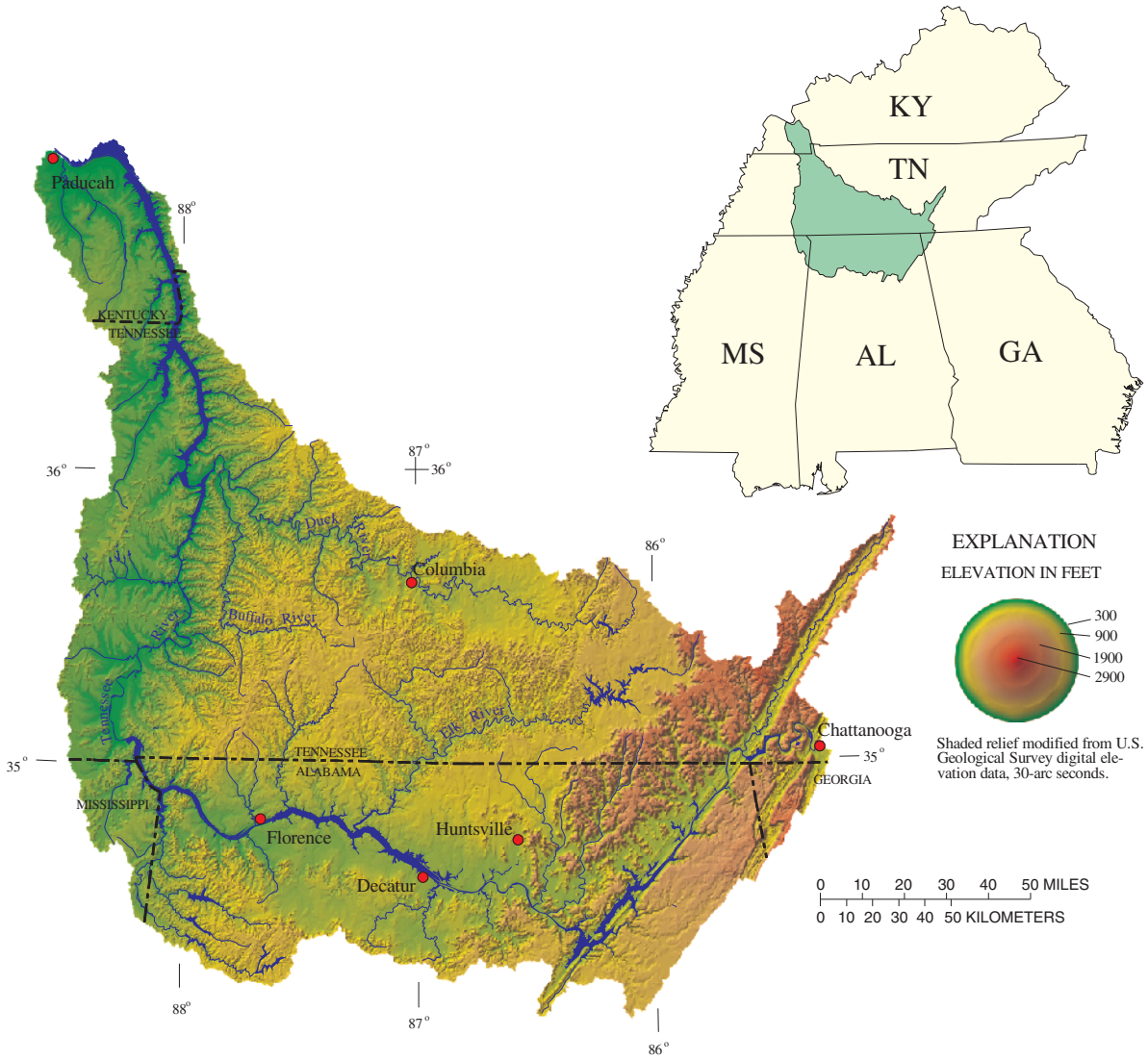
Nutrient Yields and Trends in the Lower Tennessee River Basin

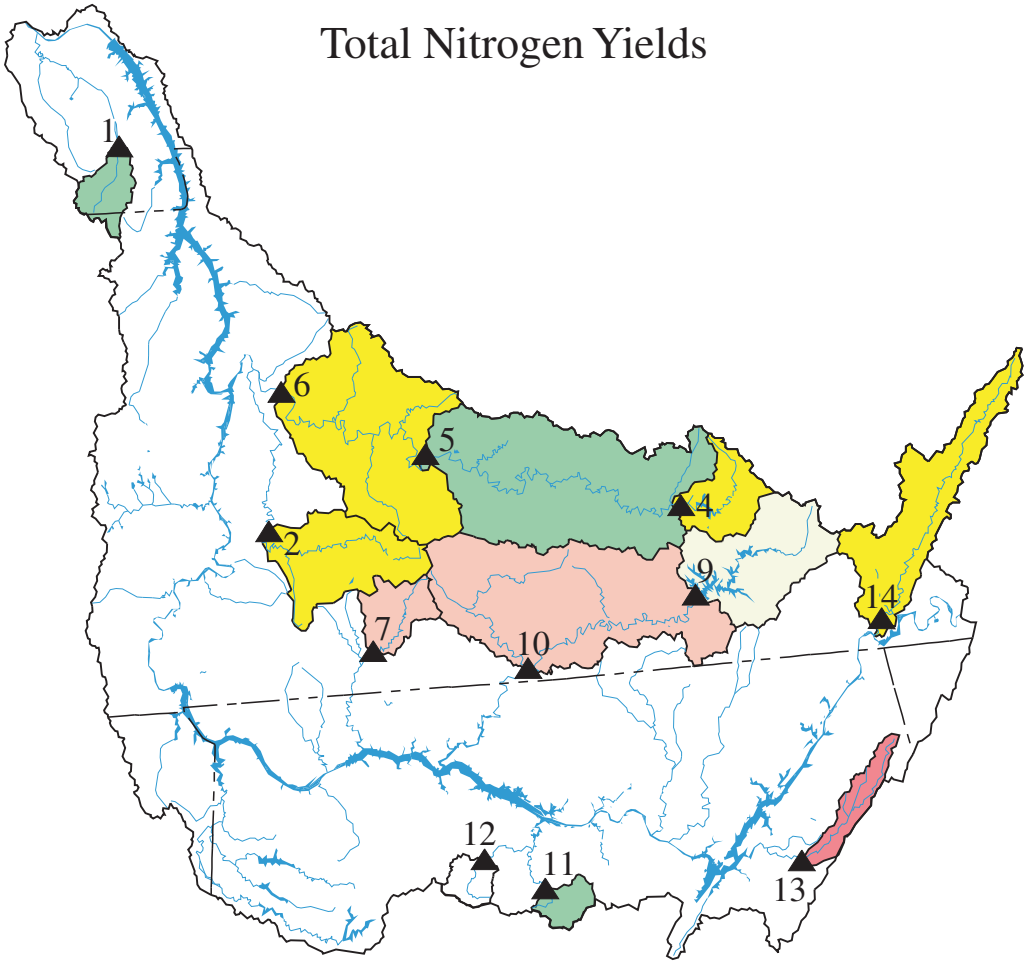


NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

During the past 25 years, industry and government made large financial investments that have resulted in improved water quality across the Nation; however, many water-quality concerns remain. The U.S. Geological Survey began a full-scale National Water-Quality Assessment (NAWQA) Program in 1991 to provide consistent and scientifically sound information for managing the Nation's water resources. This program is unique compared to other national water-quality assessment studies in that it integrates the monitoring of the quality of surface and ground waters with the study of aquatic ecosystems. The goals of the NAWQA Program are (1) to describe current water-quality conditions for a large part of the Nation's freshwater streams and aquifers (water-bearing sediments and rocks), (2) to describe how water quality is changing over time, and (3) to improve our understanding of the primary natural and human factors affecting water quality.

The goals of the NAWQA program are being achieved through ongoing or planned investigations of 59 of the Nation's most important river and aquifer systems, which are referred to as study units. These study units were selected to represent the diverse geography, water resources, and land and water use of the Nation. The Lower Tennessee River Basin and the Mobile River Basin are two such study units. The U.S. Geological Survey began both of these studies in 1996. This poster presents estimated yields of nutrients in both study units. Yields were calculated for the 1992 water year using nutrient loads which were estimated by use of a seven-parameter log-linear regression model. For basins with insufficient nutrient data for 1992, nutrient loads were estimated for a year that was hydrologically similar to 1992.

Total Nitrogen Yields



EXPLANATION

UNIT-AREA LOAD TOTAL NITROGEN FOR ENTIRE UPSTREAM DRAINAGE AREA, IN TONS PER SQUARE MILE PER YEAR

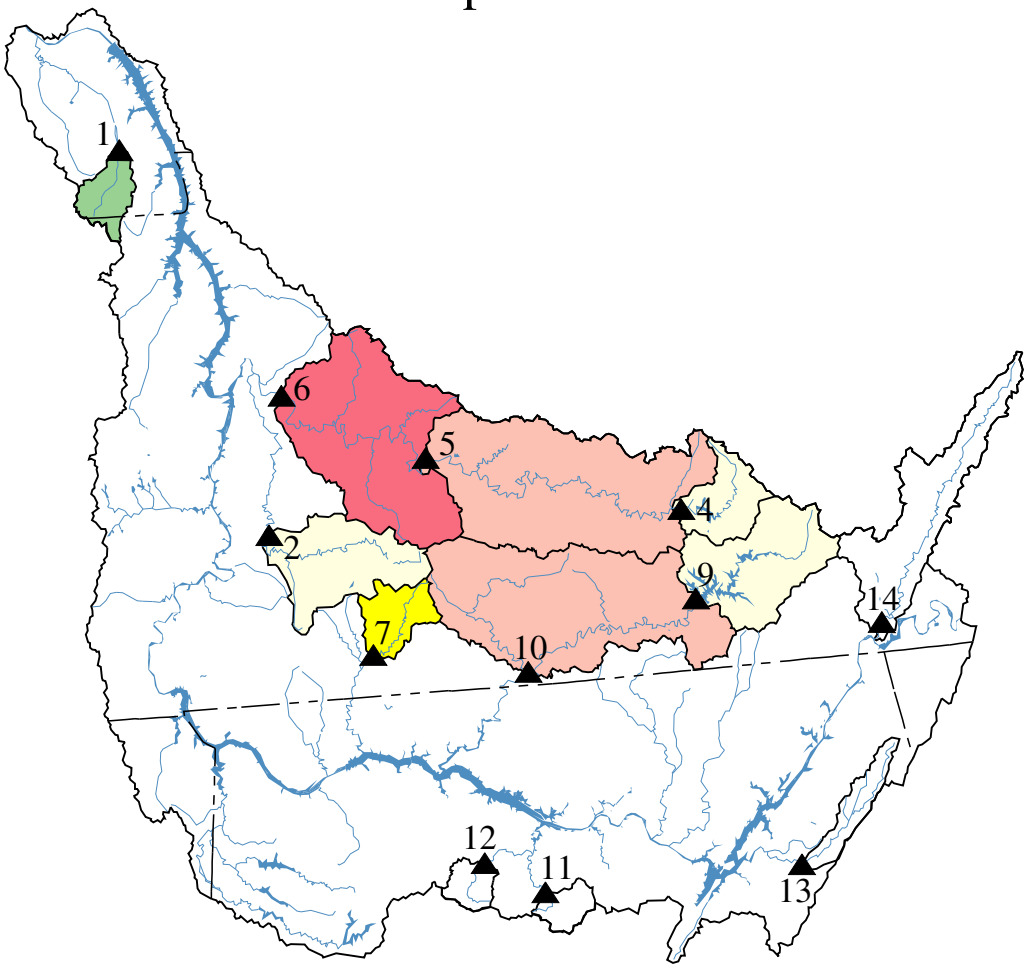
- Insufficient data
- 0.49 - 0.99
- 1.00 - 1.79
- 1.80 - 2.40
- 2.41 - 3.00
- 3.01 - 3.50

In 1992, yields of total nitrogen, estimated at 11 tributary sites in the lower Tennessee River Basin, ranged from 1.0 tons per square mile (tons/mi^2) in the Buffalo River Basin (site 2) to 3.5 tons/mi^2 in the Town Creek Basin (site 13). Estimated wastewater inputs into the Buffalo River Basin comprise less than 5 percent of the yield of total nitrogen, thus nonpoint inputs including natural sources are the largest potential sources of nitrogen. Estimated wastewater inputs into the Town Creek Basin comprise less than 1 percent of the yield of total nitrogen. Nonpoint inputs from confined-animal operations and crop production are the largest potential sources of nitrogen in the Town Creek Basin.

U. S. Geological Survey photo

Numerous surface-water impoundments are used for drinking-water supplies, navigation, hydroelectric power generation, and recreational uses.

Total Phosphorus Yields



EXPLANATION

UNIT-AREA LOAD TOTAL PHOSPHORUS FOR ENTIRE UPSTREAM DRAINAGE AREA, IN TONS PER SQUARE MILE PER YEAR

- Insufficient data
- 0.01 - 0.09
- 0.10 - 0.19
- 0.20 - 0.40
- 0.41 - 1.00
- 1.01 - 1.14

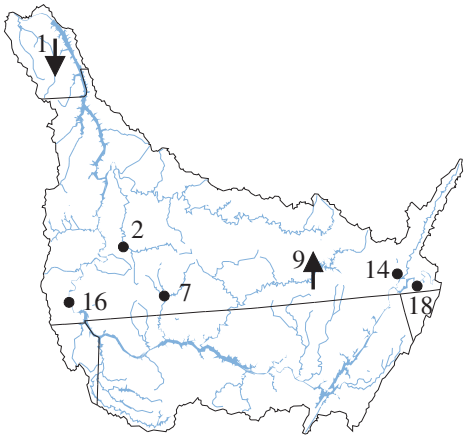
In 1992, yields of total phosphorus, estimated at 8 tributary sites in the lower Tennessee River Basin, ranged from 0.04 tons/mi^2 in the Buffalo River Basin (site 2) to 1.1 tons/mi^2 in the Duck River Basin (site 6). Naturally occurring phosphatic limestone in the Duck River Basin contributes to high yields of total phosphorus; estimated wastewater inputs comprise less than 3 percent of the yield of total phosphorus at site 6.

U.S. Geological Survey photo

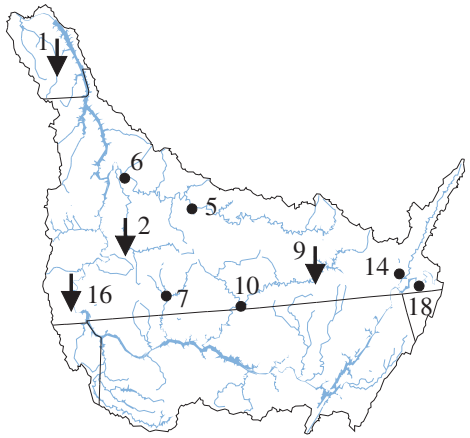
Agricultural land uses such as row crops and pasture land account for 41 percent of the land use in the Lower Tennessee River Basin.

Trends in Nutrient Concentrations

Total nitrogen,
1985-94



Total nitrate + nitrite,
1984-94



Total ammonia + organic nitrogen,
1986-93

Total ammonia,
1986-94

Total phosphorus,
1985-93

Suspended sediment,
variable

EXPLANATION

Trend in Water-Quality Constituent

- Upward
- No Trend
- Downward

Site Number	Site Name	Drainage Area (mile^2)
1	Clarks River at Almo	134.0
2	Buffalo River near Flatwoods, Tenn.	447.0
3	Duck River below Manchester, Tenn.	107.0
4	Duck River below Normandy, Tenn.	195.0
5	Duck River at Williamsport, Tenn.	1,448.0
6	Duck River above Hurricane Mills, Tenn.	2,577.0
7	Shoal Creek at Highway 43, Tenn.	176.0
8	Shoal Creek at Iron City, Tenn.	348.0
9	Elk River below Tims Ford Dam, Tenn.	529.0
10	Elk River near Prospect, Tenn.	1,784.0
11	Flint Creek near Falkville, Ala.	86.3
12	West Flint Creek near Oakville, Ala.	87.6
13	Town Creek near Geraldine, Ala.	157.0
14	Sequatchie River at Valley Road, Tenn.	578.0
15	Tennessee River at Highway 60 near Paducah, Ky.	40,330.0
16	Tennessee River at Pickwick, Tenn.	32,820.0
17	Tennessee River at South Pittsburgh, Tenn.	22,640.0
18	Tennessee River at Kentucky Dam, Ky.	21,730.0