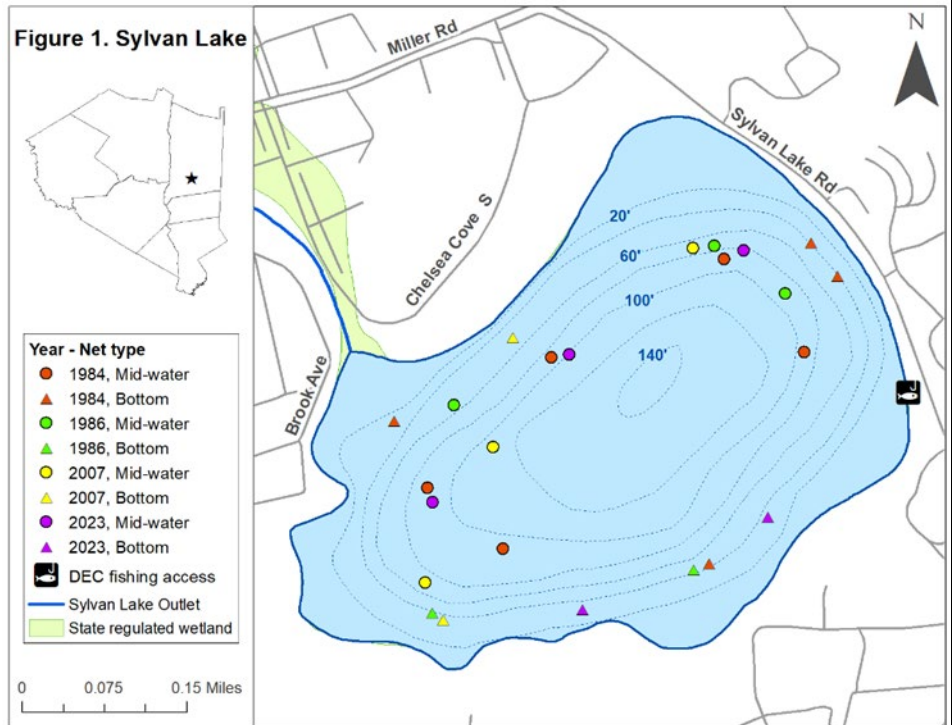


Sylvan Lake Brown Trout Netting Survey (Survey #323009)

Robert D. Adams, Region 3 Fisheries

July 2023

Sylvan Lake (Beekman, NY) is a unique 109-acre waterbody found within NYSDEC's Region 3 (See Figure 1). The lake's 518-acre watershed is relatively small, fed by intermittent tributaries, freshwater seeps, and run-off. Water exits the lake through a wetland complex on the northwest shore. Sylvan Lake is just over 140 feet in the center, making it one of the deepest lakes in the state (NYSDEC 2008). Due to strong thermal stratification in summer months, the lake supports a two-story fishery with warmwater species in the vegetated shallows and stocked salmonids in the pelagic zone. Public access is available from the NYSDEC car-top launch located on the eastern end of the lake (Figure 1). This parcel was acquired from the Dutchess County



Federation of Sportsmen (Federation) in 2012, who developed the launch in 2005. Prior to 2005, the Federation maintained a different boat launch at the lake's northeast corner from 1966 to 1985. Paid access has also been historically available through boat liveries, private clubs, and a seasonal RV park with a boat launch.

Due to the available deepwater trout habitat of the lake, the state began stocking lake trout in Sylvan Lake in 1926. Despite 10 years of stocking, the policy was canceled after no lake trout were captured in a 1936 deepwater netting survey. In 1945-1946, rainbow trout became the next salmonid stocked in the lake, but there are no available reports on the success of this short-term policy. Salmonid stocking resumed in 1966, when the Federation developed a public access at the northeast corner of the lake and annually stocked yearling and two-year-old rainbow trout. In 1969, the State of New York took over the policy, annually stocking rainbow trout fingerlings and yearlings through 1971. After netting surveys showed poor growth and returns of rainbow trout, the policy was changed to brown trout in 1972 to better take advantage of available forage species. In 1982, a policy for lake-spawning, Kokanee salmon was initiated to provide variety to the fishery and hopefully establish a self-sustaining salmonid population in the lake. Despite four years of heavy stockings of spring fingerlings (17,300 annually), no Kokanee were caught in a 1984 survey and only two were caught in a 1986 survey. It was hypothesized the large population of recently invaded alewife was outcompeting the fingerlings for food and habitat. Both the brown trout and Kokanee state policies were discontinued after public access was lost in 1985. In 2005, the Federation once again established a public access on the lake, allowing the state to resume a stocking policy of 1700 yearling brown trout that continues to present day. State stockings were initially supplemented by Federation stocked yearling and two-year-old rainbow trout from 2005-2007, but records show no additional Federation stockings after 2007. In the fall of 2023, Sylvan Lake received 300 hatchery brood stock (224 three-year-old Romiskany strain males and 76 four-year-old domestic strain females) in addition to the spring-stocked yearlings.



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To evaluate the various stocking policies, the state performed summertime trout netting surveys on Sylvan Lake in 1936, 1961, 1968, 1984, 1986, 2007, and 2023. Depth profiles of water temperature and dissolved oxygen (DO) were included with the netting surveys to evaluate the depth of the trout zone (defined as temperatures  $\leq 70^{\circ}\text{F}$  and  $\text{DO} \geq 5 \text{ mg/L}$ ) for both habitat evaluation and to guide the depths to fish suspended nets. Additional water quality surveys were made in 2003-2004, 2006, 2009-2012, and 2022 in response to public concerns about dwindling trout habitat. This Technical Brief compares the results of trout netting surveys since 1984, which all focus on evaluating the brown trout stocking policy and use very similar methodologies. A second technical brief (322023) compares historical thermal and dissolved oxygen (DO) vertical profiles.

Since 1984, trout in Sylvan Lake have been sampled through overnight sets of a combination of mid-water and benthic gill nets. The mid-water nets were similar across all years, comprised of three 90' panels of 2", 3", and 4" stretch mesh for a total of 270' net length. Panel depths were either 10' or 20', and net placement in the water column was based on real-time depth profiles of water temperatures and DO. In most cases, the nets were suspended within the trout zone over bottom depths of 50 feet or greater; however, in 2023, one suspended net was fished above the trout zone to determine if trout made diurnal movements to the surface of the pelagic zone to chase the many baitfish observed at the surface. Benthic gill nets were not as consistent across years. In 1984 and 2007, each benthic net consisted of 90' X 5' panel of 4" stretch mesh, fixed to a second 150' X 5' panel of graded mesh (1.5" – 3.5" stretch). In 1986, only the 150' X 5' panel of graded mesh was fished, while in 2023, only the 90' X 5' panels of 4" mesh were deployed. All benthic nets were fished perpendicular to shore beginning around 20 feet of bottom depth and extending deeper into the lake. All mid-water and benthic nets were fished a single night in 1984, 2007, and 2023. In 1986, each location was sampled for two consecutive nights.

As shown in Table 1, twenty-five stocked brown trout were caught in 1984, four in 1986, three in 2007, and twenty-two in 2023. Size ranges were the largest in 1984 and 2023, which were also the only years to observe yearling brown trout per scale-aging and size structure evaluation. Both otoliths and scales were evaluated in 2023 and the resulting age range was 1 to 4+ years (see Figure 2).

**Table 1. Catch rates for trout gill nets in Sylvan Lake**

Year	TZ depth (feet)	Net type	Total nets	Mesh (in)	Brown trout		
					n	size range (mm)	fish/10,000 sq yd hrs
1984	12 - 90	Benthic	4	1.5 - 4	1	297	0.30
		Mid-water in TZ*	5	2 - 4	24	203 - 521	2.72
1986	18 - 42	Benthic	4	1.5 - 3.5	0	--	0.00
		Mid-water in TZ*	6	2 - 4	4	508 - 643	0.35
2007	18 - 48	Benthic	2	1.5 - 4	0	--	0.00
		Mid-water in TZ*	3	2 - 4	3	442 - 586	0.35
2023	18 - 80+	Benthic	2	4	4	430 - 596	5.75
		Mid-water in TZ*	2	2 - 4	18	258 - 713	3.23
		Mid-water above TZ	1	2 - 4	0	--	0.00

\*TZ = Trout Zone (Temperature  $\leq 70^{\circ}\text{F}$  &  $\text{DO} \geq 5 \text{ mg/L}$ )

To standardize catch rates among years, annual catches per gear type were divided by square yards of net/10000 x hours fished. Excluding the mid-water net suspended above the trout zone, the 2023 gears saw the highest catch rates in the time series (Table 1); however, the 2023 benthic gill net catch rate



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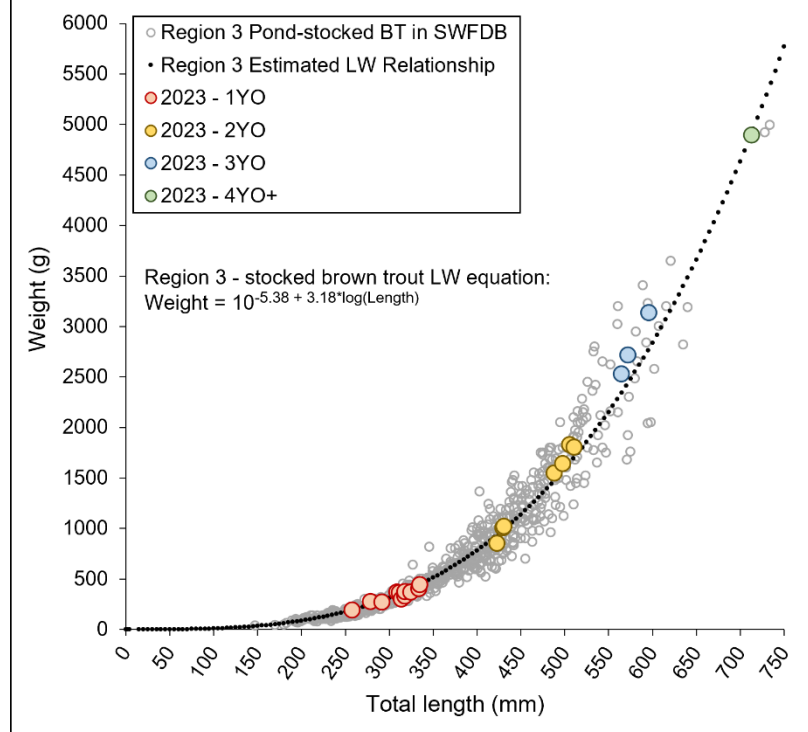
July 2023

should only be considered for two-year-old fish or older trout as yearlings were unlikely to have recruited to the mesh-size by July (4"-stretch). The catch rate for the 2023 mid-water nets fished in the trout zone is comparable to that from 1984, which also had a similar sized trout zone. Conversely, the low catch rates in 1986 and 2007 coincided with a much-reduced trout zone, likely a result of increased nutrient loading in the lake during that time period (NYSDEC 2008). A more detailed examination of these water quality issues and potential recovery to pre-1986 levels is found in Technical Brief #323009A. As with the improved catch rates, the size and winter survival of fish observed in 2023 show no indication of a struggling population. The length-weight relationship for fish caught in Sylvan Lake nearly matches the LW regression calculated for all Region 3 stocked brown trout reported in the Statewide Fisheries Database (SWFDB), indicating average growth rate for the region (Figure 2).

Previous surveys reported catches of forage fish in directed, small-mesh nets as well as bycatch in the larger trout-targeted meshes. Indications are that the pelagic prey switched from lake whitefish (relic stocking) to land-locked alewives sometime in the 1980s and only alewives were caught in the 2007 survey. Despite seeing many schools of baitfish near the surface while setting nets in 2023, no alewives were caught in the trout nets and no smaller mesh nets to target alewives were set. Future netting surveys in the lake should also target forage species using smaller mesh sizes.

Based on results from the 2022 water quality survey and 2023 trout netting survey, Sylvan Lake provides adequate water quality and apparent forage to support the current stocking policy. However, as recently as 2012, the trout zone was severely reduced, sparking concerns regarding trout survival through the summer. Netting and water quality surveys should continue every five years to evaluate the stocking policy and evaluate trends in the summertime trout zone.

**Figure 2. Sylvan Lake Brown Trout Length vs Weight**



### Literature Cited

NYSDEC. 2008. Lake Classification and Inventory Program (LCI) Water Quality Summary Report: Sylvan Lake. NYSDEC DOW, Bureau of Water Assessment and Management. Albany, NY.