Table 1. Comparison of geometric means to the Oklahoma Scenic River total phosphorus criterion calculated from 1999-2016[1] and 2012-2016.

Station (see footnotes)	1999-2016 (3-month GM'S)			2011-2016 (3-month GM'S)		
	N (Period)	N< 0.037	% Exceeding 0.037	N (Period)	N< 0.037	% Exceeding 0.037
Illinois River near Watts[2]	323	11	97%	88	8	91%
Illinois River near Tahlequah[2]	320	23	93%	78	17	78%
Flint Creek near Kansas[2]	314	0	100%	82	0	100%
Barren Fork near Eldon[2]	305	170	44%	74	52	30%
Little Lee Creek near Nicut[1]	93	91	2%	51	51	0%
Lee Creek near Short	209	208	<1%	60	60	0%
Mountain Fork River near Smithville	177	148	16%	50	47	6%

[1]Little Lee Creek near Nicut Period of Record Dataset from 2008-2016
[2]Dataset meets USAP data requirements

Table 2. Waters Listed on Oklahoma's 2014 303(d) List

Impaired Waters in the Illinois River Basin

OKWBID	Name	Listed on 303(d) for Impairments
121700020020	Tenkiller Ferry Lake	Dissolved Oxygen, TP
121700020110	Chicken Creek	Fish Bioassessment
121700020220	Tenkiller Ferry Lake, Illinois River Arm	Chlorophyll-a, TP
121700030010	Illinois River – Tahlequah	TP, Enterococcus
121700030040	Tahlequah Creek (Town Branch)	*Eschericia coli*
121700030080	Illinois River	TP, Lead, *Eschericia coli*,
121700030280	Illinois River – Chewey Bridge	TP, *Escherichia coli.* Turbidity, Enterococcus
121700030290	Flint Creek	TP,Dissolved Oxygen
121700030350	Illinois River – Watts	TP, Enterococcus, *Escherichia coli*
121700030370	Ballard Creek	Enterococcus
121700040010	Caney Creek	Enterococcus
121700050010	Illinois River - Baron Fork	TP, Enterococcus
121700050090	Tyner Creek	Enterococcus
121700050120	Peacheater Creek	Enterococcus
121700060010	Flint Creek	TP,Enterococcus
121700060040	Battle Creek (Battle Branch)	Enterococcus
121700060080	Sager Creek	DO, Sedimentation/Siltation, Enterococcus, Macro

Other Notable Impaired Waters in the Compact Area

OKWBID	Name	Listed on 303(d) for Impairements
220100010010	Poteau River (Below Wister)	Silver, Cadmium, Copper, Lead, Selenium, Turbidty
220100020020	Wister Lake	Chlorophyll-a, pH, Dissolved Oxygen, Turbidity TP, , listed as an NLW in the OWQS
220200050010	Lee Creek	Lead, Enterococcus
220200050040	Little Lee Creek	Lead

Water Quality Trends at Different Flow Regimes

Trend analyses were performed on total phosphorus concentrations as well as assessment geometric means at four BUMP permanent monitoring stations in the Arkansas River Compact area (Table 1). Using a Seasonal Kendall test, a series of trends was calculated for each station including all total phosphorus data from both 1993-2016 and 1999-2016, total phosphorus concentrations measured at both higher and lower flows from 1999-2016, and use assessment geometric means from 1999-2016. Furthermore, for each concentration data set, a trend was calculated using both unadjusted and flow-adjusted total phosphorus data. Graphical representations of these trends are not presented but may be obtained by contacting Monty Porter with the OWRB at 405-530-8933. Some general conclusions may be drawn from the data set.

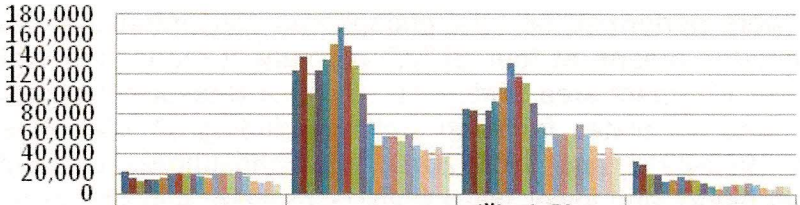
1. When considering all total phosphorus data with a period of record (POR) beginning in 1993, no station demonstrated a significant upward trend regardless of flow adjusting data. The Barren Fork River demonstrated no significant trend in both flow adjusted and unadjusted data, while Flint Creek did so for unadjusted data.
2. When all data from 1999-2016 are analyzed, all stations demonstrate a highly significant downward trend.
3. All stations show some significant downward trend when only higher flow total phosphorus concentrations are considered. Unadjusted data from the Barren Fork River show no significant trend in total phosphorus concentrations. All stations demonstrate highly significant downward trends in flow adjusted concentrations.
4. When only lower flow data from 1999-2016 are analyzed, all stations except the Barren Fork demonstrate a highly significant downward trend. The Barren Fork shows a slightly or moderately significant downward trend, depending on the flow adjusting of data.
5. All stations show a highly significant downward trend for use assessment geometric means. (Figures 1-4).

Table 1. Trends calculated for total phosphorus concentrations and use assessment geometric means at certain BUMP permanent monitoring stations in the Compact area. (Boxes shaded in yellow represent changes from the 2013 report, and 2013 results are in superscript.)

Station	All Data (1993-2015)		All Data (1999-2015)		Higher Flow Data (1999-2015)		Lower Flow Data (1999-2015)		Geomtric Mean For Assessment (1999-2015)
	Unadj	Flow Adj	Unadj	Flow Adj	Unadj	Flow Adj	Unadj	Flow Adj	Unadj
Illinois River near Watts	↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓$^{(↓↓↓)}$	↓↓↓	↓↓↓	↓↓↓	↓↓↓
Illinois River near Tahlequah	↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓$^{(↓↓)}$	↓↓↓	↓↓↓	↓↓↓	↓↓↓
Flint Creek near Kansas	NT$^{(↑↑)}$	↓↓$^{(NT)}$	↓↓↓	↓↓↓	↓↓↓$^{(↓)}$	↓↓↓	↓↓↓	↓↓↓	↓↓↓
Barren Fork near Eldon	NT	NT	↓↓↓	↓↓↓	NT	↓↓↓	↓↓↓	↓↓↓	↓↓↓

↓↓↓ = Decreasing Trend at the 95% Confidence Level
↓↓ = Decreasing Trend at the 90% Confidence Level
↓ = Decreasing Trend at the 80% Confidence Level
↑↑ = Increasing Trend at the 90% Confidence Level
NT = No Signficant Trend

Oklahoma's Average Annual Total P Loading in Kilograms per Year (excluding targeted high flows)



	Flint Creek near Kansas	Illinois River near Watts	Illinois River near Tahlequah	Barren Fork near Eldon
Total P 80-93	22,279	124,832	85,235	33,001
Total P 93-97	15,727	138,508	83,799	29,482
Total P 94-98	12,986	99,898	70,546	19,163
Total P 95-99	14,974	123,581	83,632	19,257
Total P 96-00	15,100	134,986	92,876	13,163
Total P 97-01	15,989	149,927	106,797	14,548
Total P 98-02	19,224	167,987	131,491	17,603
Total P 99-03	20,579	148,151	117,524	14,059
Total P 00-04	20,963	129,533	112,341	13,685
Total P 01-05	19,098	100,347	91,325	11,465
Total P 02-06	17,415	69,482	67,345	8,500
Total P 03-07	15,977	48,448	47,216	5,716
Total P 04-08	19,356	56,951	58,605	8,574
Total P 05-09	19,586	57,272	60,830	9,197
Total P 06-10	19,818	53,127	61,131	9,335
Total P 07-11	21,700	58,493	70,259	11,159
Total P 08-12	17,473	47,682	61,180	9,837
Total P 09-13	13,543	43,412	48,513	7,054
Total P 10-14	10,569	36,806	36,735	5,400
Total P 11-15	12,170	47,254	46,432	8,711
Total P 12-16	9,762	37,009	37,698	7,751

Values represent all available data, which is routinely collected and excludes targeted high flow events.