

BCWA PINNACLE

Clear Creek County
Jefferson County
City of Lakewood
Town of Morrison
Aspen Park Metropolitan District
Conifer Sanitation Association
Denver Water Department
Denver Parks & Recreation
Evergreen Metropolitan District
Forrest Hills Metropolitan District
Genesee Water & Sanitation District
Jefferson County School District
Kittredge Sanitation & Water District
West Jefferson County Metro District
Tiny Town

Volume 14

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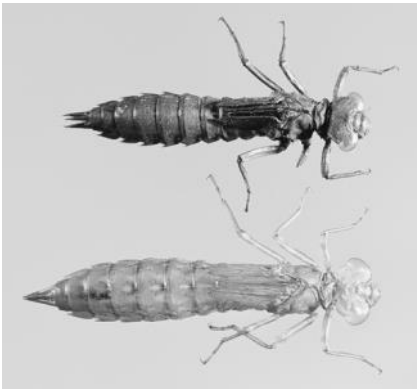


Dragon Fly Mercury Project at Bear Creek Lake Park

The Dragonfly Mercury Project engaged local citizen scientists in monitoring mercury contamination in dragonfly larvae collected in parks across the country, including Bear Creek Lake Park with assistance from BCWA members. Mercury, in its toxic methylated form, is a potent neurotoxin that is delivered to ecosystems via deposition from a global atmospheric pool, and ultimately bioaccumulates in aquatic and terrestrial food webs. This study is part of ongoing research that is evaluating the utility of dragonfly larvae (Odonata: Anisoptera) as indicators of mercury status (bio-

sentinels). The research teams are determining if mercury concentrations observed in dragonfly larvae could be detrimental to fish or birds in their food webs. They are also studying the effectiveness of dragonfly larvae as indicators of harmful contamination and their relationships to other factors that drive mercury bioaccumulation (build-up within an organism) and biomagnification (increase in mercury as it moves up the food chain). Sixteen dragonfly larvae were collected from the two turtle ponds east of the campground in Bear Creek Lake Park on May 11, 2016. Site observations were also recorded. Sam-

ples were delivered to the USGS FRESO Lab in Corvallis, OR for taxonomic identification and laboratory analyses. All dragonfly larvae collected at the turtle ponds had total mercury ranging from 5-33 parts per billion (PPB), on a dry weight basis. Nation-wide preliminary results indicate the 2014-2016 total mercury mean concentration was 137.5 (\pm 1.3) ppb, on a dry weight basis. Results also demonstrate that dragonfly larvae mercury concentrations vary widely among waterbodies, even when they are in close proximity and/or have seemingly similar watershed characteristics.

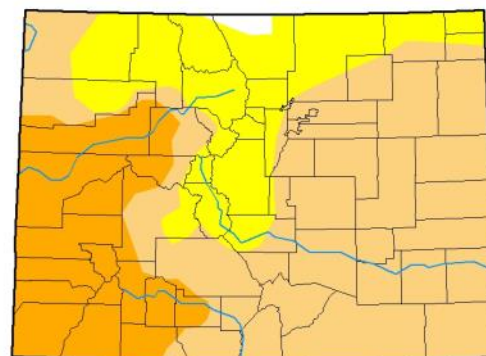


Aeshnidae dragonfly larvae exuviae (their shed exoskeletons), which look just like

Low snow and warm temperatures in many parts of the west—By January 1st there were *much-above-average* temperatures throughout the Southwest, including Colorado. The precipitation levels are noted as *much below average* for Colorado. According to NOAA data, the December snow cover extent was 120,000 square miles below the 1981-2010 average and the 20th smallest in the 52-year period of record. The dry December led to expansion or introduction of abnormally dry, moderate drought, or severe drought categories in all of the Four Corners states. According to the Colorado Water Supply Report (NRCS, January 2018), as of January 5th, the statewide snow water equivalent (SWE) was the second lowest on record. There is a wide range of snowpack levels across the state, from a low of 23 percent of normal in the combined San Miguel, Dolores, Animas, and San Juan basins to a high of 87 percent in the North and South Platte basins, with the statewide SWE being 54 percent of normal. On January 1st, 34 of the 104 SNOTEL sites with at least 10 years of data collection had record low snow water equivalent (SWE) amounts. Currently all streamflow forecasts in the state of Colorado are for below average spring and summer volumes. The South Platte and North Platte, the northernmost basins east of the Continental Divide, contain the best snowpack, with respect to normal, and are both at 87 percent of the median. Colorado's mountains have a lot of catching up to do to bring the statewide precipitation to near normal levels.

U.S. Drought Monitor Colorado

January 9, 2018
(Released Thursday, Jan. 11, 2018)
Valid 7 a.m. EST



Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

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<http://droughtmonitor.unl.edu/>

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BCWA Fact Sheet 5 BCR Dam

Drainage above dam: 236 sq. miles

Maximum Storage Capacity:
78,000 ac-ft

Surface Acres (maximum pool):
718 acres

Surface Acres (current multi-purpose pool): 110 acres

Maximum depth: 48 feet (at completion); At BCWA buoy 35 feet

Length of multi-purpose pool: 0.5 miles

Width of multi-purpose pool: 0.4 miles

Capacity of multi-purpose pool:
2,000 ac-ft



Reallocation & Water Rights Enlargement for Bear Creek Reservoir

The Colorado Water Conservation Board (Department of Natural Resources) sought partners for a project to evaluate increasing water rights storage in BCR. Letters of interest were submitted to the CWCB in December 2017.

Bear Creek Dam was the last of three dams built by the U.S. Army Corps of Engineers to protect the Denver region from floods. The Dam is located on the southwest edge of suburban Lakewood at the confluence of Bear Creek and Turkey Creek. It was authorized in 1968 and completed in 1982 (BCWA Fact Sheet 5 BCR Dam). The reservoir current storage capacity averages about 2,000 ac-ft, but the reservoir is estimated by the CWCB to have the ability to store 57,600 ac-ft of water.

The Colorado Water Plan expects the population of Colorado to double by 2050 with most of the growth in the front range. The plan predicts a water supply gap between 204,000 to 310,000 ac-ft. The CWCB will work with the U.S. Army Corps of Engi-



neers and interested parties on the project. There could be 20,000 ac-ft of available reallocation in the reservoir. A large portion of the available storage capacity in the reservoir must be maintained by the Corps of Engineers for flood control. SB 16-174 authorized \$2.5 million to study this feasibility. CWCB estimates this reallocation for an addition 20,000 ac-ft at \$69 million (FY2015 dollars). This cost doesn't include the reallocation process, moving and upgrading infrastructure within Bear Creek Lake Park, modification to the outlet structure, mitigation, water rights processes, or impacts to reservoir water quality.

Special modeling effort for Bear Creek Watershed.

The Water Quality Control Division is working with Black and Veatch Corporation and GEI Consultants to develop a new total maximum daily load (TMDL) prediction for Bear Creek Reservoir and Watershed. The Association is cooperating with this project. This process will result in new load allocations and limits for both point sources (wastewater discharges) and non-point sources (e.g., counties and stormwater permit holders) in the watershed. All data used in this modeling effort was generated by the Bear Creek Watershed Association. The Association has 32 -years of data and studies to support watershed science.

Two models are being developed to evaluate nutrient (nitrogen and phosphorus) transport and loading. The reservoir model considers both external nutrient loads and internal loading coupled with biological processes. The models and subsequent TMDL will be used to support existing management programs and recommend new or alternative management strategies to reduce external and internal nutrient loading. Modeling efforts will be completed in 2018 with a new TMDL

anticipated by 2019.

The Bear Creek Watershed Control Regulation No. 74, 5 CCR 1002-74 is an implementation plan for controlling total phosphorus loading in the watershed and to Bear Creek Reservoir with a primary goal of attaining site-specific standards established for the reservoir. The current site-specific standards for Bear Creek Reservoir require the limitation of phosphorus in the reservoir to ensure protection of beneficial uses through the control of algal growth. The reservoir standards also require sufficient dissolved oxygen in the reservoir to support survival and growth of cold water aquatic life species.

In 2015, the Water Quality Control Commission revised the chlorophyll standard to 12.2 µg/L. The Commission also revised the phosphorus standard to 22.2 µg/L. Generally, the average seasonal total phosphorus and chlorophyll concentrations measured in Bear Creek Reservoir far exceed goal-standards. The TMDL study will establish new target nutrient loads in the watershed and reservoir. New nutrient targets and management strategies will be set to meet standards for chlorophyll, phosphorus and total nitrogen.