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Science-based conservation for the rivers of Tennessee

HARPETH℠
CONSERVANCY

Harpeth Conservancy 2019 Algal Toxin Survey

Introduction:

- Previous survey (Harpeth Conservancy and Austin Peay) identified cyanobacteria in Harpeth River
- **Goal:** Survey for microcystin to determine if algal toxin (produced by cyanobacteria) is in the Harpeth River watershed

Materials and Methods:

Sampling

Water samples (n = 18) were collected between September 14th and October 2nd, 2019 at various locations within the Harpeth watershed (Table 1). Both Harpeth River mainstem and tributaries were represented within the sampling locations. Locations were selected based on ease-of-access and whether algae was present regardless of it being within the water column or as a benthic scum. Locations with more visible algal growth were given priority as cyanotoxin would be more likely to be present and/or detected.

Water samples were collected in sterile glass and plastic bottles of various size. Each bottle was rinsed with native water three times before a final sample of >250 mL was collected. Samples went through three freeze-thaw cycles before being stored in a -20°C freezer.

Analysis

Frozen samples were transported in a cooler to the Environmental Sciences Department at Tennessee State University for analysis. Each sample was analyzed for microcystins/nodularins (µg/L; EPA Method 546) using an Abraxis, Inc (Warminster, PA) ELISA kit (Item #: 520011-OH).

Table 1: Location, date, and concentration of microcystin (µg/L) for each site sampled between September 14th and October 2nd.

Date	Location	Latitude	Longitude	Time	River	Microcystin Concentration (µg/L)
9/14/2019	Cotton Ln. Bridge	35.96786	-86.90057	17:15	Harpeth	Non-Detect
9/15/2019	Moran Rd. 1	36.01732	-86.90001	13:49	Harpeth	Non-Detect
9/15/2019	Moran Rd. 2	36.01689	-86.8996	14:00	Harpeth	Non-Detect
9/15/2019	Blue Springs Rd. Bridge	36.01087	-86.89105	14:45	Cartwright Creek	Non-Detect
9/15/2019	Old Harding Rd.	36.05936	-86.94427	15:30	Harpeth	Non-Detect
9/15/2019	Eastern Flank Canoe Access	35.90945	-86.85579	16:40	Harpeth	Non-Detect
9/15/2019	Bear Creek	35.85872	-86.97597	18:00	Bear Creek	Non-Detect
9/15/2019	Tributary by Bailey Rd.	35.88256	-87.00084	18:20	Unknown Tributary	**0.44**
9/16/2019	Hwy 100 Canoe Access - Off channel pool	36.05383	-86.92854	08:45	Harpeth	Non-Detect
9/19/2019	Hidden Lake State Park Canoe Launch	36.08721	-87.0262	12:18	Harpeth	Non-Detect
9/19/2019	Gosset Tract	36.13684	-87.10205	13:02	Harpeth	Non-Detect
9/19/2019	Trace Creek Rd. Bridge over Trace Creek	36.11904	-87.19876	13:35	Trace Creek	**0.24**
9/19/2019	Carothers Pkwy Bridge/Canoe Access at Ladd Park	35.87834	-86.81469	15:45	Harpeth	Non-Detect
9/19/2019	McDaniel Rd. Bridge	35.83228	-86.69863	17:50	Harpeth	Non-Detect
9/19/2019	Bellenfant Rd. Bridge, College Grove, TN	35.78623	-86.66145	18:35	Harpeth	Non-Detect
9/22/2019	Hwy 100 Upstream of Gravel Island	36.05309	-86.92861	15:26	Harpeth	Non-Detect
10/2/2019	Ingram Property	36.00914	-86.92406	11:15	Harpeth	Non-Detect
10/2/2019	Ingram Property Downstream	36.0089	-86.92355	11:20	Harpeth	Non-Detect

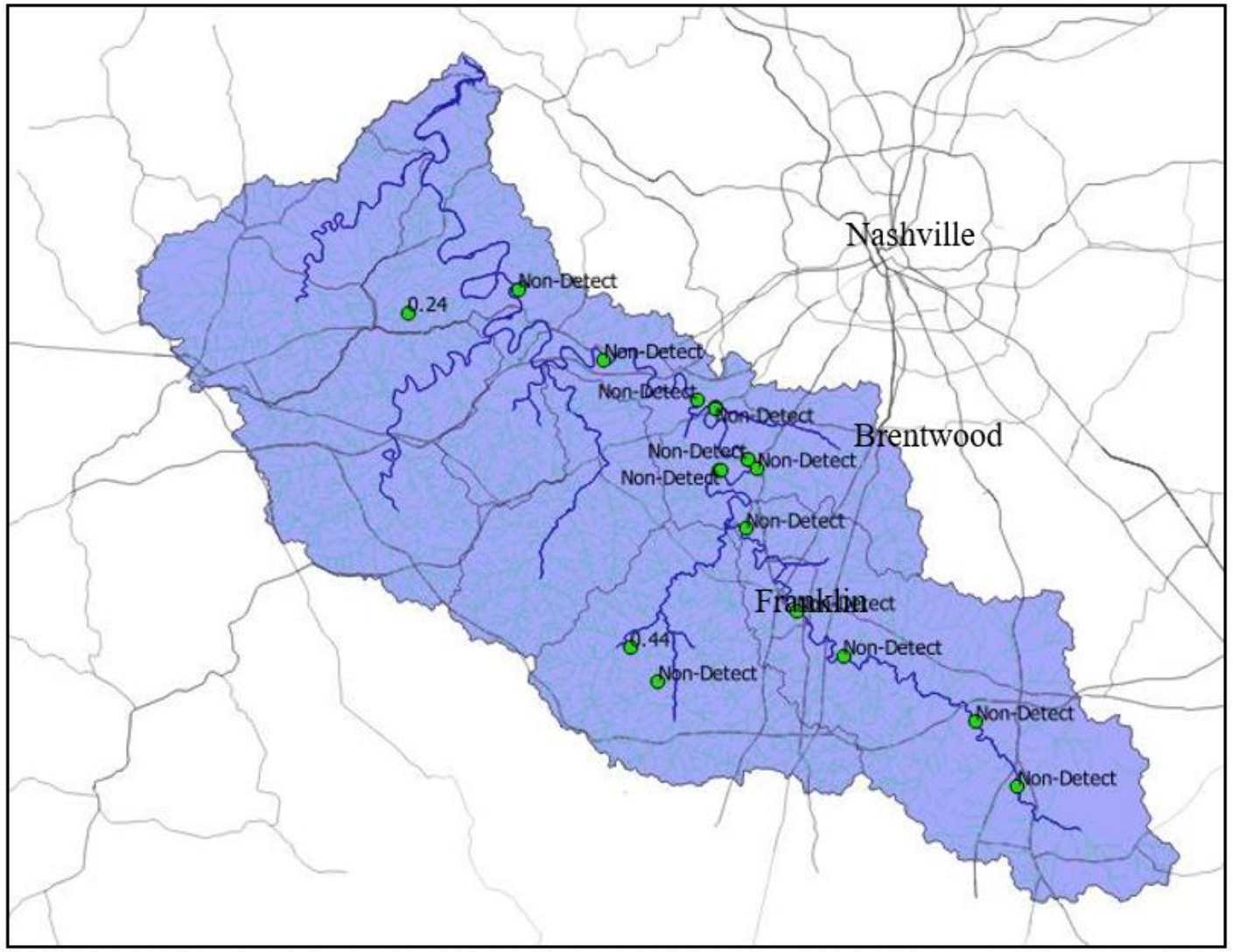

Figure 1: Location of each sampling location (green dot) and corresponding value for microcystin concentration (µg/L). The map also depicts the Harpeth River watershed (blue shaded region), major roadways (black lines), and major waterways (blue lines) within the watershed.

Figure 1-A: Trace Creek upstream of sampling location.

Figure 1-B: Unnamed tributary near Bailey Rd.

Figure 1-B: Harpeth River behind Ingram property.

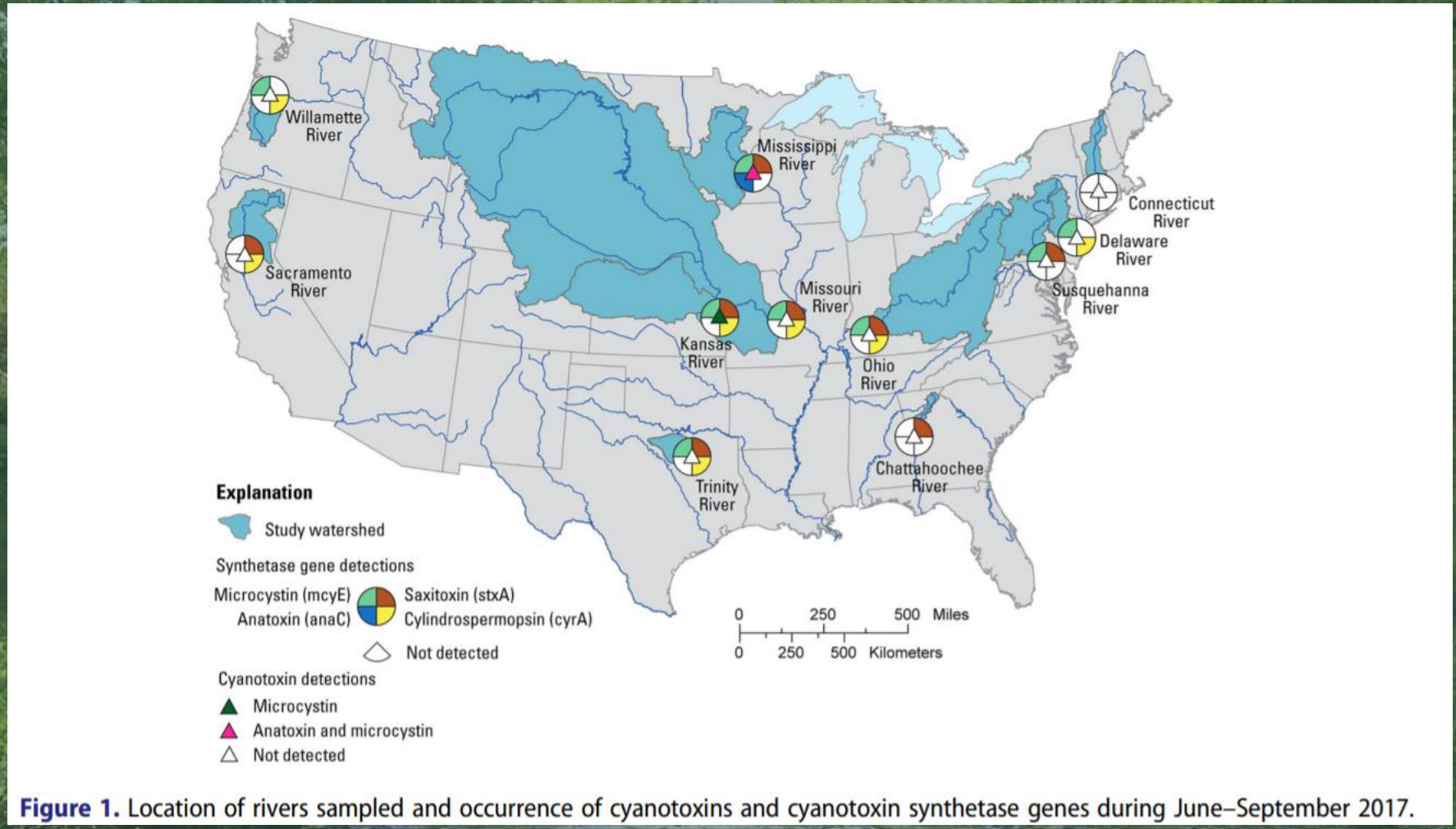

Figure 1. Location of rivers sampled and occurrence of cyanotoxins and cyanotoxin synthetase genes during June–September 2017.

Jennifer L. Graham, Neil M. Dubrovsky, Guy M. Foster, Lindsey R. King, Keith A. Loftin, Barry H. Rosen & Erin A. Stelzer (2020) Cyanotoxin occurrence in large rivers of the United States, Inland Waters, DOI: 10.1080/20442041.2019.1700749