# Bear Creek Watershed

## Fact Sheet 52 Mt. Evans Fen Water Quality

November 3, 2015

A tributary wetland in the upper watershed near Summit Lake, which is defined as Colorado waters Segment 7, is a fen (BCWA Fact Sheet 49 Wetlands, Fens Water Quality). The Association's 2009-2014 monitoring program shows several of these natural Fen ponds with no notable anthropogenic influences have unexpectedly total phosphorus concentrations ranging from 45-660 ug/l. These Fen ponds consistently exhibit high algal productivity.

In 2014, the Association conducted a special survey of three Fen ponds to establish background or expected conditions on "non-polluted" Fen Ponds. The Association selected three Fen pond sizes to establish backgrounds: a small Fen (25 square feet, about 1 foot deep), medium Fen (85 square feet, about 2 feet deep), and a larger Fen (125 square feet, about 4 feet deep). There were no indications of any anthropogenic influences on these Fen ponds.

The Fen ponds were sampled on September 17, 2014, with an expectation that this would show the season low nutrient conditions. The results for total nitrogen and total phosphorus were much higher than suspected. The median total phosphorus for this limited special survey was 165 ug/l. The preliminary data strongly suggests the chemistry and nutrient dynamics in the Fen complex is more complicated than predicted. As such, the Association is planning to continue a five-year special study to establish the background or expected nutrient conditions for the Fen complex. The data results for these natural Fen Ponds as follows:

| Site | Temperature, oC | pH | Specific Conductance, uS | Dissolved Oxygen, mg/l | Total Nitrogen, ug/l | Total Phosphorus, ug/l |
|---|---|---|---|---|---|---|
| 74 Fen #1, small | 4.4 | 7.12 | 0.0393 | 1.32 | 529 | 165 |
| 75 Fen #2, medium | 4.5 | 7.19 | 0.0355 | 1.91 | 225 | 45 |
| 76 Fen #3, larger | 4.6 | 7.43 | 0.0240 | 6.83 | 3,754 | 660 |
| Median | 4.5 | 7.19 | 0.0355 | 1.91 | 529 | 165 |

The Association summated evidence in the Regulation #38 Rulemaking Hearing for South Platte Basin Standards that suggests fen wetlands have background phosphorus levels that exceed Table Value Standards (TVS) even though streams in the same segment do not have elevated phosphorus levels. It is not yet known what background level would be appropriate or if it varies among these fens.

The Colorado Water Quality Commission applauds the efforts of BCWA to obtain data that improves our understanding of existing conditions . Site-specific standards are needed for all, or part, of Segment 7 for which phosphorus standards are required, but there is uncertainty about the habitat type or the geographic scope of applicability for site-specific standards (or conversely for the TVS). Resolving the uncertainty will require additional sampling to obtain representative data. Delaying the effective date by five years gives BCWA, time to collect additional data and propose site-specific phosphorus and Total Nitrogen standards as appropriate for the Fen complex. Total Phosphorus standards were delayed until an effective date of 12/31/2020.

*The Bear Creek Watershed Association protects and restores water and environmental quality within the Bear Creek Watershed from the effects of land use.*

Clear Creek County
Jefferson County
City of Lakewood
Town of Morrison
Aspen Park Metropolitan District
Brook Forest Inn
Conifer Sanitation Association
Conifer Metropolitan District
Denver Water Department
Evergreen Metropolitan District
Forrest Hills Metropolitan District
Genesee Sanitation & Water District
Geneva Glen
Jefferson County School District
Kittredge Water & Sanitation District
Tiny Town Foundation, Inc.
West Jefferson County Metropolitan District
Evergreen Trout Unlimited
U.S. Army Corps of Engineers

The Association maintains 4 sampling stations at Summit Lake and upper Bear Creek, Mt Evans Wilderness, Clear Creek County Colorado. Since 2009, the Association has been investigating a pollution plume associated with recreational activities and previously leaking wastewater holding vaults near Summit Lake. The pollution plume is moving through the wetland Fen complex into Bear Creek. The Association has collected total nitrogen and total phosphorus pairs to predict the movement of the plume and estimate the loading impact to Bear Creek. The Association has monitored this plume problem over a 5-year period in several Fen ponds prior to discharge into Bear Creek. (*BCWA TM 2014.02 Summit Plume*).