

Seneca Lake Forage Assessment 2020 (Survey #: 820010)
Brad Hammers, Region 8 Fisheries

12/30/22

Seneca Lake, located in West-central New York between Keuka and Cayuga Lake, is the largest of the Finger Lakes, occupying 43,343 acres and is 38 miles long. It is a deep, steep sided lake with an average depth of 291 feet and a maximum depth of 618 feet. Much of the lake has steep drop offs which limit the amount of shallow, vegetated habitat. The littoral zone occupies only about 13% of Seneca Lake. Hypolimnetic waters remain highly oxygenated throughout the summer during lake stratification. The lake supports lake, rainbow, and brown trout as well as Atlantic salmon, Forage species that support these predators include alewives, sculpin, and various minnow and shiner species. Recent evidence suggests that the alewife population in Seneca Lake is abundant. In 2017, 2,434 alewives were collected in five horizontal net sets (bottom and surface net/set) (Hammers 2018-tech brief). For comparison, only 14 alewives were collected in Keuka Lake using similar techniques. The abundant alewife population may be impacting lake trout natural recruitment due to thiamin deficiencies typical of Early Mortality Syndrome. Additionally, angler success may be negatively impacted due to abundant alewives due to lake trout being saturated with alewife

Table 1. Average number of fish collected from 24 bottom and 21 surface unbiased, horizontal gillnets from Seneca Lake, 2020. Total number in parentheses.

	Seneca	
	Bottom	Surface
Alewife	81.5 (1,955)	160.3 (3,366)
Yellow perch	5.1 (123)	<0.1 (1)
Smallmouth bass	3.6 (86)	-
Spottail shiner	1.0 (25)	1.9 (40)
Rock bass	1.8 (44)	-
Banded killifish	0.5 (12)	0.1 (3)
Pumpkinseed	0.5 (12)	-
Atlantic salmon	0.1 (3)	0.2 (5)
Golden shiner	-	0.3 (7)
Slimy sculpin	0.3 (6)	-
Rainbow trout	<0.1 (1)	0.2 (4)
Comely shiner	-	0.2 (5)
Brown bullhead	0.1 (2)	<0.1 (1)
Lake trout	<0.1 (1)	<0.1 (1)
Bluegill	0.1 (2)	-
Troutperch	0.1 (2)	-
Northern pike	-	<0.1 (1)
Total	94.8 (2,274)	163.5 (3,434)

Seneca Lake was part an experimental forage assessment survey in 2017. Based on this analyses (Sethi 2017), 24 sites throughout the lake were sampled in September 2020 with horizontal gillnets. Each monofilament net is 21 feet high and 70 feet long and consists of seven mesh sizes ranging from 0.25 to 1.0 inch bar. Sets consisted of two nets, one floating and one bottom, were fished overnight in depths ranging from 34 to 65 feet and averaging approximately 45 feet of water.

A total of 17 species were collected from Seneca Lake with nets that were considered unbiased (Table 1). An additional two species, largemouth bass and tessellated darter, were collected in nets that were considered biased. Surface nets collected more fish than bottom sets, though bottom sets collected more species of fish (Table 1). Alewives were the most abundant species collected, followed by yellow perch and smallmouth bass. Based on size distribution, several year classes of



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alewives were collected. Rainbow smelt were once again absent from collections.

Forage netting protocol appears to adequately assess alewife populations. Currently, Seneca Lake forage is abundant and consists primarily alewives. Smelt, once abundant in Seneca Lake, appear to be extirpated or at undetectable levels. When compared to other recently surveyed western two story Finger Lakes using similar sampling protocol, Seneca Lake alewife catch per unit effort (number/net night) remains well above other lake estimates (Region 8 files). Although alewives are supporting lake trout populations, they may be negatively impacting recruitment of wild lake trout and angler catch rates. Lake trout stocking rates were increased in 2020 to account for decreases in wild lake trout recruitment and utilize abundant alewife populations.

Sethi, S.A. 2017. Finger lakes forage fish gillnet survey: power analysis to assess net designs. New York Cooperative Fish and Wildlife Research Unit, Cornell University. 13 pp.

Hammers, B.E. 2018. Seneca and Keuka Lake experimental forage assessment 2017. Survey #'s 817024 and 817025. Technical Brief. New York State Department of Environmental Conservation, Avon, NY. 2 pp.

