and obtaining the sample size from Wellman Lake OTC study was disrupted from unanticipated gear restrictions. Alternate methods were attempted to collect target sample sizes for OTC analysis (n=100) but proved to be labour intensive and too costly to continue. In total, through alternative methods, four young-of-year walleye were collected for OTC detection.

The 2019 results found 86/99 (86.8%) of the sample size had no mark and could be considered naturally recruited. 2020 results were similar with no visible mark on 95/99 (94.9%) of the collected sample size. 2021 lab results, although samples are far below the target, are pending but still of interest.

From this point forward, in accordance with SVSFE's long term research plans - it was decided to utilize DFO's SR20 every two years to coordinate with other local projects. As a result, year 4 of the OTC study is now scheduled for 2023. It may take some time, but SVSFE and Manitoba Fisheries will determine an effective long-term stocking strategy for Wellman Lake.

History

Historically, Wellman Lake was a high-quality walleye fishery that did not require artificial propagation. As access improved in the 1950's so did angling pressure. Angling pressure ultimately increased until the 1980's where the walleye fishery collapsed. The common understanding of what happened from the 1950's-1980's can be summarized by the angling culture that existed during that time. Generally, walleye were kept (8 fish limit), and pike were released (unless it was a large pike). Supplemental stocking of walleye did not occur on a regular basis in those days. Four decades of this led to a composition shift, which ultimately resulted in the establishment of a hammer-handle fishery.

By the late 1980's, SVSFE and Fisheries Branch began working deliberately to shift the species composition back to "historical levels". Efforts throughout 1990s included: increased walleye stocking (fry, and rearing programs), limno-corral walleye rearing program, Loat Lake rearing program, spawning reef enhancement (1993), pike removals through various netting efforts and fishing derbies, and walleye regulation changes from an 8 fish limit to a zero fish limit (1989), and then to a 2 fish limit with a protected slot (1993). The pike removal programs were discontinued in 1993 and walleye stocking (fry and sub-adult) has occurred regularly since.

In recent years, (2010-present) SVSFE in partnership with Fisheries Branch have begun assessing the walleye population and recruitment success under the new management regime. The objective has been to understand the population dynamics and recruitment under current levels of angling pressure. Efforts since 2010 have included annual reef guzzling (2010-present), annual barrel counts (2011-2019), near-shore community index netting (2010, 2011 and 2019) and a multi-year oxytetracycline (OTC) survey (2019-2021). Reef guzzling resulted in the re-enhancement of the spawning reef in the winter of 2017. Population assessments found that under current management, the walleye fishery had rebounded from the collapse in the early 1990's. 2019 netting data had shown a walleye composition of (45%); the highest it has been since 1967 (58%) alongside healthy population dynamics with a wide range of age classes. Inconsistent stocking and a lack of information on natural recruitment success made it difficult to propose a future stocking strategy based on available information. A full research history and data summary for NSCIN can be viewed in the 2019 Wellman Lake Nearshore Community Index Netting & Walleye Recruitment Surveys.

In late 2019, it was recommended to continue with the OTC study until at least three years of data is acquired. At this point, a stocking strategy could be proposed based on results. It was also recommended annual guzzling occur on the reef and it is suggested that notes on sedimentation are observed and recorded to determine if cleaning becomes

necessary. Barrel counts should be re-considered, and replication of the near-shore community index netting program should occur every six-eight years from 2019 forward. If recruitment to younger cohorts becomes low following the natural recruitment/fry management strategy outlined through OTC results - fingerling stocking can be considered again; as there appears to be notable age class success resulting from plantings via the Beautiful Lake Walleye Transfer (2009-2017).

Study Rationale

The objectives of research conducted on Wellman Lake in 2021 are as follows:

- 1) As a method to quantify reef usage by walleye, replicate guzzling protocol for monitoring purposes.
- 2) As an effort to determine natural recruitment success, conduct year three of the OTC study. This data will provide valuable information on natural recruitment success which will ultimately contribute to the development of a long-term stocking strategy.
- 3) Using the data collected in 2021 - complete an intermediate report for Fisheries Branch, The Fish and Wildlife Enhancement Fund (FWEF), the SVSFE board of directors, and the Wellman Lake cottage owners/lake users.

Study Area

Wellman Lake is one of the largest waterbodies in the Duck Mountain Provincial Park. Located in the north-central portion of the park, Wellman Lake lies approximately 54km southeast of Swan River, Manitoba. The lake is 429.5 hectares and has a maximum depth of 18.7 meters. Wellman is one of the most developed lakes in the Duck Mountains with 127 cottages, 105 campsites (seasonal & transient), and an additional 13 cottages at the nearby - Glad Lake. The destination has many public and private services. Wellman lake Lodge has 7 available cabins for rent, a private campground, boat rentals, a restaurant, and a convenience/grocery store amongst other services.

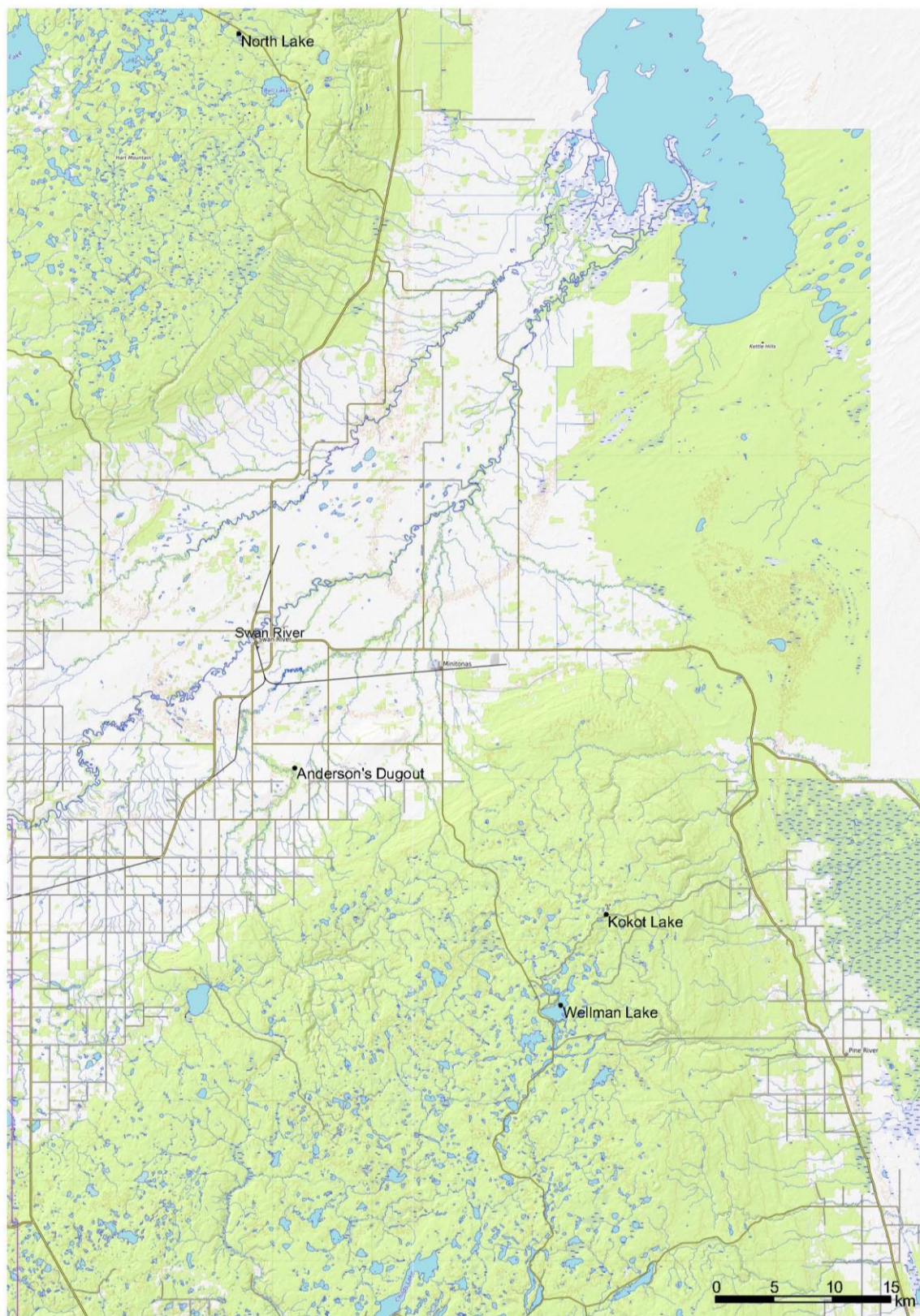


Figure 1: Study Area

Methods/Results

Reef Guzzling

Guzzling the reef to determine walleye utilization has been the selected method since 1992. The guzzling equipment used from 1992-1995 was an electric pump, while eggs collected from 2011 to 2021 used a manual hand pump. The number of sites varied over the years with a minimum being 6, and a maximum being 10. Sites were randomly chosen each year and 1 square meter plots were guzzled for durations of 1 minute to 5 minutes. Since 2016, 10 random sites were guzzled for 60 seconds with a 30 second flush. Live egg CPUEs are counted and released back onto the reef following sampling. In 2021, reef guzzling occurred on May 19th and 20th and surface temperatures averaged 12°C and found a CPUE of 5.9 live eggs/minutes (Figure 2).

Oxytetracycline (OTC) Detection on Age 0+ walleye

The Whiteshell Fish Hatchery has been marking walleye fry using Oxytetracycline (OTC) since 2003. OTC is a non-lethal, non-toxic internal dying agent that imprints a mark on boney structures of fish (i.e. otoliths). Prior to stocking, recently hatched walleye fry were immersed in an OTC solution for 6-7 hours; thus dying their bony structures. Past efficacy trials for the Whiteshell Hatchery have reached the 95+% mark (Kansas, 2013).

On May 25th, 200,000 fry supplied by the Whiteshell Fish Hatchery were stocked on the south shore of Wellman Lake. The surface water temperature was 10°C and fish were stocked on the windward shore to maximize the potential for the fry stocking location to overlap with the location of zooplankton. Fry were noted to be in fair condition.

Three different waterbodies were chosen for efficacy trials in 2021 because of limited survival in North Lake in 2020. On May 25th, 30,000 OTC fry were stocked in North Lake, 20,000 into Kokot Lake, and 10,000 into Austen Anderson's Dugout. By the time the OTC fry were transported the efficacy waterbodies - technicians noted poor condition in all three bags.

Collection surveys were attempted on September 7th and 8th, 2021. The SR20 was not operable during the scheduled survey, therefore alternative methods were experimented with. First, fine mesh trap netting was attempted in beach areas where YOY collection was significant in previous years. A Redden custom trap net (3'x6'x15') 1" mesh was set overnight in two locations. The first was set at the Regatta Bay beach and the second was set at the Regatta Bay Narrows overnight. Two custom trap nets from Superior Net and Twine (6' trap net with ¼" mesh) were set overnight at two locations in Tompkin Bay (Figure 3). Trap nets were unsuccessful in capturing young-of-year walleye.

Beach seining and backpack electrofishing occurred on the evening of September 7th. Seven beach seines occurred between two high catch locations from past assessments - the main beach and the east boat launch (Figure 3). Attempts to string three seines side by side to cover more area and having two seines travelling towards each other was experimented with limited success. Two backpack electrofishing transects were attempted, with one trying to track fish into beach seines - again, with limited success. In total, on the evening of September 7th we were able to collect four young of year walleye (Table 1). Following discussions with the team and Provincial Fisheries staff, it was determined that using these methods would be too time consuming to collect the desired sample and waiting for repairs of the SR20 would be the best option - which ultimately did not work out.

From the beach seining, walleye were sampled for fork length(mm), total length(mm) and weight (to a tenth of a gram). Otoliths were placed in micro-tubes to protect from damage during shipping. When present, stomach contents were recorded. Otolith samples were sent to AAE Tech Services out of Winnipeg, Manitoba on October 21st, 2021 and are still awaiting analysis. AAE Tech Services, is known for their quality of work in all aspects of fisheries research and meet the aging standard and OTC detection standards set out by the Department of Fisheries and Oceans. Comparison of past OTC surveys can be reviewed in Table 2.

On September 13th a trap net was set in North Lake, a trap net was set in Kokot Lake, and two gill nets were set in Anderson's Dugout. The trap nets were both 6ft custom trap nets (1/4" mesh) built by Superior Net and Twine. Anderson's dugout received a Swedish net and a 1" mono mesh gill net. Both nets were set parallel to each other and set across the entire dugout. The gill nets were checked on September 14th, which yielded nothing and were reset. Trap nets were pulled on September 16th. Kokot yielded fathead, dace, and stickle back. North Lake found only dace and stickleback, while the nets in Anderson's dugout were still empty on the 16th. In total, netting effort equated 222.93 hours. Comparison of past OTC efficacy trails on Whiteshell Fish Hatchery fry can be review in Table 3.

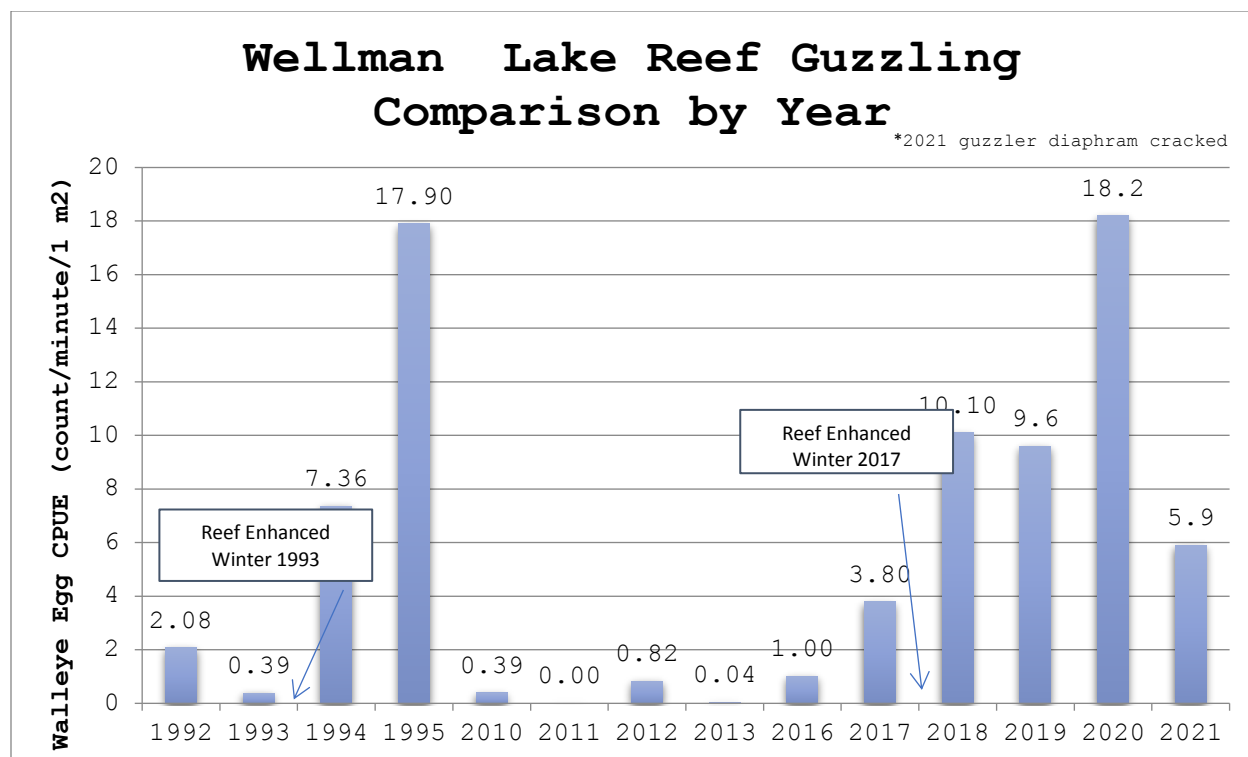


Figure 2: Guzzling Results 1992-2021

Table 1: 2021 young-of-year walleye collected via seining

Project Site Code	Fish #	Species	Fork Length (mm)	Total Length (mm)	Weight (g)	Otolith Count
WE-SE-21-003	WE-21-001	WALL	114	120	12.8	2
WE-SE-21-003	WE-21-002	WALL	110	119	12	1
WE-SE-21-005	WE-21-003	WALL	120	130	16.3	2
WE-SE-21-006	WE-21-004	WALL	85	92	5.4	2



Figure 3: Wellman Lake Sample Map

Table 2: Wellman OTC Results (2019-2021)

Wellman Lake OTC Results (2019-2021)					
Year	Total Sample (n)	Unreadable (n)	Mark (n)	No Mark (n)	Percent of Sample Natural
2019	100	1	13	86	86.8%
2020	100	1	5	94	94.9%
2021	4	-	-	-	-

Table 3: Whiteshell OTC Efficacy Trials (2011-15 & 2019-21)

Whiteshell OTC Efficacy Trials		
Year	Sample Size	Efficacy Confidence
2011	-	88%
2012	-	100%
2013	-	86%
2014	-	73%
2015	-	65%
2019	0	n/a
2020	11	100%
2021	0	n/a

Discussion

In 2021, eyed egg CPUE of 5.9 live eggs/minutes was the lowest recorded since the reef was enhanced in 2017. Reef guzzling results were likely influenced by faulty gear. The guzzler was noted to have reduced suction due to a cracked diaphragm which could influence CPUE. During the survey, it was evident fish utilized enhanced areas as there were notable areas cleaned by spawning fish. Unfortunately, the guzzler could not be replaced locally and therefore guzzling could not be replicated prior to the hatch.

Within the OTC study, efforts to increase probability of acquiring the target efficacy sample (n=30), SVSFE increased the fry request from 20,000 to 60,000 and distributed between three different rearing lakes. These lakes included Kokot Lake (~20,000), North Lake (~30,000), and Austen Anderson's dugout (~10,000). After putting significant effort (~220 netting hours) into all three rearing locations zero walleye for efficacy were captured. It has been hypothesised that these results can be attributed to a combination of a very hot/dry summer, predation, and poor fry condition at the time of planting.

As bad luck comes in three, it wasn't a surprise when faced with yet another technical difficulty when it was time to collect walleye for the OTC survey. In light of effort, it was not until late August that DFO's SR20 electrofishing boat was first tested for the season and found the onboard generator would not fire. After being unable to diagnose the problem locally the boat then went back to Winnipeg for repairs. Pritchard Group had several issues diagnosing the problem and were finally able to diagnose and fix the boat by late October - which was too late in the year to complete recruitment surveys. Attempts were made to gather target sampled size (n=100) using alternative methods. Fine mesh trap netting, beach seining, and backpack electrofishing were attempted but it was concluded it would take too much time and become too expensive to acquire the full sample using these methods. In total from using alternative methods, four young-of-year walleye were sampled for OTC detection. Lab results are pending.

Although 2021 proved to be a trying year, it is recommended to still move forward with the OTC study. In accordance with SVSFE's long term research plans - it was decided to utilize DFO's SR20 every two years to coordinate with other local projects. This decision was made primarily because of costs, demands and logistical of lending agreements associated with the boat. For this reason, year 4 of the OTC study is planned for 2023. In 2023 if year four is completed the SR20 will have to be test driven long before fall sampling begins. In terms of efficacy, a new pond, perhaps on closer to the hatchery will have to be used. If unable to complete this study, the recommended stocking strategy is as follows: 200,000 walleye fry on alternate years for Wellman Lake with follow up NLSP surveys every 6-8 years to monitor walleye population trends.

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