# Lake Trout Population Study in Sherbrooke Lake: 2022 Report

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# Lake Trout Population Study in Sherbrooke Lake: 2022 Report

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## Executive Summary

This report details activities performed by Coastal Action for the 2022 Lake Trout Project, funded by the Freshwater Fisheries Research Cooperative. This work was for Year 2 of a proposed two-year project. This project occurred in Sherbrooke Lake, Lunenburg County, Nova Scotia, and was designed to continue a mark-recapture program on lake trout (*Salvelinus namaycush*) to provide a better understanding of this population of fish, engage citizen scientists, and inform future recovery of this potentially valuable sportfish. Activities included capturing and tagging lake trout, assessing parasite load on lake trout, engaging with volunteers, and education and outreach. Additional data were collected from across the LaHave River Watershed for an assessment of mercury bioaccumulation and chain pickerel (*Esox niger*) stomach contents during the 2021 field season, which was included as part of a master's thesis at Saint Mary's University.

# 1.0 Introduction

## 1.1 Background

Lake trout (*Salvelinus namaycush*) is a salmonid species that is restricted to freshwater. Currently, there are only two known populations in Nova Scotia: Sherbrooke Lake and Dollar Lake. There is little known about lake trout in Nova Scotia, despite repeated calls for more information about this species (Crossman 1995; Kanno & Beazely 2004). Lake trout require a large, deep, well-oxygenated hypolimnion and follow a unique life cycle of moving from shallow to deep regions when surface water temperatures reach $15^0$C in the spring (Inland Fisheries 2005). This unique requirement potentially limits lake trout to a few lakes in the province with this characteristic.

Gerald Foster, and a small group of dedicated anglers, have informally recorded valuable information on this species in Sherbrooke Lake since 2016. They have recorded detailed accounts of lake trout behaviour, feeding activity, nursery areas, and parasite presence. Although a small group of anglers in Sherbrooke Lake target this species, there is no significant fishery in the province. This project intends to establish baseline information on lake trout in Sherbrooke Lake, Lunenburg County, Nova Scotia.

## 1.2 Project Objectives

This lake trout project had several goals and objectives for 2022, outlined as follows:

1. Generate baseline data on the existing lake trout population in Sherbrooke Lake.
2. Continue the mark-recapture study for ongoing monitoring.
3. Engage citizen scientists in reporting lake trout (both tagged and untagged) through the newly established Facebook group.
4. Collect reports of lake trout found in other lakes in Nova Scotia.
5. Continue development of a map of key features in Sherbrooke Lake with regards to lake trout population (i.e., angling hotspots, feeding areas, nursery areas, etc.).
6. Assess parasite load (i.e., lamprey) on lake trout in Sherbrooke Lake.
7. Lethal sampling of chain pickerel (*Esox niger*) with stomach content analysis.
8. Promote new provincial regulations of zero-retention limits for lake trout.
9. Digitize and record all previously collected data from the Sherbrooke Lake volunteer angling group.

The goal of this project was to continue the mark-recapture study on lake trout in Sherbrooke Lake to provide a better understanding of this population of fish, engage citizen scientists, and inform future recovery of this potentially valuable sportfish.

This project also supported the analysis of mercury in the muscle tissue of fish from the LaHave River Watershed, which provides insight into potential mercury risk across freshwater ecosystems in Nova Scotia. The fieldwork efforts also supported Matthew Warner's master's of science project (Acadia University) which assessed lake trout movements and habitat use within Sherbrooke Lake and lake trout genetics.

### 1.3 Report Objectives

This report provides a detailed account of Coastal Action's activities for the lake trout work as funded by the Freshwater Fisheries Research Cooperative for Year 2 of the project. This report reviews the fieldwork activities conducted between May to June 2022 in Sherbrooke Lake, and the results from this work. This is to provide information to the Nova Scotia Department of Fisheries and Aquaculture – Inland Fisheries Division and inform future conservation efforts of this species.

## 2.0 Materials and Methods

### 2.1 Fish Capture

Fish were caught in the deepest parts of the lake (Figure 1; areas A and B) using gear recommended and provided by volunteers. A variety of lures were used including spoons, spinners, and flies. Down-rigging equipment, including a rod holder, crank, cable, boom and 3-lbs canon weights, was used to target the deep-water fish. Humminbird fish finders were used to locate fish, with efforts focused throughout the south end of the lake, where volunteers have indicated the best fishing spots. The most effective fishing method was trolling the south end of the lake with the lure approximately 1 foot off the bottom. We monitored the Humminbird for arcs that appeared on the screen and then focused efforts on those areas (Figure 2).

Invasive fish chain pickerel (*Esox niger*) and smallmouth bass (*Mictropterus dolomieu*) were periodically targeted and caught using scientific angling near the shoreline.

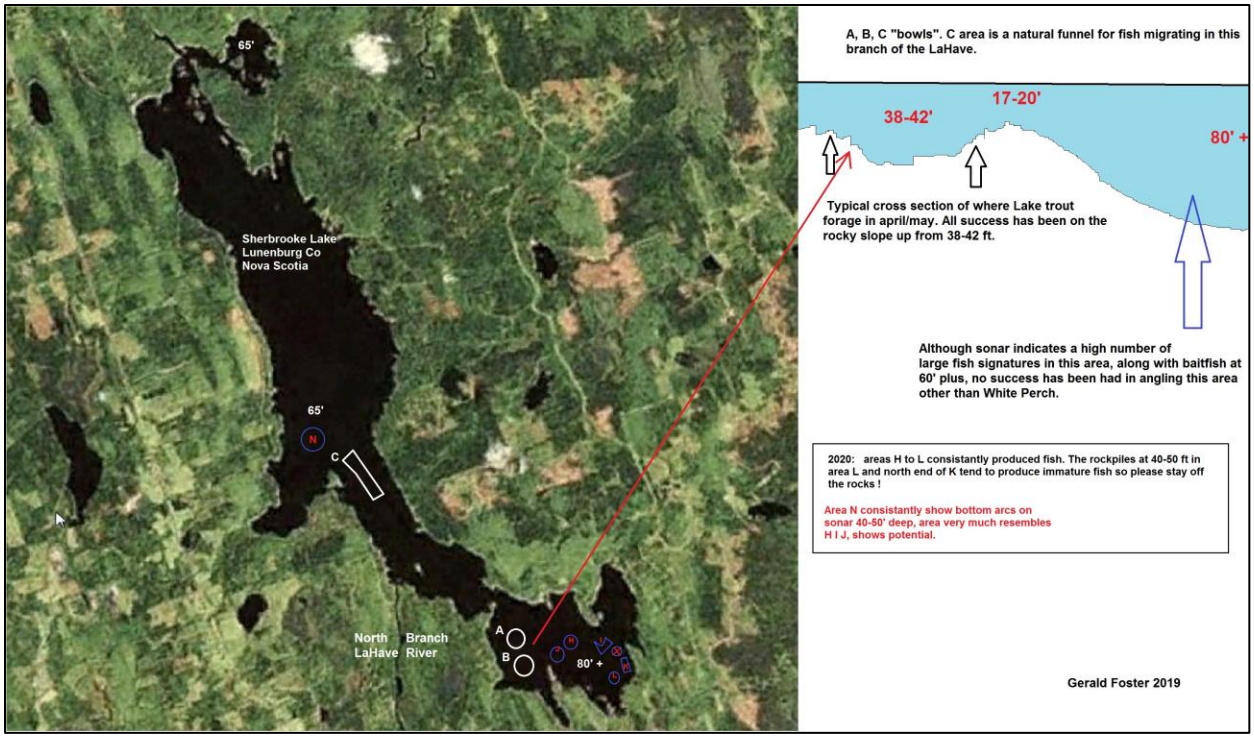


*Figure 1. Map of lake trout habitat and fishing areas on Sherbrooke Lake. (Foster, 2019).*


*Figure 2. Humminbird fish finder showing arcs just above the lake bottom. Based on angling success, these arcs are likely lake trout investigating the fishing lures.*

## 2.2 Tagging

Once a fish was angled, it was placed in a live well on the boat. Each live well was monitored for temperature and had an oxygen supply. Acadia University's fishing boat was the main research station, as they were acoustically tagging lake trout >30 cm. The fish was placed in a clove oil solution (provided and measured by Acadia University) until it lost equilibrium, and then was weighed and measured using a semi-submerged trough measuring board. Fish were visually examined for any external parasites or indicators of previous parasites (i.e., sea lamprey (*Petromyzon marinus*) scarring). As part of Matthew Warner's research, Acadia MSc students surgically implanted an acoustic tag into the gut cavity, which was then sutured shut. A small fin clipping and scale sample were also taken as part of Acadia's research.

A T-bar Floy tag was inserted below the dorsal fin for the mark-recapture program (Figure 3). Fish were then placed in the live well to fully recover before release. Fish deemed too small to be safely tagged (<20 cm) were quickly measured, placed in the recovery tank, and released when fully recovered.

*Figure 3. A small lake trout with a floy tag just below the dorsal fin. Image taken just before fish was released.*

## 2.3 Volunteer Efforts

Volunteers angled for lake trout from May to mid-June 2022. They used a variety of gear such as spoons and flies, all using down-rigging equipment. Volunteers used methods of trolling as well as jigging to capture lake trout at the south end of the lake. Volunteers generally

estimated the fish size and examined fish for parasites before release. To limit handling time for the safety of the fish, volunteers attempt to unhook and release fish as quickly as possible.

This group of volunteers has been angling lake trout on Sherbrooke Lake since 2016 and has refined their methods over the years. Data from the group was not recorded until 2019.

### 2.4 Support for Mercury Analysis

As part of a master's of science degree, Kaylee MacLeod analyzed the muscle tissue of native and invasive fish across six sites along the LaHave River Watershed, which was supported by this project in 2021. Detailed methods are outlined in the 2021 lake trout report (MacLeod 2022). These data, along with historic data from an additional 15 lakes sampled 2013-2015, were compared for mercury biomagnification (the rate of mercury transfer between trophic levels) across different freshwater ecosystems throughout Nova Scotia.

Kaylee used existing water quality from Nova Scotia to develop a course-scale framework that estimates the potential risk of mercury available for uptake into freshwater food webs. More information is available on this project upon request.

## 3.0 Results

### 3.1 Tagging

A total of eleven volunteers and research team members spent approximately 54 hours fishing (catch per unit effort [CPUE]= 0.085) over the field season. The CPUE calculation is based on the number of individuals angling and the duration of each trip. A total of 22 lake trout were caught during tagging efforts in 2022 (Table 2). Of these, 12 individuals were given a floy and/or acoustic tag before release. Not all fish were tagged due to equipment availability, to reduce fish handling time, or due to fish size. Fish that were only given an acoustic tag had a small fin clipping taken, which would allow researchers to identify recaptured individuals within this field season. One fish was recaptured during this field season. Priority was given to Matthew Warner's acoustic tagging, as that was part of his master's program and will provide insight into lake trout habitat use and movements within the lake.

*Table 1. Lake trout caught and tagged by research teams from May to June 2022. N = 12*

| Date | Fork length (cm) | Total length (cm) | Weight (kg) | Tag # (Floy) | Tag # (Acoustic) |
|---|---|---|---|---|---|
| 20-May-22 | 62.0 | 66.0 | 3.13 | 4818 | 1520936 |
| 21-May-22 | 64.0 | 68.0 | 3.49 | 4813 | 1520235 |
| 24-May-22 | 30.5 | 33.0 | 0.24 | NA | 1520229 |
| 25-May-22 | 30.4 | 32.7 | 0.24 | NA | 1520230 |
| 26-May-22 | 59.0 | 63.2 | 2.41 | NA | 1520231 |
| 26-May-22 | 46.2 | 51.0 | 1.13 | 4806 | 1520232 |
| 01-Jun-22 | 53.0 | 58.9 | 1.96 | 4825 | 1520233 |
| 03-Jun-22 | 26.2 | 29.3 | 0.18 | NA | 1520234 |
| 04-Jun-22 | 56.1 | 60.5 | 2.58 | 4801 | 1390137 |
| 06-Jun-22 | 30.0 | 33.4 | 0.27 | NA | 1390136 |
| 06-Jun-22 | 61.0 | 65.5 | 2.78 | 4802 | 1390135 |
| 10-Jun-22 | 20.2 | 22.3 | 0.09 | 92202 | NA |

## 3.2 Volunteer Efforts

Since 2019, the volunteer angler group has recorded a total of 69 lake trout of various sizes (ranging from approximately 12 cm to 84 cm) from Sherbrooke Lake (Appendix A). These fish were caught and released immediately and most were given an estimated length by the volunteers. There are additional fish that have been caught but not recorded.

## 3.3 Parasite Load

The fish caught by the research team did not show signs of external parasites. However, approximately 22% (15 of 69) of lake trout caught by volunteers from 2018 to 2022 have had scars of a consistent size, indicating sea lamprey parasitism (Gerald Foster, personal communication) (Figure 4). In June 2020, volunteers removed a 15 cm lamprey that was attached to a 35 cm lake trout (Gerald Foster, personal communication).

*Figure 4. Volunteer-caught lake trout with visible scarring, suspected to be from sea lamprey (Petromyzon marinus). Photo courtesy of Gerald Foster.*

## 3.4 Additional Fish

One smallmouth bass (forked length of 33.6 cm; total length 35.7 cm; 0.51 kg) was caught and humanely euthanized during the 2022 field season. The stomach contents of this fish were unidentifiable macro-invertebrates. One yellow perch (*Perca flavescens*) (total length 15 cm) was caught at the south end of the lake near a rocky outcrop. No chain pickerel were caught during the sampling efforts.

### 3.5 Outreach and Education

An important component of conservation efforts is providing information on the species and ongoing research to the public. Coastal Action used social media to highlight this project. Online material was used more frequently than in-person outreach. A total of three lake trout social media posts were made on Instagram, Facebook, and Twitter during the 2022 project year. These posts were shared within the "Nova Scotia Lake Charr Anglers" Facebook group to encourage anglers to report any tagged lake trout caught within the lake, as well as promote the zero retention policy. These social media posts included a longer "reel" created by Coastal Action's videographer. Coastal Action staff also engaged with several email enquiries about the lake trout project.

This project was highlighted at a fishing day for Park View Education Centre students, where Coastal Action staff presented on the lake trout work. Students then had the opportunity to aid in invasive species removal in the LaHave River (Wentzells Lake) for a class dissection.

## 4.0 Discussion and Recommendations

### 4.1 Population

Various sizes of lake trout have been reported by volunteers, as well as caught by the research team, which is an indication of an active breeding population within the lake. This season, lake trout ranged from 22.2 cm (total length) to 68 cm (total length). Approximately 45% of fish that were measured this season were less than 30 cm total length. Many of the juvenile fish (<30 cm) caught by researchers still had their parr marks and many of these smaller fish were caught in a rocky outcrop where volunteers suggest a "nursery" is occurring. There is currently not enough data to give population estimates for this species in Sherbrooke Lake; however, this data provides baseline information for a long-term population study. Fish measured by research teams over the last two years have ranged in size from 19.2 cm to 68 cm (total length).

One fish was recaptured within this field season. A lake trout (ID number 11-2022) with a total length of 29.3 cm was initially caught and tagged on June 3, 2022. This individual was recaptured on June 10, 2022, in the same section of the lake where it was originally caught from. This recapture only seven days following the initial tagging event suggests that this individual did not show trap/catch aversion, suggesting other tagged fish may be recaptured.

On the Facebook group "Nova Scotia Lake Charr Anglers" the only reports of lake trout being caught in Sherbrooke Lake were from Gerald Foster or other individuals involved in the project. There have been no reports of lake trout being caught in other Nova Scotian lakes on this site. Coastal Action staff are moderators of the group and continue monitoring its

activity. This site has gained popularity and is a useful place to highlight this work, remind anglers of the zero-retention policy of lake trout and report tagged fish.

The volunteer efficiency in catching lake trout has improved over the last few years, as only four fish were recorded in 2019, 23 fish in 2020, and 36 fish in 2021. The CPUE for tagging has also improved since 2021, with the CPUE increasing by 0.072 units from 0.013 to 0.085 (554%). Continuing work with these volunteers for future research could provide an opportunity to improve catch efficiency and tagging efforts.

The information volunteers provided on both their experience with the fish and key features of the lake has proven to be invaluable for catching lake trout.

## 4.2 Parasite Load

Although the fish caught by the research team did not have evidence of external parasites, approximately 21% of fish caught since 2018 by volunteers have shown scars consistent with previous sea lamprey attachment (Gerald Foster, personal communication). This is concerning because although sea lamprey is native to Nova Scotia, its impact on lake trout is unknown. In the Great Lakes region, studies show that sea lamprey is negatively impacting the breeding and overall health of lake trout (Tyler Firkus PhD candidate, personal communication).

Coastal Action staff have connected with Dr. Linda Campbell to develop a project investigating sea lamprey parasitism on lake trout in Nova Scotia. Funding opportunities were not available for a full-time master's student during the 2022 field season, so we are continuing to look for funding and students for future work.

## 4.3 Mercury

Nova Scotia, particularly Southwest Nova Scotia, is known as a biological hotspot for mercury concentrations. This also pertains to bioaccumulation in freshwater fish, as Southwest Nova Scotia was found to have some of the highest levels of Hg in fish in North America (Kamman et al. 2005).

Mercury concentrations are correlated with trophic position; being highest in piscivorous species and increasing in concentrations with age and size (Depew et al. 2013). Top predators, such as chain pickerel and smallmouth bass, are more likely to have elevated Hg concentrations. This was consistent with our findings, and the one lake trout from 2021 measured for mercury had the highest concentrations out of all fish sampled.

In the 21 sites across Nova Scotia, mercury biomagnification and bioaccumulation rates varied depending on the waterbody but were not significantly different in systems with

invasive species compared to systems with only native species. Similar food web structures across the province (standardized using Eastern elliptio [*Elliptio complanata*]) suggest that another factor is influencing the different mercury accumulation rates in Nova Scotian freshwater food webs. Water quality is known to influence mercury, so further examination of water quality and its relationship to mercury in fish can improve our understanding of the potential mercury risk in freshwater.

More information is available upon request and a full thesis will be published and publicly available on the Saint Mary's University website in the coming months.

## 4.4 Additional Fish

The single smallmouth bass was a mature female caught along the shoreline of the south end of the lake, near location A (Figure 1). No other smallmouth bass were caught throughout the project. Smallmouth bass tend to occupy shallow rocky or sandy habitats (DFO 2021), so they are unlikely to compete for habitat with deep-water inhabiting lake trout.

The yellow perch was caught near area "X" (Figure 1), which tends to have a high population of smaller-bodied lake trout. Anecdotally, this is the first yellow perch volunteers have seen from this area of the lake in the last few years.

Volunteers from both the lake trout project and Coastal Action's Sherbrooke Lake Water Quality program have discussed a decline in large-bodied chain pickerel within the lake over the last decade. No chain pickerel were caught during this project, despite angling in some areas of potential chain pickerel habitat (shallow, reedy areas). Some volunteers theorize that the decline in large-bodied chain pickerel is due to lake trout population increases. However, previous studies have shown both smallmouth bass and lake trout diet is composed largely of alewife (*Alosa pseudoharengus*) (Happel et al. 2017), so there could be resource competition occurring between these species.

## 4.5 Limitations

Originally as part of Kaylee MacLeod's master's work, a biopsy was planned to be taken from lake trout dorsal muscle. Stable isotope analysis of muscle tissue from lake trout and other species within Sherbrooke Lake would provide insight into species interactions. To minimize risk to the health and safety of the fish, which were undergoing a surgical procedure for acoustic tag insertion, no biopsies were taken during the 2022 field season.

Carlin tags were also proposed as an option for the 2022 field season, as they tend to have better retention rates. However, to limit fish handling time due to measuring, surgery and tag insertion, we chose to use floy tags. Although the retention rate tends to be lower with

floy than carlin tags, the surgical scar and fin clippings will allow researchers to identify any recaptured fish that lost their tag within the next year.

Originally it was proposed that work also occur during the fall months, but due to volunteer and staffing availability, the fall sampling did not occur in 2022.

### 4.6 Future Work

We propose the project continue in 2023. The focus should be during the spring and fall when the fish are moving from shallow to deeper waters. Gerald Foster has noted this generally occurs during May and late September when volunteers have more capture success. Working with volunteer anglers during these times should prove to be a successful mark-recapture endeavor.

Continuing a mark-recapture program and working with volunteers could improve the knowledge of population size and growth within Sherbrooke Lake.

Discussions are ongoing about the framework developed as part of Kaylee MacLeod's thesis, to increase our understanding and knowledge of mercury in Nova Scotian freshwater ecosystems.

## 5.0 Acknowledgements

Coastal Action would like to extend our appreciation and gratitude to those who contributed to the successful completion of the 2022 field season. The following groups and individuals were critical in supporting the lake trout work:

- Coastal Action field crew and photographer: Kaylee MacLeod, Dave Welsford
- Dedicated volunteers: Gerald Foster, Michael McLean, and Michael Peck.
- Nova Scotia Department of Fisheries and Aquaculture staff: Andrew Lowles and Lori Swider.
- Acadia University: Matthew Warner, Cameron Solda, and Kristine Hannifen.
- The numerous volunteers, landowners, and researchers who contributed to this project.

## 6.0 References


Crossman, EJ. (1995). Introduction of lake trout in areas outside its native distribution: a review. J Great Lakes Res., 21:17–29.

Department of Fisheries and Oceans (DFO). (2021). Smallmouth bass (*Micropterus dolomieu*). Unpublished government page. [Modified 2021 Sept 16; Accessed 2023 Jan 19]. https://www.dfo-mpo.gc.ca/species-especes/profiles-profils/smallmouthbass-achiganpetitebouche-eng.html

Depew, D., Burgess, N., Anderson, R., Baker, R., Bhavsar, S., Bodaly, R., … Campbell, L., 2013. An overview of mercury concentrations in freshwater fish species: a national fish mercury dataset for Canada. Can. J. Fish. Aquat. Sci.., 70(3), 436–436.

Feener, S., & MacLeod, K. (2019). LaHave river invasive species project. Coastal Action. Annual Project Reporting. Lunenburg. 18pgs.

Government of Canada (2019). Mercury in fish – questions and answers. Unpublished government page. [Modified 2019 Nov 27; Accessed 2022 Jan 10]. https://www.canada.ca/en/health-canada/services/food-nutrition/food-safety/chemical-contaminants/environmental-contaminants/mercury/mercury-fish-questions-answers.html#ca2.

Happel, A., Pattridge, R., Walsh, M., & Rinchard, J. (2017). Assessing diet compositions of Lake Ontario predators using fatty acid profiles of prey fishes. J Great Lakes Res., 43 (5), 838–845.

Inland Fisheries. (2005). Nova Scotia Trout Management Plan (Final Draft). Nova Scotia Department of Agriculture and Fisheries.

Kamman, N., Burgess, N., Driscoll, C., Simonin, H., Goodale, W., Linehan, J., . . . Scruton, D. (2005). Mercury in Freshwater Fish of Northeast North America – A Geographic Perspective Based on Fish Tissue Monitoring Databases. Ecotoxicology (London), 14(1), 163-180.

Kanno, Y. & Beazley, K. (2004). Freshwater fish considerations for aquatic conservation systems planning in Nova Scotia. Proc N S Inst Sci., 42. 10.15273/pnsis.v42i2.3612.

MacLeod, K. (2022). Lake Trout Population Study in Sherbrooke Lake & Support for Mercury Food Web Analysis: 2021 Interim Report. Mahone Bay, Nova Scotia.

# Appendix A. Supplementary data

*Table 2. Volunteer recorded lake trout data from 2019 – 2022 Lengths with ~ represent estimated size from volunteers, recorded in a logbook at Gerald Foster's cottage.*

| Date | Year | Fork length (cm) | Total length (cm) |
|---|---|---|---|
| 08-May-19 | 2019 | NA | ~38 |
| 08-May-19 | 2019 | NA | ~76 |
| 09-May-19 | 2019 | NA | ~66 |
| 09-May-19 | 2019 | NA | ~71 |
| 31-May-20 | 2020 | NA | ~76 |
| 31-May-20 | 2020 | NA | ~28 |
| 31-May-20 | 2020 | NA | ~68 |
| 31-May-20 | 2020 | NA | NA |
| 08-Jun-20 | 2020 | NA | ~60 - 73 |
| 08-Jun-20 | 2020 | NA | ~60 - 73 |
| 08-Jun-20 | 2020 | NA | ~60 - 73 |
| 09-Jun-20 | 2020 | NA | ~35.5 |
| 11-Jun-20 | 2020 | NA | NA |
| 11-Jun-20 | 2020 | NA | NA |
| 12-Jun-20 | 2020 | NA | NA |

| | | | |
|---|---|---|---|
| 12-Jun-20 | 2020 | NA | NA |
| 12-Jun-20 | 2020 | NA | NA |
| 12-Jun-20 | 2020 | NA | NA |
| 12-Jun-20 | 2020 | NA | NA |
| 12-Jun-20 | 2020 | NA | NA |
| 13-Jun-20 | 2020 | NA | ~66 |
| 13-Jun-20 | 2020 | NA | ~68.5 |
| 13-Jun-20 | 2020 | NA | ~43 |
| 13-Jun-20 | 2020 | NA | ~76 |
| 14-Jun-20 | 2020 | NA | ~76 |
| 03-May-21 | 2021 | NA | ~23 |
| 21-May-21 | 2021 | NA | NA |
| 21-May-21 | 2021 | NA | NA |
| 21-May-21 | 2021 | NA | NA |
| 22-May-21 | 2021 | NA | NA |
| 22-May-21 | 2021 | NA | NA |
| 22-May-21 | 2021 | NA | NA |
| 22-May-21 | 2021 | NA | NA |

| | | | |
|---|---|---|---|
| 24-May-21 | 2021 | NA | NA |
| 24-May-21 | 2021 | NA | NA |
| 28-May-21 | 2021 | NA | NA |
| 28-May-21 | 2021 | NA | NA |
| 08-Jun-21 | 2021 | NA | NA |
| 10-Jun-21 | 2021 | NA | NA |
| 10-Jun-21 | 2021 | NA | NA |
| 11-Jun-21 | 2021 | NA | NA |
| 12-Jun-21 | 2021 | NA | NA |
| 18-Jun-21 | 2021 | NA | ~12 |
| 18-Jun-21 | 2021 | NA | ~30 |
| 18-Jun-21 | 2021 | NA | ~50 |
| 18-Jun-21 | 2021 | NA | ~71 |
| 23-Jun-21 | 2021 | NA | NA |
| 23-Jun-21 | 2021 | NA | NA |
| 23-Jun-21 | 2021 | NA | NA |
| June 7 -12 | 2021 | NA | NA |
| June 7 -12 | 2021 | NA | NA |

| | | | |
|---|---|---|---|
| June 7 -12 | 2021 | NA | NA |
| June 7 -12 | 2021 | NA | NA |
| May 04 to 11 | 2021 | NA | ~22 - 30 |
| May 04 to 11 | 2021 | NA | ~22 - 30 |
| May 04 to 11 | 2021 | NA | ~50 |
| May 11 to 16 | 2021 | NA | NA |
| May 11 to 16 | 2021 | NA | NA |
| May 11 to 16 | 2021 | NA | NA |
| May 11 to 16 | 2021 | NA | NA |
| 11-May-22 | 2022 | NA | NA |
| 23-May-22 | 2022 | NA | NA |
| 23-May-22 | 2022 | NA | NA |
| 23-May-22 | 2022 | NA | NA |
| 23-May-22 | 2022 | NA | NA |
| 24-May-22 | 2022 | NA | ~25 |
| 25-May-22 | 2022 | 22.7 | 26.2 |
| 30-May-22 | 2022 | 21.4 | 21 |
| 30-May-22 | 2022 | 21 | 23.4 |