



ANNUAL REPORT 2017



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CHATFIELD WATERSHED AUTHORITY

www.chatfieldwatershedauthority.org

The purpose of the Chatfield Watershed Authority (Authority) is to provide for and promote a regional, coordinated approach for the provision of water quality improvements and the protection of water quality in the Chatfield watershed for recreation, fisheries, drinking water supplies, other beneficial uses.

This approach is for the public benefit of the Members of the Authority, their inhabitants, and the People of the State of Colorado, as deemed appropriate by the Board of Directors of the Authority. This includes continuing to implement Colorado Water Quality Control Commission Chatfield Reservoir Control Regulation, 5 CCR 1002-73 (Control Regulation No. 73); and coordinating with state and federal agencies regarding water quality control measures.

On April 26, 2016, the Authority approved an amended Intergovernmental Agreement (IGA) and bylaws. The new 5-member Board of Directors is comprised of

elected officials representing Douglas and Jefferson counties, the Town of Castle Rock, one wastewater district representative and one representative for other members. The Board continues to implement Control Regulation No. 73 and to meet quarterly to address policy and fiscal issues. The Technical Advisory Committee is a standing committee that meets monthly to address technical and scientific matters, serving at the pleasure of the Board. Other standing committees may be formed to address specific issues at the Board's request.

The Chatfield watershed includes over 400-square miles and is comprised of the Plum Creek basin and South Platte River basin (from the outfall of Strontia Springs Reservoir to Chatfield Reservoir, including the Massey Draw and Deer Creek sub-basins).

Figure 1 on the next page shows the Authority member entities.



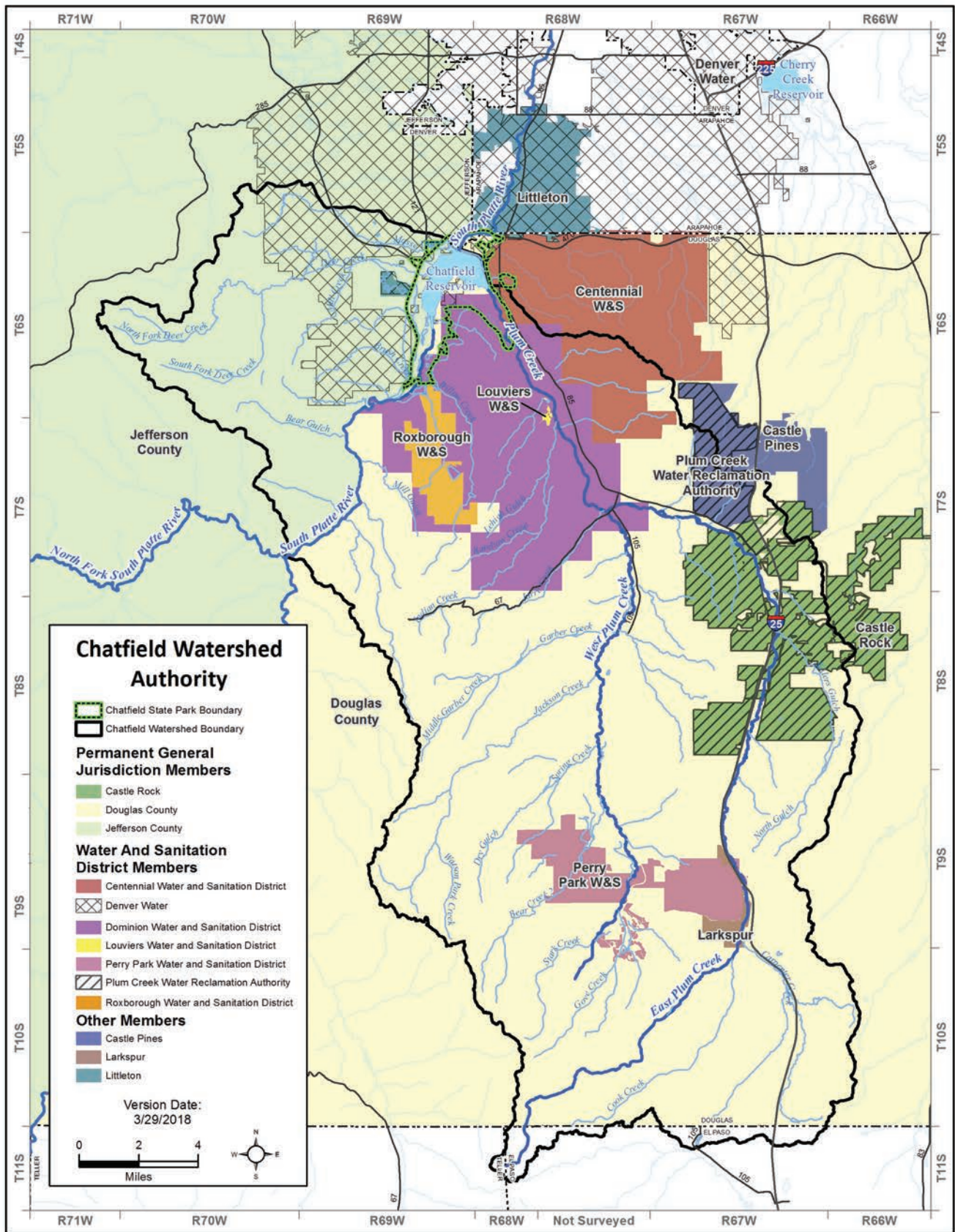


Figure 1. Chatfield Watershed Authority Member Entities.

Chatfield Watershed Authority Board Members

Chair: Lora L. Thomas, Douglas County Commissioner

Vice-Chair: George Teal, Town of Castle Rock Councilman

Director: Tina Francone, Jefferson County Commissioner

Director: Kevin Urie, Denver Water

Director: Larry Moore (term through November 20, 2017), Roxborough Water & Sanitation District

Director: Barbara Biggs (appointed November 20, 2017), Roxborough Water & Sanitation District

Chatfield Watershed Authority Technical Advisory Committee (TAC) Representatives

Jefferson County: Patrick O'Connell (TAC Chair)

Dominion Water & Sanitation District: Mary Kay Provaznik (TAC Vice-Chair)

Castle Pines Metropolitan District: Jeff Coufal

Centennial Water & Sanitation District: Julie Tinetti

City of Littleton: Carolyn Roan

Douglas County: Jim Dederick

Louviers Water & Sanitation District: Ron Beane

Perry Park Water & Sanitation District: Scott Monroe

Plum Creek Water Reclamation Authority: Weston Martin

Roxborough Water & Sanitation District: Ronda Sandquist

Town of Castle Rock: David Van Dellen

Town of Larkspur: Paul Grant



RESERVOIR REGULATORY COMPLIANCE

In 2017, Chatfield Reservoir was in compliance with chlorophyll α and phosphorus standards (Regulation 38, Water Quality Control Commission 5 CCR 1002-38). The Authority maintains a monitoring program to characterize reservoir water quality and determine regulatory compliance. The constituents are monitored monthly when ice has melted off the reservoir.

During the growing season (July through September), reservoir sampling is conducted twice monthly. Figure 2 shows the locations of the reservoir centroid that is used for regulatory compliance sampling along with the South Platte Inflow, Plum Creek Inflow, South Platte Arm, Plum Creek Arm, and the Reservoir Outflow.

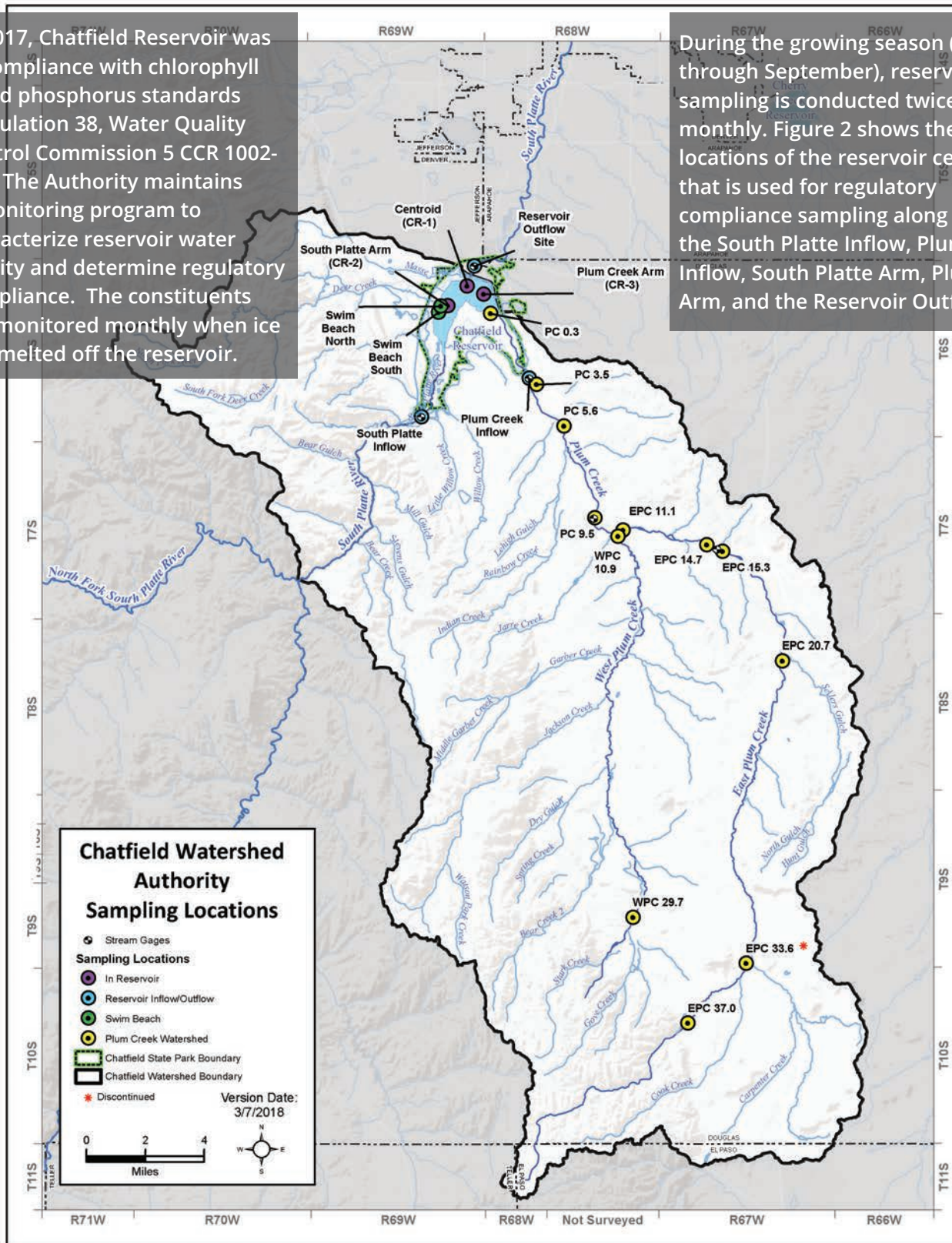


Figure 2. Chatfield Watershed Authority Sampling Locations.

CHLOROPHYLL α

The chlorophyll α (chl-α) standard in the reservoir is 10 µg/L, with an allowable exceedance frequency of one time in five years. By Colorado Water Quality Control Commission (WQCC) direction, compliance with the standard is evaluated using an assessment threshold of 11.2 µg/L. The chl-α growing season (July through September) average in 2017 was 9.8 µg/L, which is below the assessment threshold.

There has only been one exceedance in the last five years; the reservoir remains in compliance with the standard (Figure 3).

Observed 2017 chl-α concentrations in Chatfield Reservoir are depicted in Figure 4. Chl-α levels were met for the growing season (July through September), but spiked in October which is outside of the growing season (Figure 4).

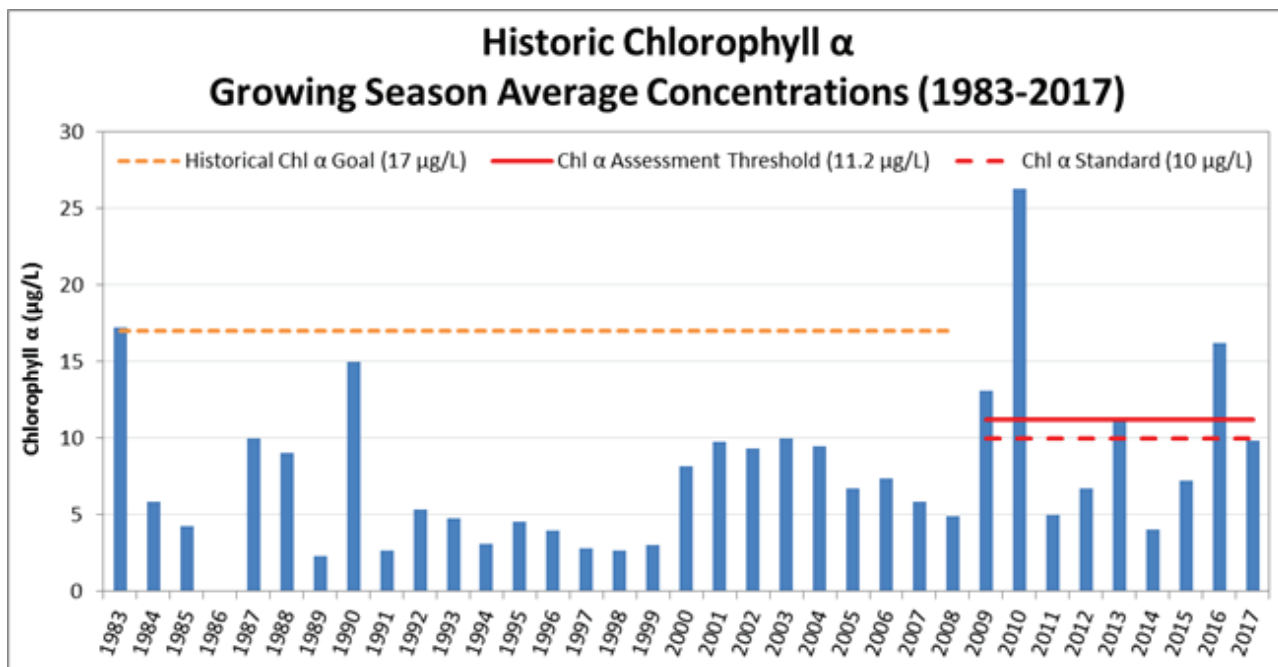


Figure 3. Growing Season Average Chlorophyll α Concentrations, Chatfield Reservoir, 1983-2017.

The July-September growing season average in 2017 was 9.8 µg/L, which is below the assessment threshold of 11.2 µg/L (see Figure 3). In 2017, Chatfield Reservoir continued to be in compliance with the chlorophyll-α water quality standard.

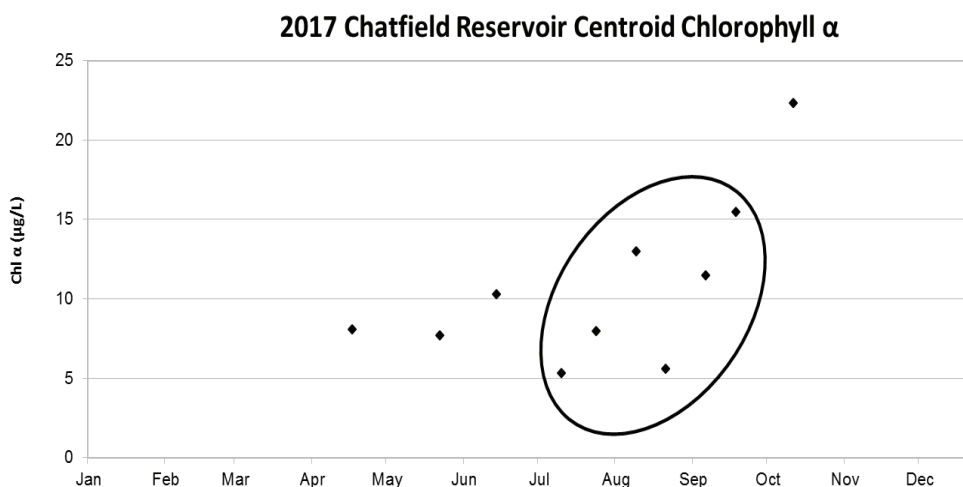


Figure 4. Monthly Chlorophyll-α Concentrations, Chatfield Reservoir, 2017.

The chl-a concentrations observed are a function of nutrient availability from reservoir inputs and internal loading, as well as other conventional reservoir parameters including dissolved oxygen, temperature, and pH.

In 2017, cyanobacteria (phylum Cyanophyta) concentrations ranged from 2,619 to 128,693 algal cells/mL, compared to the 2016 range of 64 to 5,260 algal cells/mL. The highest concentrations occurred in

July (Figure 5). Algae (genera Anabaena, Ankistrodesmus and Aphanocapsa) typically correspond with elevated chl-a measurements. Specific species of cyanobacteria can convert nitrogen gas to biologically available forms of nitrogen, serving as an additional source of nitrogen to the reservoir system. Cyanobacteria were a predominant algae observed in the May - October sampling events (Figure 6).

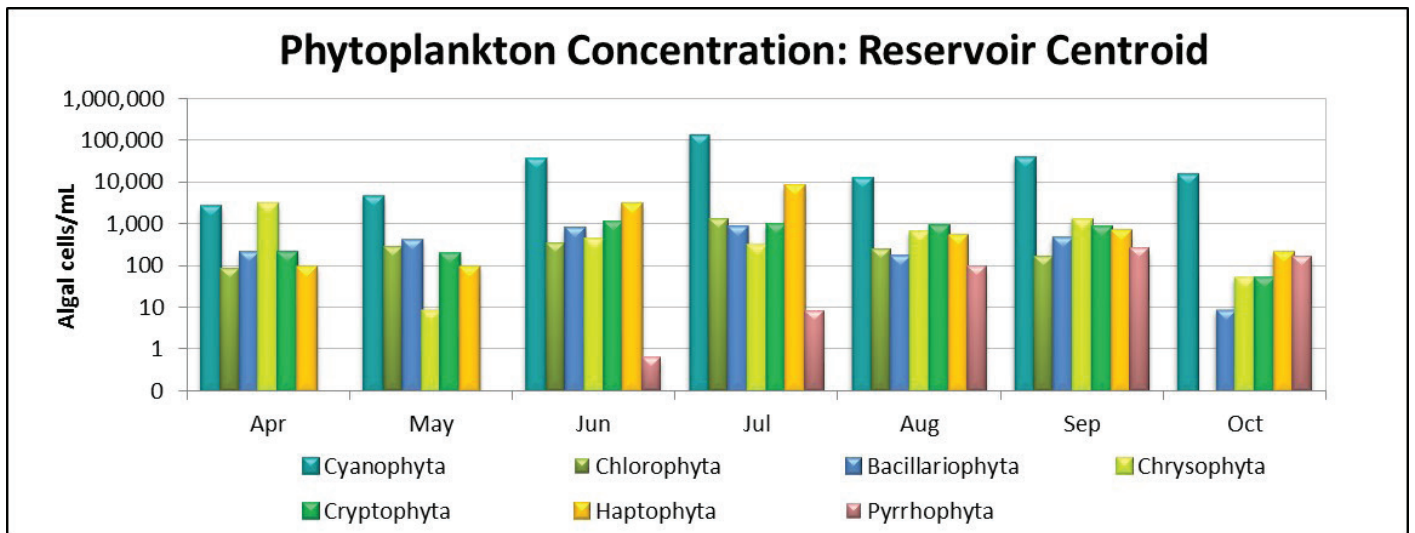


Figure 5. 2017 Phytoplankton Monthly Summary - Phytoplankton samples taken in the Reservoir during 9 sampling events from April through October 2017. Cyanophyta, also sometimes called blue-green algae, are shown to peak in July at 128,693 algal cells/mL.

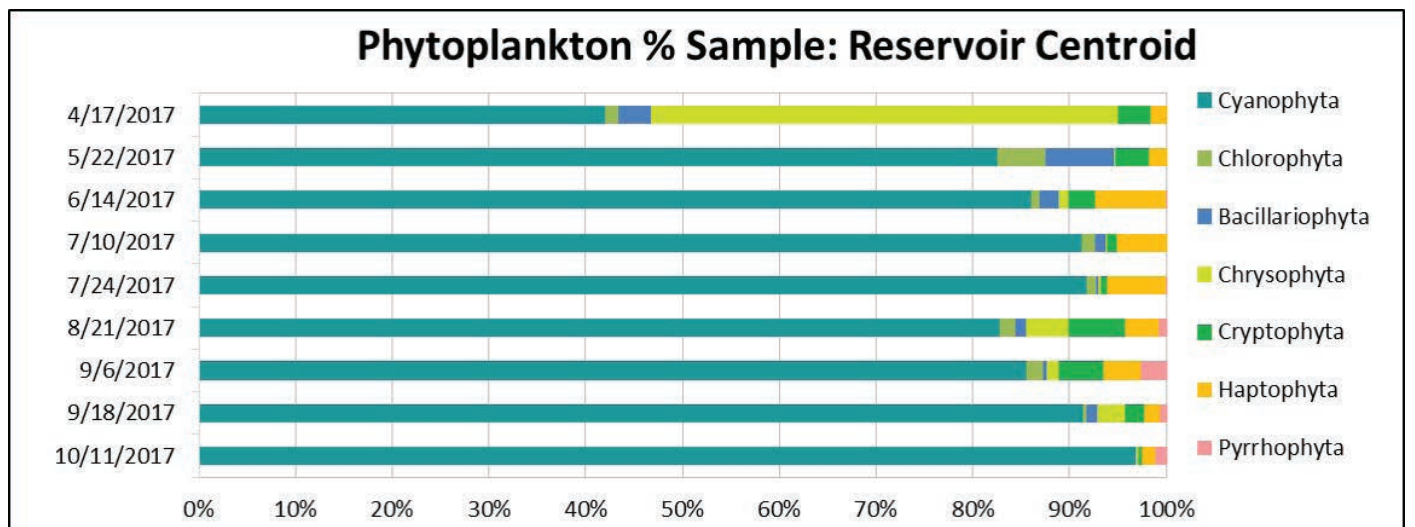


Figure 6. 2017 Phytoplankton Speciation Variability - Cyanophyta (cyanobacteria) were a predominant algae observed in May through October.

TOTAL PHOSPHORUS

The total phosphorus (TP) growing season average was 20.83 µg/L, which is below the standard of 30 µg/L, with an assessment threshold of 35 µg/L, and a one time in five year allowable exceedance frequency (Figure 7). A review of TP compliance with the water quality standard from 1983 to 2017 is illustrated in

Figure 7. The TP growing season average has remained below the water quality assessment threshold of 35 µg/L since the standard changed in 2009.

The monthly TP concentrations observed in 2017 in Chatfield Reservoir are shown in Figure 8.

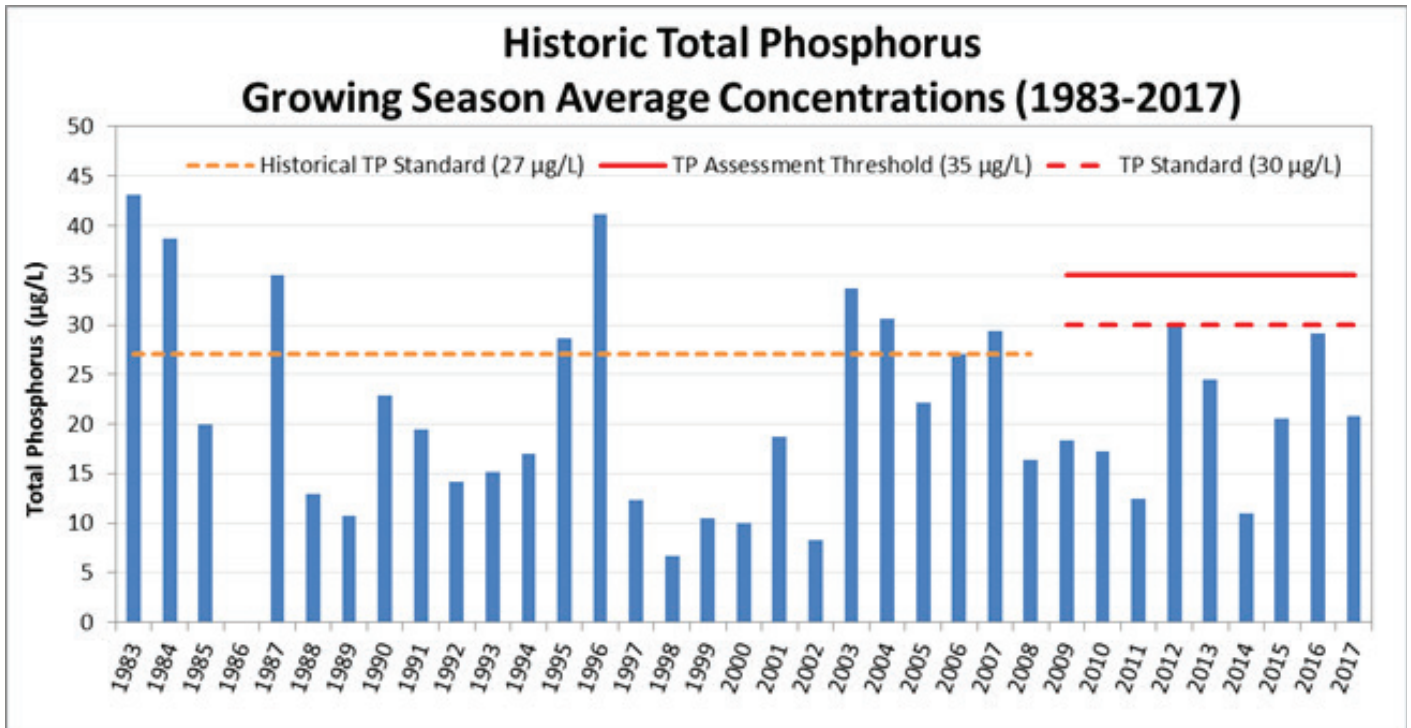


Figure 7. Growing Season Average Total Phosphorus Concentrations, Chatfield Reservoir, 1983-2017.

The July-September growing season average in 2017 was 20.83 µg/L, which is below the assessment threshold of 35 µg/L (see Figure 7). In 2017, Chatfield Reservoir continued to be in compliance with the total phosphorus water quality standard.

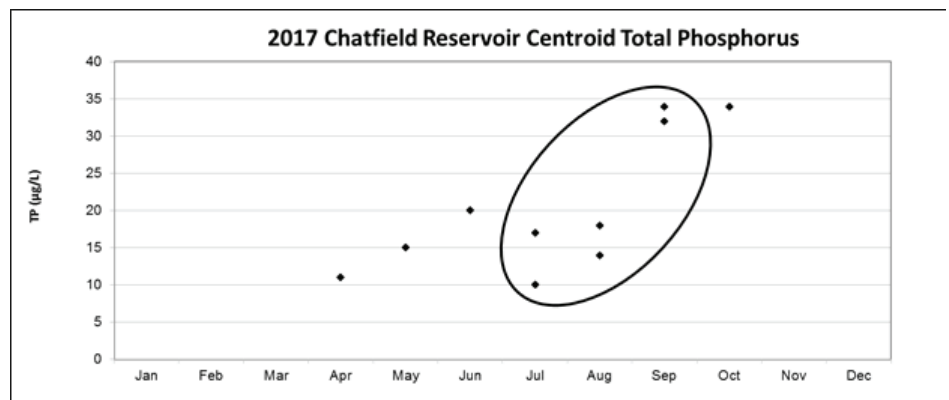


Figure 8. Monthly Total Phosphorus Concentrations, Chatfield Reservoir, 2017.

COMPLIANCE WITH THE TMAL

The phosphorus Total Maximum Annual Load (TMAL) of 19,600 pounds/year at a median flow of 100,860 acre-feet/year was revised by the WQCC in 2009, based on statewide reservoir data and a probabilistic model describing the linkage between watershed TP loads and in-lake TP concentrations. The WQCC acknowledged that progress towards development of revised phosphorus allocations to achieve the revised TMAL is contingent on suitable funding to support data and modeling needed to:

- Re-partition loads between the South Platte River and Plum Creek;
- Reallocate loads within each basin; and
- Revise wasteload allocations, as appropriate.

The Authority completed the development and calibration of a watershed model in 2016. Additional stream, precipitation, and stormwater quantity and quality data would be needed for the model to be applied to identify TP sources, locations, and net contributions to the reservoir. The Authority continues to coordinate with the Chatfield Reallocation Mitigation Company (CRMC) regarding data collection and calibration of the reservoir model (required as part of the water quality adaptive management program).

The Authority currently serves on the Chatfield Reservoir Model Coordination Committee (RMCC), which is tasked with overseeing the development of a two-dimensional, hydrodynamic water quality model for the reservoir. Development of the model is funded by the CRMC as part of the Chatfield Storage Reallocation Project (CSRP). The independently peer-reviewed model has been calibrated for the period of 2013 through 2016, and is currently undergoing a sensitivity analysis for key water quality parameters which may provide some insight into future watershed management strategies. Additional data collected from 2017 through 2019 will be added to the model as needed to complete the pre-project water quality model. After storage begins in 2020, potential impacts from the CSRP, if any, will be evaluated on a yearly basis.

The Authority continues to collect water quality data (over 20 years of monitoring) and since 2016 has collaborated with the CRMC on data collection efforts pursuant to the Memorandum of Understanding between the two agencies. This data will support work on the revised TMAL in the coming years. While there are uncertainties associated with the CSRP as it relates to water quality, modeling is a useful tool to provide insight into water-quality dynamics in the reservoir. Data collection and modeling provide information on what is happening in the watershed and the reservoir. In turn, that information can guide proper and efficient implementation of management activities that are focused on meeting water quality needs.

2017 TP CONCENTRATIONS – INSTREAM AND RESERVOIR

Observed 2017 monthly TP concentrations of Chatfield Reservoir (Centroid), Chatfield Reservoir Outflow, Plum Creek Inflow, and South Platte Inflow are depicted in Figure 9. Refer to Figure 2 for these sampling locations. Plum Creek TP concentrations were highest for all months of the year in comparison to measurements observed elsewhere in the watershed.

CALCULATED TP LOAD

The 2017 annual TP load to the reservoir totaled 12,727 pounds at an inflow of 100,354 acre-feet. This is compared with the TMAL of 19,600 pounds at an inflow of 100,860 acre-feet. Figure 10 shows the calculated annual TP load to Chatfield Reservoir from 1986 to 2017. Figure 11 has the Chatfield Reservoir calculated annual flow from 1986 to 2017. A comparison of the 2017 inflow and TP load contributions is presented in Figure 12.

The relative TP loading from sources is typical compared to historic TP inputs. This year, TP loading from Plum Creek was 9,328 pounds, or 73% of total input, compared to 2,666 pounds from the South Platte River, or 21% of total input. Direct precipitation on Chatfield Reservoir, alluvial inflows, and other direct flow sources contributed approximately 733 pounds, or 6% of total input.

2017 Total Phosphorus Average Monthly Concentrations

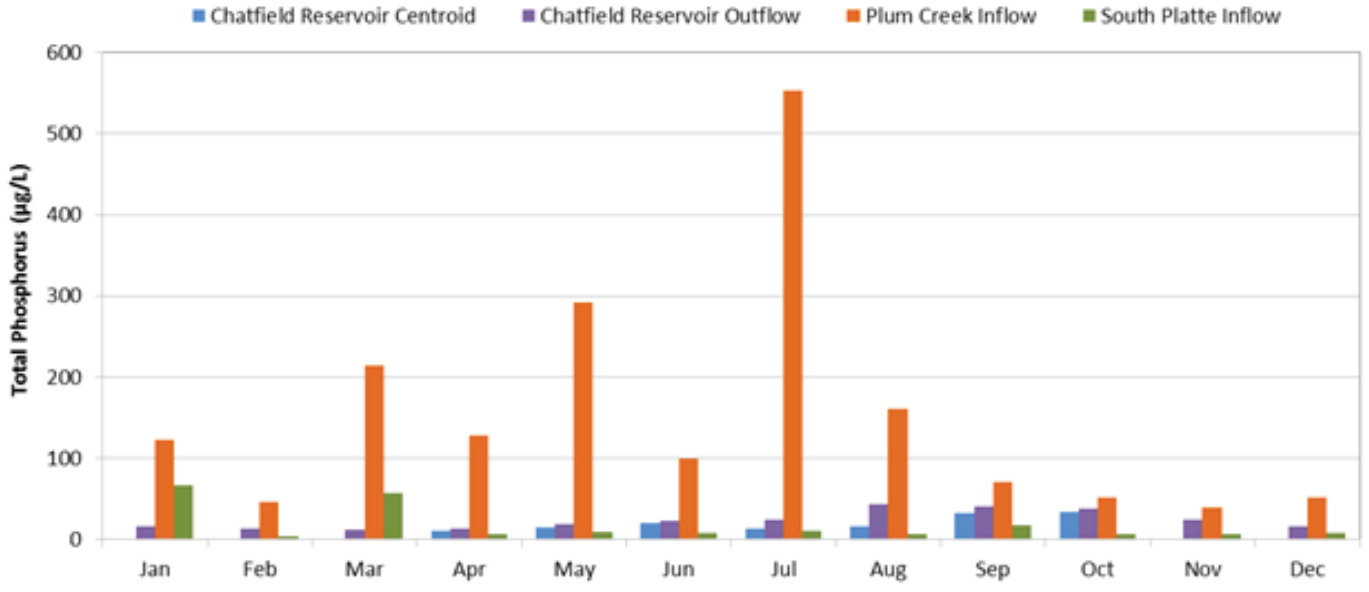


Figure 9. Average Monthly TP Concentrations in the Chatfield Watershed and Chatfield Reservoir.

Chatfield Reservoir: Calculated Annual TP Load

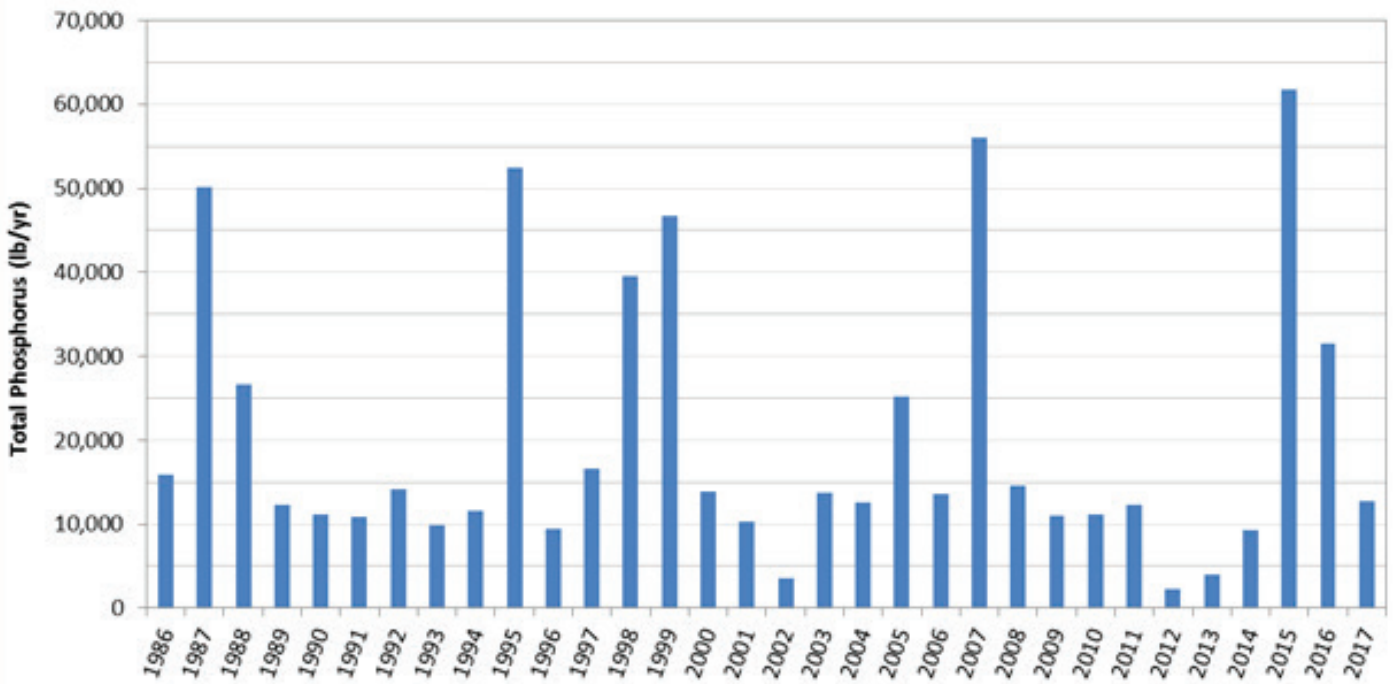


Figure 10. Calculated TP Load to Chatfield Reservoir (1986 - 2017).

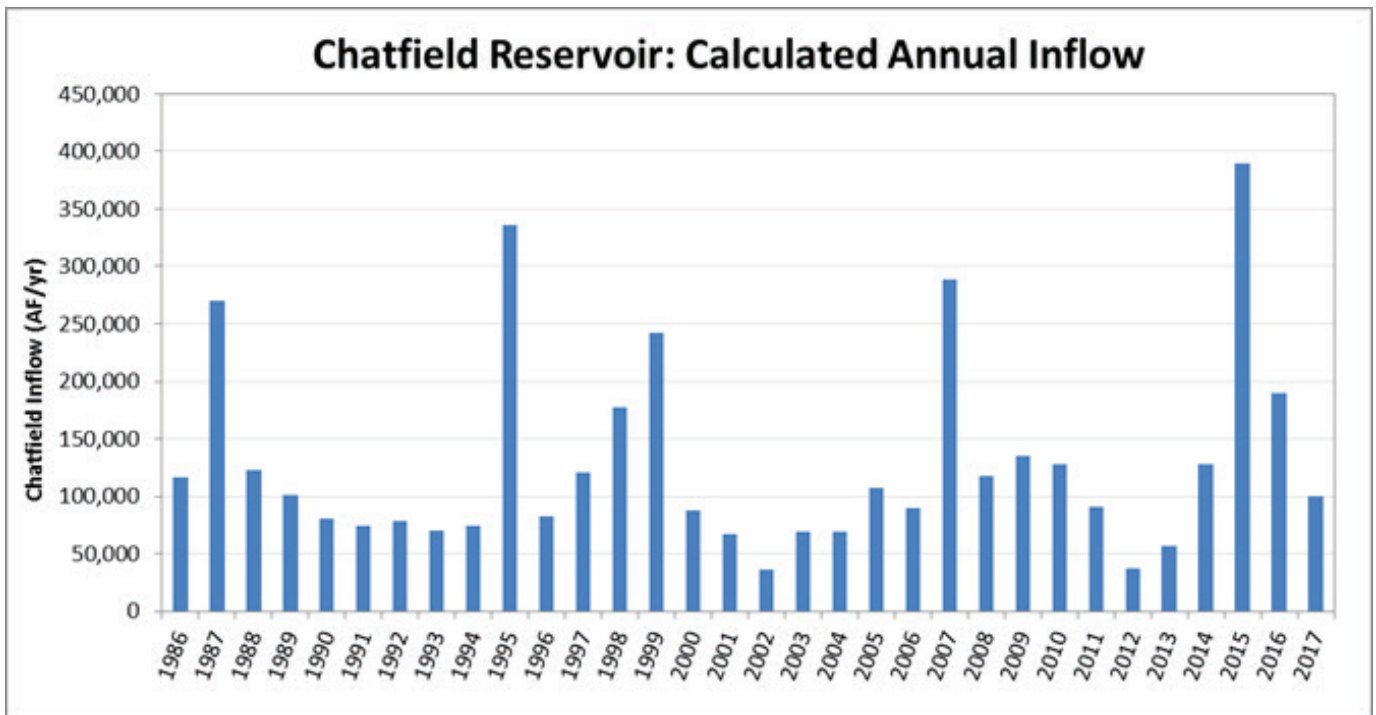


Figure 11. Chatfield Reservoir Calculated Annual Inflow (1986 - 2017).

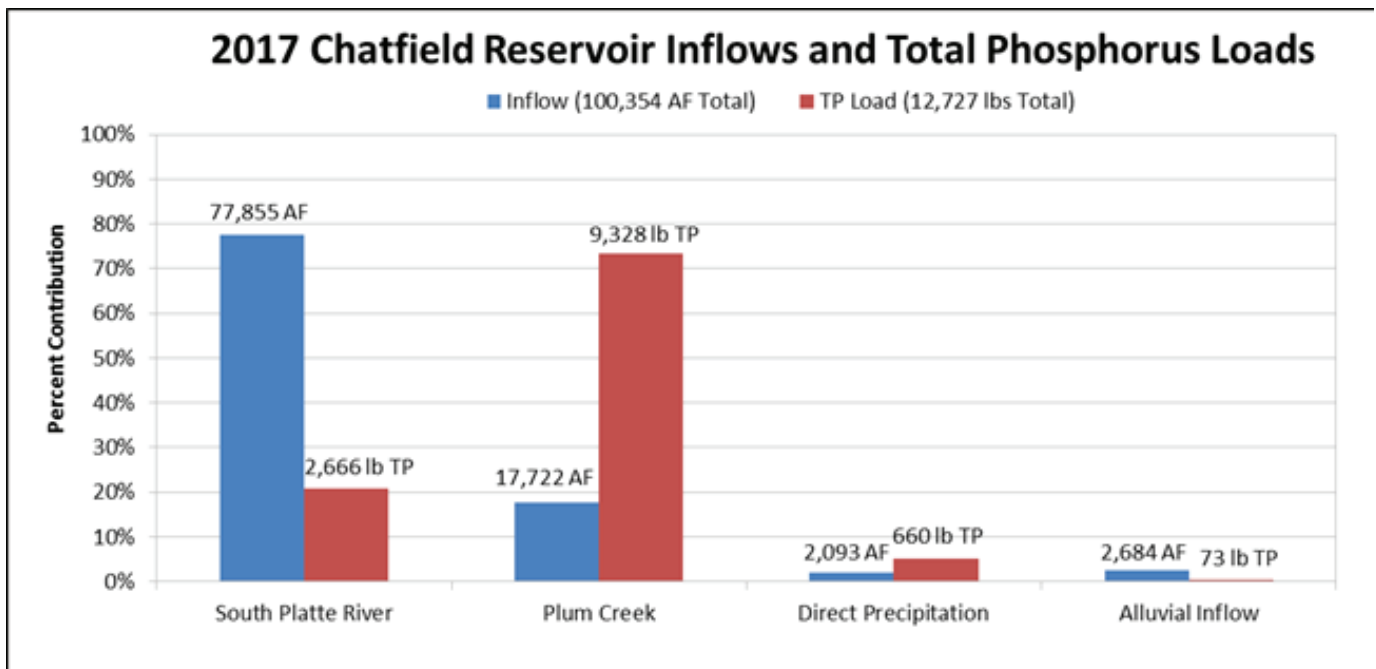


Figure 12. 2017 Comparison of Chatfield Reservoir Inflows and TP Loads.

RESERVOIR MONITORING PROGRAM



The Authority has conducted a monitoring program for over 20 years to characterize water quality and determine regulatory compliance in the reservoir. Surface water samples are collected by Centennial Water and Sanitation District, Colorado Parks and Wildlife, and Denver Water (Figure 13). These locations include:

- South Platte Inflow
- Plum Creek Inflow
- South Platte Arm (in Chatfield Reservoir)
- Plum Creek Arm (in Chatfield Reservoir)
- Reservoir Centroid (Chatfield Reservoir)
- Reservoir Outfall

The constituents are monitored monthly when ice has melted off the reservoir. During the growing season (July through September), reservoir sampling is conducted twice per month. To better understand reservoir dynamics, the Authority collects water column measurements, including the epilimnion and hypolimnion layers, at various depth intervals. All water quality data are available on the Authority's website:

www.chatfieldwatershedauthority.org

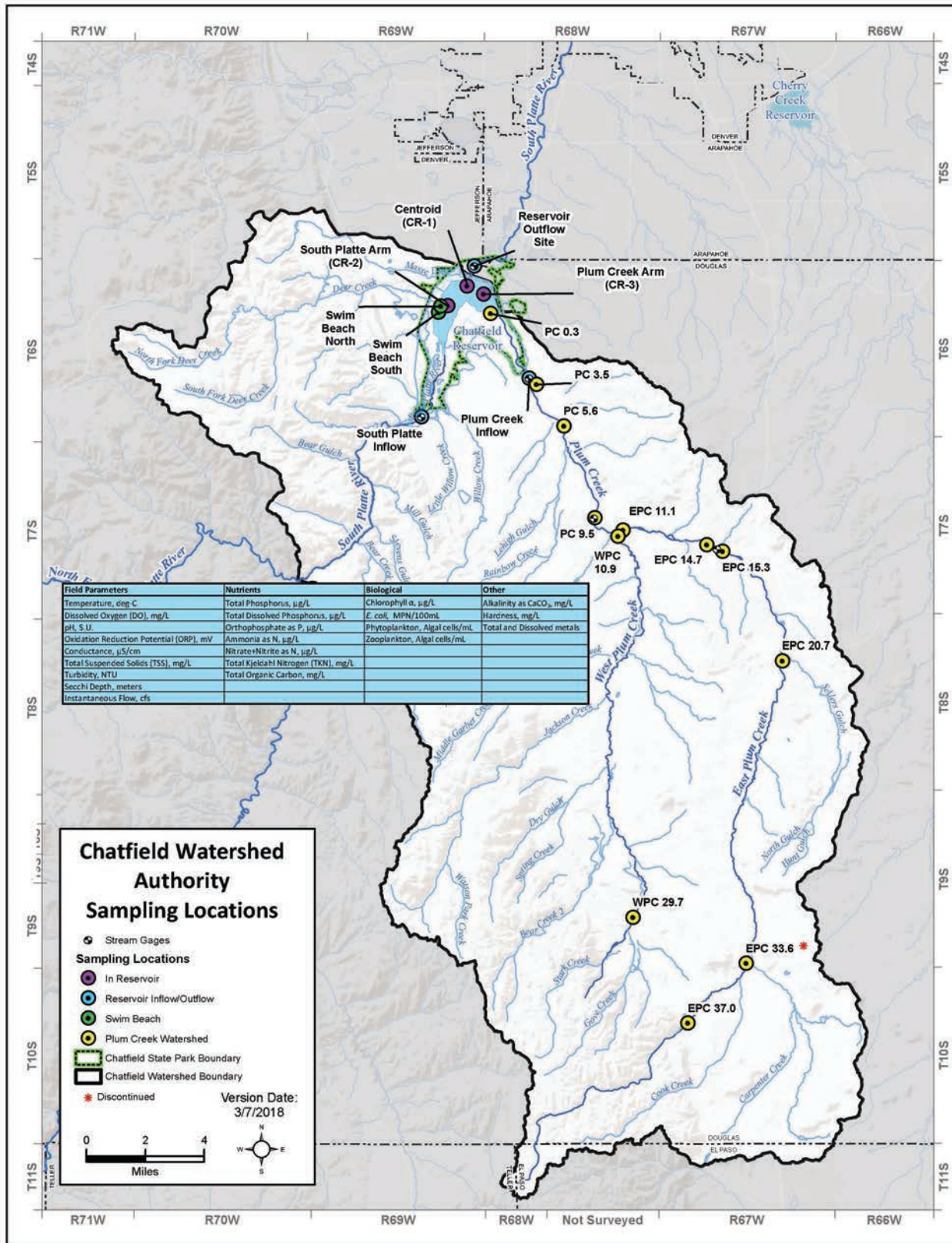


Figure 13. Chatfield Watershed Authority Sampling Locations and Constituents.

PLUM CREEK WATERSHED MONITORING SYSTEM

In the Plum Creek basin, watershed monitoring continued in 2017 through voluntary sampling efforts by the Plum Creek Water Reclamation Authority (PCWRA); monitoring locations are shown in Figure 13 on previous page. The objective of the Plum Creek monitoring program is to better characterize water quality in Plum Creek and identify potential nonpoint source pollutant sources, a variety of which have already been identified in the watershed, including:

- Stormwater runoff from historic urbanized and rural areas
- Leachate from unmaintained septic systems, agricultural activities, including runoff from overgrazed agricultural lands
- Runoff from wildfire burn areas
- Runoff from impervious areas
- Erosion from degraded streambanks (Chatfield Watershed Plan, May 2015)

Further data collection is needed, contingent on available resources, to identify and quantify phosphorus sources in the Plum Creek basin. The 2017 Plum Creek water quality observations included the following:

- **Streambank Erosion.** There is major streambank erosion on Plum Creek in the State Park. This eroding area is contributing significant sediment, and likely TP. As part of the mitigation for the CRMC reallocation project, stabilization of a portion of Plum Creek is proposed. Additional stabilization on Plum Creek will continue to be evaluated by watershed stakeholders.
- **E. Coli.** Although variability is evident at all monitoring sites, the central tendency of observed *E. coli* remains below the water quality standard of 126 organisms/100 mL (Figure 14), with the exception of site PC-3.5 (Plum Creek at Titan Road) which had a median value of 149.5 organisms/100 mL and site PC-0.3 (Plum Creek at Chatfield Reservoir Inlet) median value of 194.7 organisms/100mL. In 2015, the Authority commenced a molecular source tracking monitoring program to help understand potential sources of *E. coli*. Sources identified in East Plum Creek, West Plum Creek, and at the inlet to the Reservoir included human, horses, cattle, beaver and general bacterioidetes.

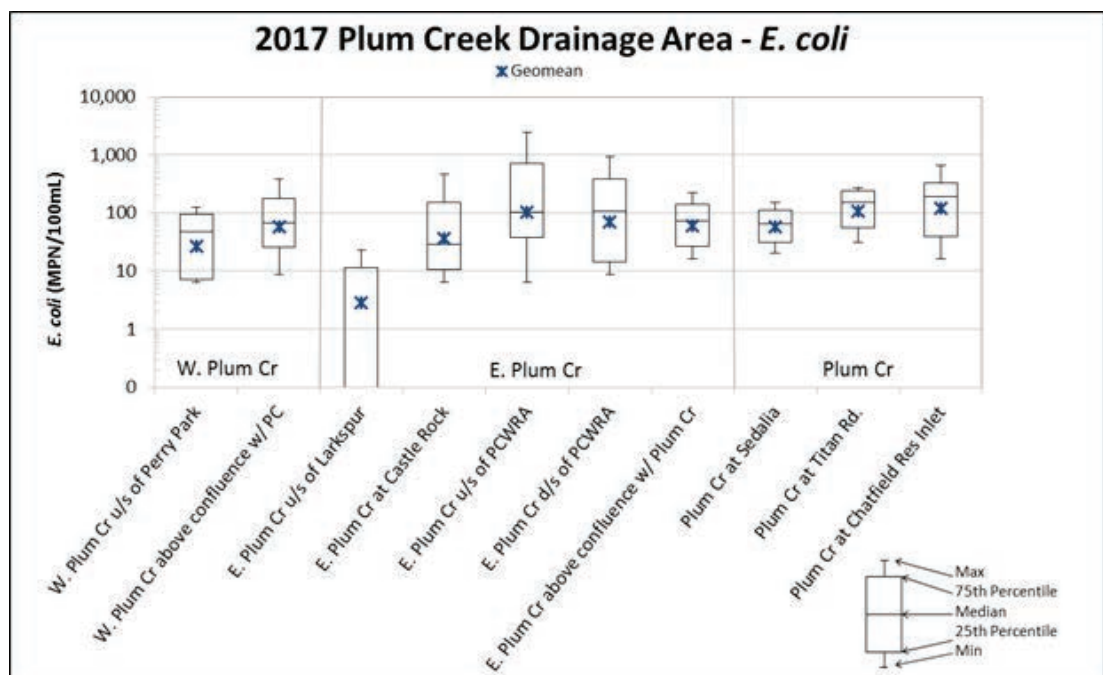


Figure 14. *E. coli* in Plum Creek Drainage Area, 2017.

- **Total Phosphorus.** TP concentration generally increases from upstream to downstream for both East Plum Creek and Plum Creek (Figure 15). There were no significant spatial trends found in West Plum Creek. TP concentrations have historically been observed to be relatively high at the East Plum Creek above confluence with Plum Creek

(Site EPC-11.1), compared to other sites in Plum Creek watershed. In 2017, the average TP observed at this site was 245.0 $\mu\text{g/L}$ compared to the 2016 average of 296.3 $\mu\text{g/L}$. The average TP observed at the two sites (EPC-15.3 and EPC-14.7) upstream of Site EPC-11.1 both had a higher average TP.

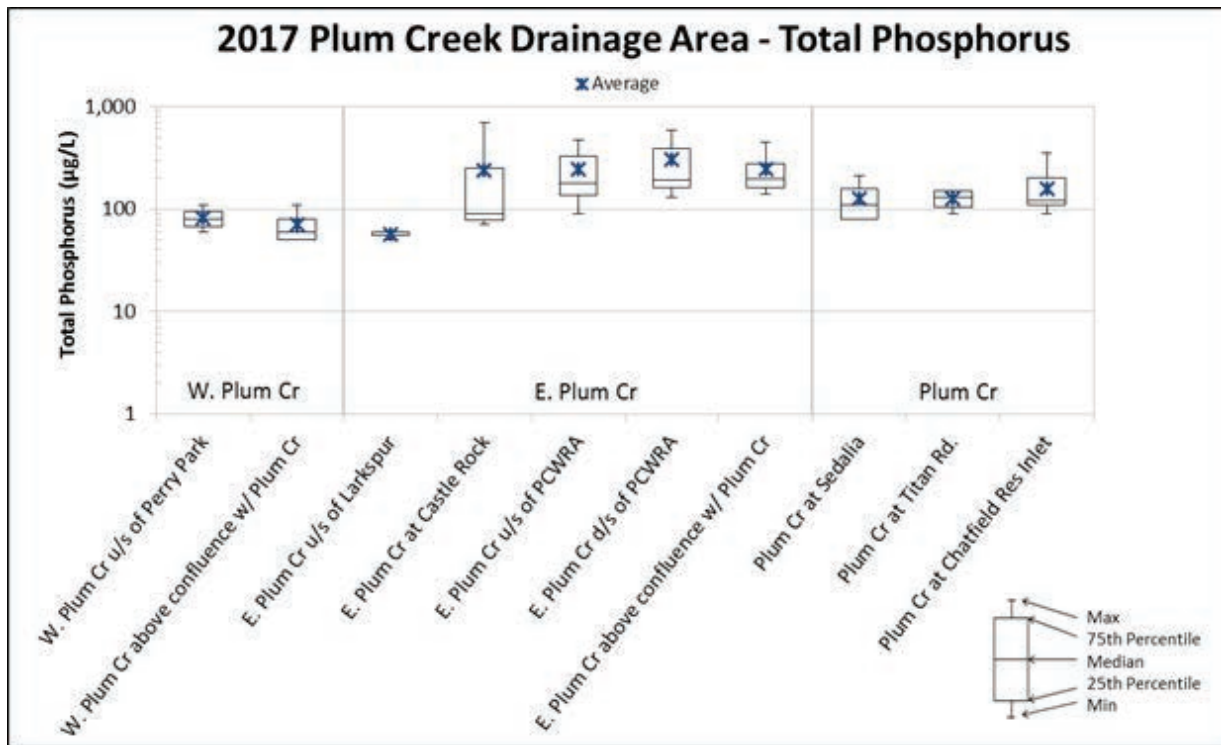


Figure 15. 2017 Total Phosphorus Variability in the Plum Creek Basin.

“Considerable monitoring has been performed in the Plum Creek watershed. This effort provides the ability to evaluate conditions on both a temporal and spatial scale.”

- Chatfield Watershed Plan, 2015

- **Total Suspended Solids (TSS).** The average TSS concentration is an indicator of sediment and high precipitation events. The highest average TSS concentration observed in 2017 was at Site EPC-11.1 (East Plum Creek above the confluence with Plum Creek) at 201.4 mg/L, this was also the highest average TSS site in 2016 (350 mg/L) (Figure 16). Only two sites increased in average TSS compared to 2016. The average TSS over the past

year at site WPC-29.7 (West Plum Creek at Perry Park), which was 5.7 mg/L in 2017 compared to 3.9 mg/L in 2016. The average TSS over the past year at site EPC-20.7 (East Plum Creek at Castle Rock), which was 187.4 mg/L in 2017 compared to 75.2 mg/L in 2016. All of the other sites decreased in average TSS concentrations in 2017 compared to 2016.

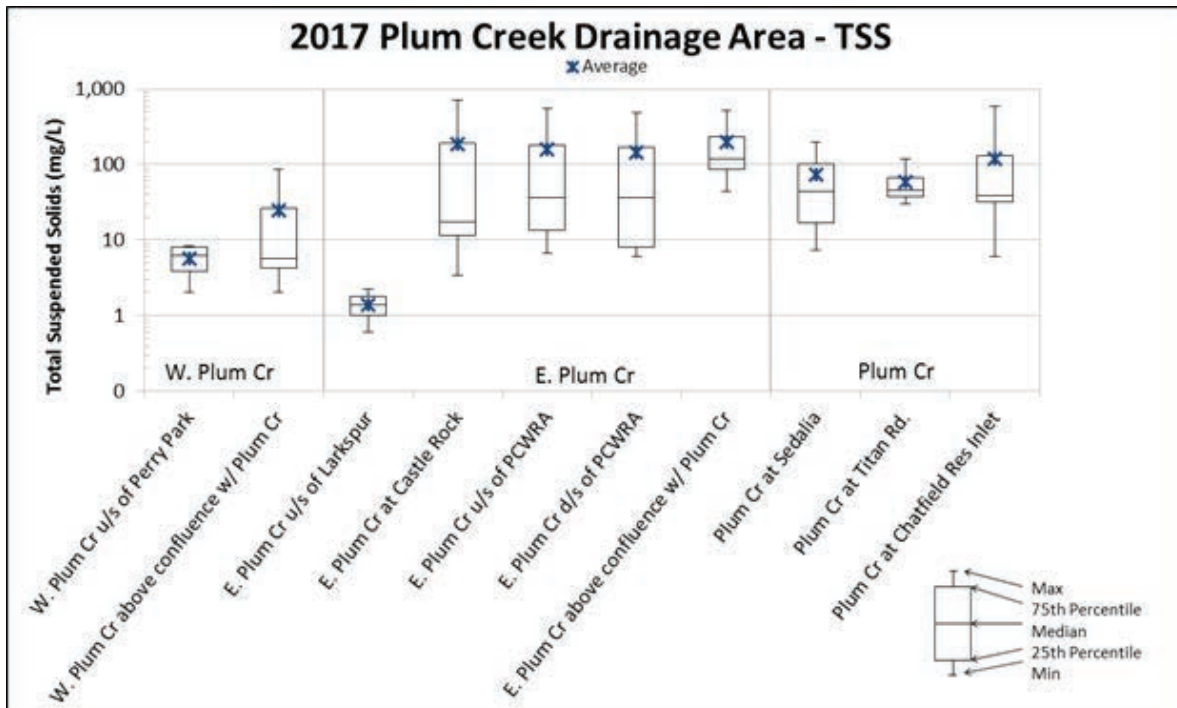


Figure 16. 2017 Total Suspended Solids (TSS) Variability in the Plum Creek Basin.



Total Phosphorus vs. Total Suspended Solids. The relationship between TP and TSS is complex. The highest TSS and TP data collected in the watershed generally occurred during the spring runoff months during high flow, (April-June). Additionally, TP and TSS has an increasing trend through the watershed. The TP vs TSS relationship, along with identification of potential nonpoint sources of TP, will be further evaluated as monitoring in Plum Creek basin continues.

WASTEWATER TREATMENT PLANTS

Table 1 summarizes the wastewater treatment plants (WWTPs) in the Chatfield watershed and their respective TP wasteload allocations. In 2017, reported TP discharges from WWTPs were approximately 2,224.5 pounds or 29.5% of the allowable wasteload allocation of 7,533 pounds. Refer to Figure 17.

Wastewater providers treat effluent to meet TP load

allocations and a TP concentration pursuant to Control Regulation No. 73. Their monitoring and reporting of effluent discharges demonstrates compliance with their individual permits and the state regulations. During 2017, the discharges maintained their record of compliance, with every discharger in the Chatfield Watershed complying with their TP concentration limits and TP wasteload allocation.

Table 1 - 2017 Phosphorus Wasteload from WWTPs in the Chatfield Watershed		
ALLOCATION SOURCES	TP WASTELOAD ALLOCATION (POUNDS)	2017 TP LOADING FROM WWTPS (POUNDS)
Plum Creek Water Reclamation Authority	4,256	2,051.6
Perry Park Water and Sanitation District: Waucondah	365	86.6
Perry Park Water and Sanitation District: Sageport	73	42.6
Lockheed Martin Space Systems Company	1,005	30.0
Town of Larkspur	231	5.9
Law Enforcement Foundation	30 ¹	7.4
Centennial Water and Sanitation District	20	0.0
Ponderosa Retreat Center	75 ²	Lysimeter has insufficient flow for sampling ⁴
Louviers Water and Sanitation District	122	No discharge ⁵
Roxborough/Dominion Water and Sanitation District	1,218	No discharge ⁵
Sacred Heart Retreat	15 ³	0.4
Jackson Creek Ranch	50	No reporting data available
Reserve Emergency Pool	73	Not Used
TOTAL PHOSPHORUS WASTELOADS	7,533	2,224.5

Notes:

*TP loading from WWTPs is from the WWTP point of discharge; the TP load discharged from WWTPs does not equate to the TP load delivered to Reservoir due to assimilation of TP and geochemical fate and transport processes in the watershed.

1. Law Enforcement Foundation water quality credits awarded pursuant to Authority's Trading Program.
2. Ponderosa Retreat Center water quality credits are subject to completing a trade project pursuant to the Authority Trading Program.
3. Temporary five-year phosphorus allocation of 15 pounds for inclusion in discharge permit; allocation obtained from Roxborough Water and Sanitation District.
4. Source: Environmental Protection Agency Integrated Compliance Information System database through the third quarter (October 31, 2017).
5. No discharge of wastewater effluent reported in the Chatfield watershed.

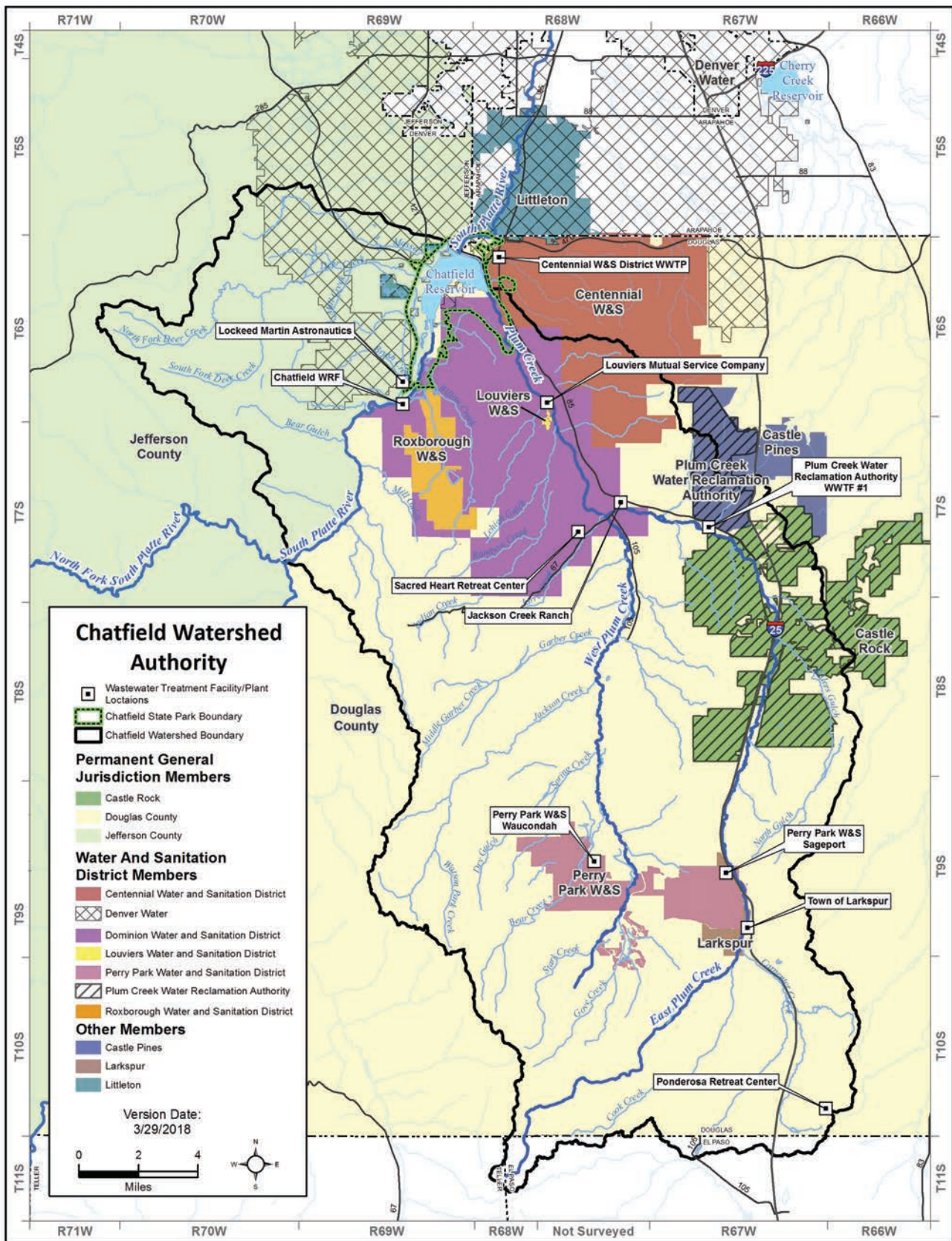


Figure 17. Chatfield Watershed Authority Wastewater Treatment Plants.

RECOMMENDATIONS

Site Location Applications and Land Use Referrals

As the 208 Management Agency, the Authority reviews site location applications and associated engineering reports for new or proposed facilities to effectively manage waste treatment works and related facilities serving Chatfield Basin. The Authority manages land use referrals in conformance with the water quality and regulatory requirements.

Site Location Applications. The Authority reviews, comments, and makes recommendations to the Water Quality Control Division for site location applications for domestic wastewater treatment works, including wastewater treatment plants, individual sewage disposal systems, lift (pumping) stations, and certain interceptor sewers with a capacity of 2,000 gallons per day or greater, as well as certain facilities that produce reclaimed domestic wastewater. As required by Colorado's Site Location and Design Approval Regulations for Domestic Wastewater Treatment Works (Regulation 22), most site location applications are submitted to the Authority by the Applicant prior to submittal to the Water Quality Control Division.

In 2017, Authority reviewed the following projects for compliance with the Chatfield Reservoir Control Regulation No. 73:

- Hunting Hill Filing 2 Wastewater Lift Station
- Larkspur Lift Station & Force Main
- Sageport Wastewater Treatment Plant Improvements
- Swim Beach Lift Station

Under Control Regulation No. 73, the Authority is to implement the TMAL for total phosphorus loading to the Reservoir. The Authority reviews site location applications for compliance with the Control Regulation No. 73 and the Emergency Response Plan. The review primarily assesses the following criteria:

1. Colorado Department of Public Health and Environment (CDPHE) WQCC Control Regulation No. 73: 73.3.2(b) *No municipal, domestic, or industrial wastewater discharge in the Chatfield Watershed shall exceed 1.0 mg/l total phosphorus as a 30-day average, concentration, except as provided under section 73.3(2)(f).*
2. CDPHE WQCC Control Regulation No. 73: 73.3.2(c) *The allowed annual wasteload of point source phosphorus in the Chatfield Watershed is limited to 7,533 lbs/yr, allocated among the dischargers.*
3. The likelihood of sanitary sewer overflows and contaminants reaching Chatfield Reservoir, Plum Creek, or the South Platte River and, in the event of an emergency, the ability of emergency response plans to contain the sanitary sewer overflows and contaminants, per the Cherry Creek Reservoir Watershed Site Application Review Process Emergency Response Plan Criteria (Emergency Response Plan Criteria) which have also been adopted by the Chatfield Watershed Authority.

The Chatfield Watershed Authority was formed by local governments and Title 32 districts, industry, corporations, and other entities within the Chatfield Watershed to implement point source, nonpoint source, and/or stormwater controls.

- Control Regulation No. 73.2.4

Land Use Referrals. In 2017, the Authority reviewed 18 land use referrals from the Town of Castle Rock, Douglas County, and the Town of Larkspur for compliance with the Chatfield Reservoir Control Regulation No. 73. Table 2 summarizes the 2017 land use referrals.

The Authority took no exception to these projects, as long as each project complied with Control Regulation No. 73.

TABLE 2 - REVIEWED LAND USE REFERRALS					
YEAR	TOTAL LAND USE REFERRALS REVIEWED	RESIDENTIAL	ROAD/UTILITY	INDUSTRIAL	OTHER ¹
2017	18	7	2	2	7

Notes:

- 1. Other includes Parks, Recreation Centers, Charter Schools



REGULATED STORMWATER SOURCES

Colorado’s stormwater permit program requires control of stormwater runoff in all Phase I and Phase II Municipal Separate Storm Sewer Systems (MS4) entities. These requirements are separate and distinct from the Chatfield Control Regulations, but complement the TMAL’s purpose. Through the efforts of the MS4s, rate payers have spent significant funds to address water quality through implementing projects to mitigate impacts from urban stormwater runoff. Authority members with Phase I and II MS4 permits in the Chatfield Basin include:

- Statewide General Permit (COR090000)
 - Jefferson County
 - City of Littleton
- Cherry Creek Reservoir General Permit (COR080000)
 - Douglas County
 - City of Castle Pines
 - Town of Castle Rock
- Individual/Other Permit
 - Castle Pines Metropolitan District
 - Colorado Department of Transportation
- Non-Standard General Permit (COR070000)

General MS4 permits require the permittee to develop programs that meet six minimum control measures:

- Public education and outreach on stormwater impacts
- Public participation and involvement
- Detection and elimination of illicit connections and discharges
- Construction site stormwater runoff control
- Post-construction stormwater management in development and redevelopment
- Pollution prevention/good housekeeping for municipal operations

MS4 permits require implementation of best management practices (BMPs) to reduce pollutants discharged to the “maximum extent practicable.” A summary of 2017 MS4 permit inspection and enforcement metrics are provided in Table 3.

TABLE 3 - SUMMARY OF 2017 MS4 PERMIT ACTIVITIES							
LAND USE AGENCY	PERMIT NUMBER	PERMIT INSPECTION ACTIONS			PERMIT ENFORCEMENT ACTIONS		
		ILLICIT DISCHARGES	CONSTRUCTION	POST-CONSTRUCTION	ILLICIT DISCHARGES	CONSTRUCTION	POST-CONSTRUCTION
Douglas County	COR080003	2	10,554	13	0	70	13
Jefferson County	COR090024	38	1,212	5	9	33	0
Town of Castle Rock	COR080012	14	4,271	244	12	1,166	1
City of Littleton	COR090055	16	871	92	12	20	7

Notes: Castle Pines Metropolitan District inspection and enforcement action data incorporated in Douglas County reporting; City of Castle Pines MS4 boundary predominately in the Cherry Creek Basin; only a very small portion is located in the Chatfield Watershed. Town of Castle Rock inspected and enforcement action data includes data from the Cherry Creek Basin. Town of Castle Rock MS4 boundary is predominately in the Chatfield Basin; about two-thirds of the Town is located in the Chatfield Watershed. The data for the City of Littleton includes all MS4 activities within the city limits. However, the city limits of Littleton only overlap with the Chatfield watershed boundary for a small portion (i.e. the Trailmark development).

EDUCATION AND OUTREACH



Jefferson County regularly reports to the Chatfield Watershed Authority on stormwater management. The county has a municipal separate storm sewer (MS4) permit management program that includes:

- Public Education and Outreach through Stewardship Programs
- Public Participation and Involvement in Water Quality Improvement
- Illicit Discharge Detection and Elimination
- Construction Site Runoff Control
- Post Construction Site Runoff Control
- Pollution Prevention/ Good Housekeeping



The county has a comprehensive storm sewer outfall map to trace sources of potential illicit discharges and illegal dumping in the watershed and keep materials out of septic systems. The county continues to partner with the Rooney Road Recycling Facility and in 2017, over 600,000 pounds of hazardous household waste such as electronics, household chemicals, paints, propane cylinders, and automotive products was collected.

Jefferson County participated in a number of public events to reach diverse audiences for their MS4 and floodplain management programs. As part of their MS4 permit, the county maintains an erosion and sediment control program, including publishing a small-site erosion control manual that explains the basic principles of erosion control and illustrates techniques to control sediment from small development sites. Finally, Jefferson County has an inspection program for illicit discharges, construction activities, and includes post-construction inspections.

Jefferson County



Douglas County's Stormwater Management Program provides public education, tracking of stormwater system impact activities, stormwater system project reviews, and coordination between federal, state, and local government for compliance with federally-mandated programs. Through a county Co-op program, the county has created the "One Thing is Clear... our creeks, rivers and lakes depend on you" public awareness program. The interactive website provides information for Douglas County residents on how they can work to keep pollution out of their water ways. Additional information on various topics related to Stormwater and Pollution Control can be found on Douglas County's website.

Douglas County



The Authority helped to sponsor the Town of Castle Rock's annual "Spring Up the Creek", a public outreach community event to preserve waterways by removing trash that collects along the stream banks. The 2017 theme was "Scoop Up the Poop" and 174 volunteers collected filled 98 bags of trash and various pieces of debris, including a tire, a kiddie pool, a car bumper, large signs and chicken wire from East Plum Creek and its tributaries. Sponsor donations included funding for a new pet waste station with a full-sized trash can will be installed at Front Street and Scott Boulevard along Hangman's Gulch trail.

Town of Castle Rock

PROGRESS TO PROMOTE WATER QUALITY PROTECTION

While funding sources remain very limited, the Authority's collaborative role seeks out partnerships to support our water quality goals now and in the future. In 2017, donations and in-kind services from Authority members to support progress to promote water quality protection included:

- Continued implementation of the amended Intergovernmental Agreement (IGA) and bylaws
- Continued water quality monitoring program, including Plum Creek
- Continued implementation of the Chatfield Watershed Plan
- Continued collaboration with Chatfield Reservoir Mitigation Company (CRMC) regarding data collection to support CRMC reservoir modeling efforts
- Revised and updated Authority policies
- Created a Public Outreach Committee



CHATFIELD WATERSHED PLAN

The Authority adopted the Watershed Plan in 2015. While data collection and modeling are a priority in understanding water quality processes in the reservoir and watershed and developing the new TMAL, there is still a need to holistically address nonpoint source water quality issues in Chatfield Reservoir and its watershed to protect water quality now and in the future.

The Watershed Plan prioritizes the additional monitoring, data collection, studies, and projects, contingent on funding, to address water quality concerns. It also provides a starting place to define water quality issues, and to solve potential nonpoint problems with the goal of promoting water quality for high-value water uses, drinking water supplies, recreation, aquatic life, and agriculture.

As part of the Watershed Plan, in 2016 the Chatfield watershed model was completed, with some additional data collection and modeling needs identified. The model utilized topography, land use, meteorological data, soils, hydrology, diversions and return flows, water quality data, and atmospheric deposition data inputs. The purpose of the watershed model was to determine phosphorus loading in the Chatfield watershed and have a tool to predict pollutant loads and source identification.



PROACTIVE MEASURES

Proactive measures are required to protect Chatfield Reservoir for its long-term designated uses. High-quality surface water is essential to sustain growth and development in the watershed.



NONPOINT SOURCES

Nonpoint sources potentially impact water quality; consequences may include degraded streambank erosion, runoff over agricultural lands, seepage from unmaintained septic systems located in the floodplain, and wildfire burn areas.



CHATFIELD WATERSHED AUTHORITY

www.chatfieldwatershedauthority.org

Member Entities

Douglas County
Jefferson County
Town of Castle Rock

Water and Sanitation Members

Centennial Water & Sanitation District
Dominion Water & Sanitation District
Louviers Water & Sanitation District
Perry Park Water & Sanitation District
Roxborough Water & Sanitation District
Plum Creek Water Reclamation Authority

Other Members

Castle Pines Metropolitan District
Denver Water
Town of Larkspur
City of Littleton

Ex-Officio Participants

Colorado Agricultural Leadership Foundation
Colorado Parks and Wildlife Commission
Colorado Department of Transportation
Colorado Water Conservation Board
Ken Caryl Ranch Master Association
The Law Enforcement Foundation
Ponderosa Retreat
Sacred Heart Retreat
Tri-County Health Department
U.S. Army Corps of Engineers
Chatfield Reservoir Mitigation Company, Inc.
Water Quality Control Division
Highlands Ranch
ERO Resources
Hydros Consulting

Management

Leonard Rice Engineers, Inc.

Website

Hughes and Stuart Sustainable Marketing

Financials

TWS Financial, Inc.

Photographs

U.S. Army Corps of Engineers, Omaha District
Tri-Lakes Project Office
Leonard Rice Engineers, Inc.
The Town of Castle Rock
Douglas County

