



BEAR CREEK WATERSHED

Fact Sheet 56 Climate Model Upper Bear Creek Watershed September 7, 2016

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 Metro District

Active Climate Adaptation

- Watershed Plan
- Bioretention Facilities
- Climate Training
- Coldwater Management
- Drought & Stormwater Run-off Monitoring
- Ecological (Vegetation) Monitoring
- Ecosystem & Watershed Management Quality
- EGL and Other Off-channel Ponds Dissolved Oxygen Management
- Evergreen Lake Level & Water Quality Monitoring
- Fire Management & Water Quality
- Source Water Assessments
- Habitat Improvements & Management
- Nutrient Models
- Public Advisory System
- Public Communication Plans
- Regulatory Flexibility Water Quality Standards
- Stakeholder Engagement
- Temperature (Air/Water) Monitoring & Models
- Treatment Alternatives Wetlands & Riparian Meadows for Flood Protection

From December 2015 to June 2016, BCWA and Evergreen Metro engaged in a series of webinars and an in-person meeting to conduct a *climate change risk assessment* using the U.S. Environmental Protection Agency’s (EPA) Climate Resilience Evaluation and Awareness Tool (CREAT). CREAT provides data for historical and projected climate conditions that users can incorporate into scenarios to help them understand how threats are driven by climate change. BCWA built scenarios by selecting different future conditions defined by changes in annual average and monthly temperature and precipitation, as well as intense precipitation events and hot days that may exacerbate the climate-related threats of concern. While all Global Circulation Models (GCMs) project warming, the projected changes in precipitation vary. Some models project wetter conditions for a given location and others project drier conditions. The models also vary in the changes in the magnitude of intense precipitation events; some project stormier conditions than others. CREAT averages the projected data from climate models to provide data for warmer and wetter, hotter and drier and moderate future conditions. BCWA and Evergreen Metro are using the assessment to build on existing modeling and monitoring efforts to better understand how climate change threats could affect utility operations and watershed health. BCWA included a number of climate change threats in our assessment that would present water quality and quantity issues through 2050 within the upper Bear Creek Watershed. Predicted increasing temperatures from climate change could present regulatory and treatment challenges for members, in addition to affecting the health of sensitive fish species in the watershed. A minimal very likely near-term temperature increase of 1 to 2°F will present issues for the cold-water fisheries. Additional concerns include water supply reductions from drought, as well as water quality degradation from wildfires and subsequent flooding. Previous flooding events have resulted in significant sedimentation in Evergreen Lake that diminished the reservoir’s capacity. BCWA considered how climate change may increase the severity or frequency of these threats, and assessed the risks of water quality or quantity conditions that would challenge their ability to maintain a reliable supply, to treat the incoming raw water and to protect the health of the watershed ecosystem. BCWA considered both moderate and hotter and drier conditions with a stormy future. These two scenarios were used to ensure that BCWA members were conducting robust planning that considered different potential future climate conditions. The *Minimum Proactive Plan* includes short-term measures to increase modeling, monitoring, watershed management, staff training and public outreach activities, as well as implementing new green infrastructure in the service area. These measures would improve temperature and water quality data collection as well as modeling capabilities so that BCWA and Evergreen Metro can better understand the potential impacts to their infrastructure and operations due to climate change.

CLIMATE VARIABLE	BASELINE SCENARIO	MODERATE CONDITIONS SCENARIO	HOTTER AND DRIER CONDITIONS SCENARIO
Average Annual Temperature	46.26°F	5.18°F increase	6.12°F increase
Average July Temperature	67.4°F	5.75°F increase	5.88°F increase
Average December Temperature	29.82°F	4.39°F increase	5.96°F increase
Hot Days over 90°F	2.3 days	>10 days	>20 days
Total Annual Precipitation	19.27 inches	3.68% increase	0.88% increase
July Precipitation	2.04 inches	4.69% decrease	0.93% increase
December Precipitation	0.82 inches	18.04% increase	5.48% increase
100-Year Storm Event	2.8 inches 6 hours	28.59% increase	28.59% increase