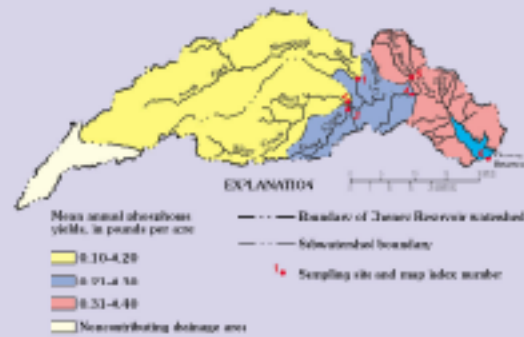


## Background

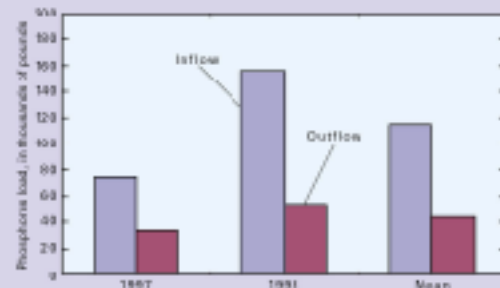
- A water-quality study of the 953-square-mile Cheney Reservoir watershed in south-central Kansas was begun in 1996 to evaluate potential degradation of Cheney Reservoir from water-quality constituents such as nutrients (compounds of nitrogen and phosphorus), pesticides, and suspended sediment.
- This 5-year study is being conducted by the U.S. Geological Survey in cooperation with the city of Wichita.
- Maintaining suitable surface-water quality in the Cheney Reservoir watershed is important because the reservoir is a principal public water-supply source for more than 300,000 people in south-central Kansas.
- The purposes of this study are to:
  - describe spatial differences in concentrations and loads characteristics for selected water quality constituents;
  - evaluate annual loads of selected constituents into and out of Cheney Reservoir;
  - evaluate long-term changes in reservoir sediment quality; and
  - provide information to the public and Citizens Management Committee to evaluate the effectiveness of current and future implemented best-management practices.

## Assessment of Phosphorus Transport

- Estimated mean annual (1997-98) phosphorus yields from subwatersheds ranged from 0.13 to 0.37 pound per acre and generally increased in an easterly direction.
- The easterly increase was related in large part to an easterly increase in water yield, which ranged from 108 acre-feet per square mile in the west to 198 acre-feet per square mile in the east. Generally, subwatersheds with the largest mean water yield also had the largest phosphorus yields.
- On average (1997-98), Cheney Reservoir has a phosphorus retention efficiency of about 2 percent of the phosphorus load transported into it.

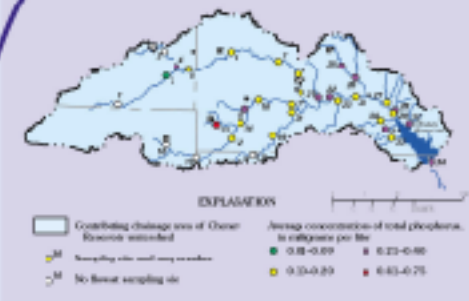


Distribution of mean annual phosphorus yields estimated for the Cheney Reservoir watershed, 1997-98.

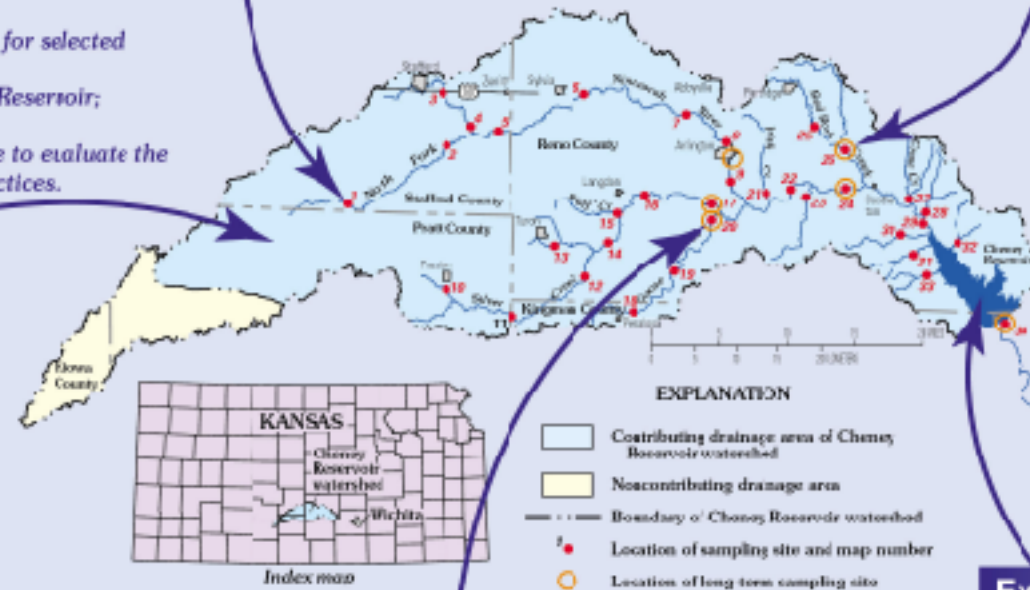


Comparison of 1997 and 1998 estimated annual phosphorus inflow and outflow loads for Cheney Reservoir.

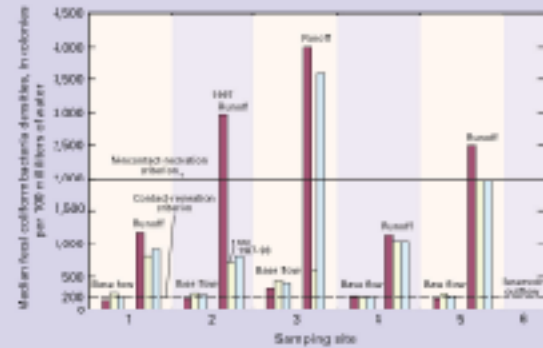
## Low-Flow Investigation



- Stream sampling at 34 sites during low flow in 1996 did not identify significant point-source discharges in the watershed.
- Phosphorus concentrations throughout the watershed generally were larger than the watershed goal of 0.10 milligrams per liter to prevent algal blooming in Cheney Reservoir.



## Occurrence of Fecal Coliform Bacteria



- Median fecal coliform densities in samples of base flow for both the 1997 and 1998 water years (October 1 - September 30) did not exceed the 1974 Kansas water-quality criteria for the classified use of the stream at any of the six long-term monitoring sites.
- However, median densities in samples collected during runoff conditions were many times larger than median densities in samples collected during base-flow conditions.

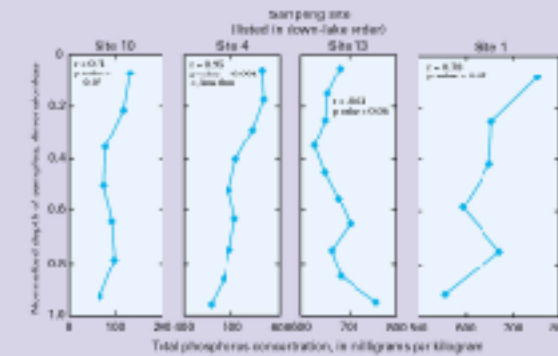
## Long-Term Monitoring

- Six sites were established in 1996 in the watershed for long-term monitoring.



- Each site was instrumented for continuous streamflow recording, and the five sites upstream from the reservoir were equipped with automated water-quality samplers.

## Examination of Reservoir Bottom Sediment



- Results from the analyses of bottom-sediment core samples collected in 1997 generally indicated an increasing time trend in phosphorus concentrations.
- This trend is probably of nonpoint-source origin and may be related to an increase in fertilizer sales in the area, which more than doubled between 1965 and 1996, and to livestock production.