



BEAR CREEK WATERSHED

Fact Sheet 51 Reducing Risk of *E. coli* Contamination in Waterbodies

August 5, 2015

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
 West Jefferson County Metropolitan District
 Evergreen Trout Unlimited
 U.S. Army Corps of Engineers

Escherichia coli is a species of bacteria that normally live in the intestines of humans & other warm-blooded animals. While most strains of *E. coli* are harmless, the O157:H7 strain can cause severe diarrhea, severe kidney failure, and can break down the lining of the intestine in humans. Other disease-causing strains of *E. coli* that have been found in the U.S. are O26:H11 and O111:H8. Illness can be caused by only a few cells (as few as 10 to 100 cells) of the O157:H7 strain.

The *E. coli* criterion adopted for recreation class 1a in Colorado by the Water Quality Control Commission is 126 colonies per 100 milliliters (3 ounces of water). The *E. coli* monitored in recreational waters is not specific to the dangerous human strains, but positive results can indicate a potential for the presence of these more dangerous strains or even virus.

BCWA Fact Sheet 39 *E. coli* identifies standards for waters in the Bear Creek Watershed and lists those stream segments on the Colorado 303(d) list of impaired waters. An alternative BCWA management program that doesn't require the adoption of a formal regulatory total maximum daily load for *E. coli* in these listed segments or other waterbodies in the watershed with suspected bacterial contamination contains the following management strategies and approaches.

- **Waterway Source Tracking** - Fecal coliform & *E. coli* bacteria found in streams in the watershed originate in human, pet, livestock, and wildlife waste. Irrigation, stormwater runoff, snowmelt and flood water, failed on-site wastewater treatment systems (OWTS) leach fields, broken/leaking sewer lines contaminated with fecal matter pose higher risks. *E. coli* does not occur naturally in soil and vegetation, but can survive for periods in moist soil or on vegetation. It only enters water from fecal contamination.
 1. Routine bacterial monitoring at long-term reference sites can be used to detect presence of *E. coli* over established standards (in lower watershed two-sites below BCR and near Wadsworth on Bear Creek). Routine sites include comprehensive water quality monitoring as defined in the BCWA annual water quality sample plan using established quality assurance protocols.
 2. Systematic bacterial monitoring when *E. coli* is detected can be used to trace upstream potential sources of contamination. A targeted monitoring process can identify and isolate likely problem areas. If a problem area is identified, targeted management solutions for that site can be applied through established watershed partners and land-use decision makers.
 3. Predict potential pathways from land uses (e.g., map pastures, large animal grazing or corral operations, parks and open space, dog parks, locate OWTS by sub-drainages, maps of sewer mains, erosional problem areas and high use human recreational areas
 4. Establish a water watch program for citizens and businesses that includes education & trained data collection.
 5. Apply adaptive management to monitoring program. Provide an annual technical memorandum on *E. coli* management in the watershed.
- **Land-Use & Site Development** - Amounts of *E. coli* tend to be lower in the forested areas, and higher in agricultural and more urban areas. Bacteria levels in lakes and reservoir tend to be much lower than in streams. Landscaping practices can create ideal habitat for geese and other migratory waterfowl, concentrating populations during the nesting season or creating year-round flocks, and creating hazardous quantities of fecal litter, allowing *E. coli* to be washed into ponds and waterways.
 1. Support or encourage application of conservation practices that include, but are not limited to, erosion and sedimentation controls, composting, use of filter or buffer strips, prescribed grazing, runoff controls, fencing to exclude large animals from direct access to streams, sediment basins, wetlands, recreational use limitations, and other locally adopted or supported practices.
 2. Minimize landscape practices that concentrate geese. Discourage geese from large grassy areas that connect to streams. Ongoing application of best management practices such as pond buffer plantings, replacing turf with shrubs and trees, and interfering with feeding and nesting will potentially reduce areas of contamination.
 3. Prevent or minimize pollution through land use planning, regulations and protection (e.g., .Native Landscaping Ordinance Development).
- **Sewer and Stormwater Maintenance, and BCWA Policies**
 1. Routine clean-out and inspection of sewer and stormwater lines by the appropriate water and sanitation districts, and MS4s. Look for illicit connections and eliminate .
 2. *BCWA Policy 18 - Illegal Material Dumping.* A watershed illegal dumping and pollution incidence response program. *BCWA Policy 4 Manure Management* of large animal waste, *BCWA Policy 17 Beneficial Recycling of Natural Resources in Bear Creek Watershed*, *BCWA Policy 15 Nonpoint Source Strategies and BMPs*, and *BCWA Policy 29 BCWA Integration with Other Planning Efforts*.