

**T Lake Chemistry Survey #519083:
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T Lake (M-P862) is located in the West Canada Lakes Wilderness of Hamilton County, it is accessed by a 3.3-mile trail that includes an ascent of 860 feet. It has a surface area of 37 acres, a maximum depth of 30 ft and an average depth of 7.9 ft. There was sufficient dissolved oxygen for trout throughout the water column. T Lake Falls acts as an impressive natural fish barrier on the outlet. T Lake was limed in 1963 and 1964, but brook trout stocking, which began in 1942, was ultimately cancelled when a 1966 survey (#5660008748) caught only a single brook trout.

In 2015, samples were drawn from T Lake and advanced chemical analyses were performed by the Adirondack Lakes Survey Corporation to identify waters recovering from the effects of acid precipitation that may once again support native fish communities. Relatively recent improvements in the acid/base chemistry of some Adirondack waters have already been documented, and some of these waters, such as Brooktrout Lake (B-P874), now contain self-sustaining brook trout populations.

The 2015 chemistry values were such that an experimental stocking policy for 1000 fin clipped Horn Lake strain brook trout fingerlings was initiated for the fall of 2017 (Table 1.). The 2019 survey provided a chance to analyze the deeper waters of T Lake and to assess the temperature and dissolved oxygen. While on the lake, the sampling crew documented that rising fish were present during the 2019 survey.

Table 1. T Lake selected water chemistry values from 1934 to 2019.

Date	Depth (feet)	Air Equilibrated pH (pH units)	Acid Neutralizing Capacity (µeq/L)	Inorganic Monomeric "toxic" Aluminum (µM/L)	Base Cation Surplus (µeq/L)	BC/ RCOOs-	Conductivity (µmhos/cm)	Silica mg L ⁻¹	Sodium mg L ⁻¹
5/9/19	5	5.91	11.9	0.00	5.8	5.8	8.1	0.9	0.40
5/9/19	30	5.66	9.5	0.96	-0.5	0.5	9.9	2.5	0.35
8/26/15	0	5.60	12.8	0.19	2.5	5.6	9.0		
7/13/05	5	5.13	-15.0				13.0		
7/13/05	20	4.94	-1.1				16.8		
7/14/66	15	5.50							
9/5/62	5	4.60							
3/2/49	2	5.20							
7/26/48	0	6.00							
7/36/34	5	7.00							

In both the 2015 and 2019 samples additional chemical metrics such as the Base Cation



Surplus (BCS) and the ratio of Base Cations to Strong Organic anions (BC/RCOOs) were collected. These metrics give a deeper understanding regarding the ability of this water to sustain a brook trout population. The BCS provides a useful tool for the evaluation of recovery from acidification in the presence of increasing dissolved organic carbon and the BC/RCOOs helps to quantify the strength of “naturally acidic conditions” found in some Adirondack waters. Preliminarily, it appears that for a water to support brook trout, BCS values should be above -15 $\mu\text{eq/L}$, and the BC/RCOOs ratio should be above 1.5. As well as the advanced metrics a “toxic aluminum” level below $2 \mu\text{M L}^{-1}$ is thought to be critical for brook trout survival in a summer sample, and that threshold was also easily met. In every metric, the acid/base chemistry of T Lake has improved since the 2015 survey (#515049). Additionally, in the 2019 survey, the dissolved oxygen and temperature profile as well the chemical metrics drawn from deep water show that this water appears capable of supporting brook trout. This is unsurprising given that the survey crew observed rising fish here. A fisheries survey should be performed here in 2022 or later to reveal the status of this Horn Lake strain population with regard to natural reproduction.