SURFACE WATER CLASSIFICATION - LAKES

Lake Assessments for Surface Water Classification
As part of the continued assessment of New Jersey waters dissolved oxygen and temperature profiles are performed to determine a lake's ability to support trout throughout the harsh summer months. During the summer most New Jersey lakes deeper than 3 m (10 ft) thermally stratify. The epilimnion (surface waters) become too warm to support coldwater fishes (trout), and the metalimnion and hypolimnion (middle and bottom waters), while often cold enough for trout, often have dissolved oxygen levels too low to support trout (and other fish species). Only deep lakes (generally at least 15 m (50 ft) deep), that are not overly eutrophic, maintain sufficient levels of dissolved oxygen in some portion of the strata below the epilimnion during the summer and early fall. A water temperature and dissolved oxygen profile is conducted in the deepest part of a lake using a YSI meter with cable marked in one-foot increments. Measurements are generally taken at 5 to 10 foot intervals, but more frequently (1-ft increments) when marked changes are observed (typically in the metalimnion). A secchi disk (also marked in one-foot increments) is used to measure water transparency. The criteria used to determine trout-supporting water is water temperature $\leq$ 21ºC (69.8ºF) and dissolved oxygen $\geq$ 4 mg/L. If criteria are met, Lakes and reservoirs are classified as *Trout Maintenance* and they are classified as *Non-Trout* if they are not met. The presence and amount of trout supporting water can vary from year to year, depending on air temperature and rainfall. Shallow lakes, particularly those less than 50 feet deep, often have little or no trout supporting water during the summer due to anoxic conditions in their colder bottom waters and warm surface waters.

Three water temperature and dissolved oxygen profiles were conducted during 2015 that can be used to assess the current Surface Water classifications (Table 6).

Iliff Lake (Sussex) - This 32-acre lake is owned by Andover Twp. and is classified as *Trout Maintenance*. A profile was conducted on August 28 in the deepest part of the lake (30 ft max depth). Trout supporting water was documented at 14 ft below the surface. Above that depth the water was too warm (>21°C) and below that depth dissolved oxygen was too low (<4 mg/L) to support trout.

South Vineland Park Pond (Cumberland) – A dissolved oxygen temperature profile was completed at this 17-acre pond on July 30th. Although currently classified as *Non-Trout*, previous profiles suggested that trout supporting water may exist during the summer. Trout supporting temperatures and dissolved oxygen were not present on this date. Limited fish supporting water exists in depths greater than 10 feet. Another profile will be completed in 2016.

Tilcon Lake (Morris) - This 88-acre lake lies within Allamuchy Mtn. State Park, in the Musconetcong River watershed. The lake is not specifically listed in NJ's SWQS and therefore assumes a *Non-Trout* classification by default because it is over five acres. Profiles conducted in

previous years (2013 and 2014) have documented trout supporting water. Subsequently, a recommendation was submitted to the NJDEP Bureau of Water Quality Standards and Assessment in 2011 to suggest its upgrade from *Non-Trout* to *Trout Maintenance*, however it has not been changed as of December 2015. This lake is also stocked with Landlocked Salmon. A profile was conducted on August 28 in the deepest part of the lake (50 ft max depth), in which trout supporting water was documented from 21 ft below the surface down to 45 ft.

TABLE 6.— Summary of 3 temperature & dissolved oxygen profiles conducted during the summer months on lakes in 2015. Results page number references in *2015 Investigations & Management of NJ's Freshwater Fisheries Resources Report*.

Waterbody (County)	Current surface water classification	Depth (ft) of water capable of supporting trout [a]	Recommended classification change	Date
Southern Region (Lower Delaware River and Lower Atlantic Coastal)				
South Vineland Park Pond (Cumberland)	FW2-NT	none	no (current confirmed)	7/30/15
Upper Delaware Region (Upper Delaware & Wallkill)				
Iliff Lake (Sussex)	FW2-TM(C1)	14	confirmed	8/25/15
Tilcon Lake (Morris)	FW2-NT	21 - 45	FW2-TM (also recommended in 2011 based on 2007 data)	8/25/15

[a] Depth measured from the surface; criteria for trout supporting water: water temperature $\leq$ 21ºC and dissolved oxygen $\geq$ 4 mg/L.