

Bear Creek Watershed Association



Approved: August 14, 2013, Revised October 6, 2016

BCWA Policy 15 Nonpoint Source Management Strategies, Implementation Tools and BMPs in the Bear Creek Watershed

Statement of Basis and Purpose

The Bear Creek Watershed Association (Association) oversees implementation of the Bear Creek Watershed State Control Regulation (Regulation #74, 5 CCR 1002-74) (Control Regulation). The Association is the local water quality management agency responsible for implementation of best management practices for control of erosion and sediments in the Bear Creek Watershed. The Association membership tracks nonpoint source practices, programs and loadings within the watershed. The Association management and implementation programs function at the watershed level.

The Control Regulation states:

74.5 CONTROL OF NONPOINT SOURCES

Jefferson County, Clear Creek County, Park County, municipalities, and districts in the Bear Creek Watershed shall implement best management practices for control of erosion and sediments. The Commission shall review the performance in implementation of existing erosion and sediment control programs by the counties, municipalities, and districts at each triennial review of this regulation. The Association will identify nonpoint source management practices and programs in the management plan and annual report.

The Association may include in the management plan and annual reports a listing of those non-urban areas where existing or planned development relies on individual sewage disposal or onsite systems as mapped by Jefferson County, Clear Creek County, or Park County. The Association may recommend that counties develop a septic management plan. Septic management plans should be designed to protect watershed surface and groundwater quality and will not target individual onsite systems.

"Best Management Practices (BMPs)" means best methods, measures, prohibitions or practices, schedule of activities, operation and maintenance procedures, and other management practices to prevent or reduce the introduction of pollutants into state waters. Best Management Practices include, but are not limited to, structural and nonstructural controls or policies. Such practices can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

Management Strategies

The management of nonpoint sources in the Bear Creek Watershed is a component of the Association's planning and management programs. Phosphorus reduction from nonpoint sources is required in the watershed; however, a lack of implementation authority limits the Association nonpoint source program. The Association does maintain a comprehensive watershed-monitoring program to determine sources, including nonpoint sources, of nutrient loading into waterways.

Association Policies Directed Toward NPS Management

Policy 1 – Trading Program. The BCWA supports nutrient (nitrogen and phosphorus) trading as a long-term and necessary water quality management practice for the Bear Creek Watershed. The BCWA will maintain and periodically update Nutrient Trading Guidelines. The BCWA endorses the use of nutrient trading for nonpoint source to point source total phosphorus trading specific to the Bear Creek Watershed (*Trading Guidelines*).

Policy 3 - 4-Step Review and Low Impact Development. The BCWA is a referral agency for land use development applications submitted to Jefferson and Clear Creek Counties, and potentially Park County. The Association, as a water quality management agency and local watershed authority, reviews applications for consistency with local, regional and state environmental regulations, associated policies and the watershed management plan.

Policy 4 – Bear Creek Watershed Manure Management. This policy applies to new facilities where animals are or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period (“Animal Facility”) within the Bear Creek Watershed. It shall also apply to existing *Animal Facilities* that are enlarged, expanded, extended, increased, altered, or moved for any reason within the Bear Creek Watershed.

Policy 10 – Water Quality Monitoring Tiers. There are numerous non-point sources in the watershed that have the potential to generate water quality pollutants. However, not all activities, or minor “non-point” sources of pollutants are anticipated to cause measurable degradation of waters within the watershed. As such, the BCWA asserts it will be more effective over the next 10-years (through 2023) to target a more limited subset of non-point sources within the watershed that have the greatest potential to cause either site-specific or watershed-wide water quality degradation.

Policy 11 and 11a - Site-Specific Wastewater Treatment/ Disposal Systems. The Bear Creek Watershed Association (BCWA) asserts any privately owned and operated site-specific wastewater treatment/disposal systems (SSWDs) have the potential to adversely affect water quality within the Bear Creek Watershed. These systems have been referenced as non-point sources.

Policy 17 Recycling Programs. The Association considers recycling as a best management practice that can help manage natural resources and protect water and environmental quality in the watershed. Recycling programs protect water quality by reducing or eliminating pollutants before they become a problem. Recycling programs can manage household hazardous waste products, organic material/yard wastes, slash, manure generated at stabling operations, clean fill material, recyclable materials (e.g., cans and bottles) disposed at parks and open spaces, and prescription drug take-back programs.

Policy 18 Illegal Dumping. The Association has an obligation to report pollution incidents to appropriate or responsible parties, following up on pollution incidents that directly or indirectly affect adopted stream standards or classifications, and recommending appropriate strategies to help mitigate these pollutants that can be incorporated in the Association Watershed Plan or reported to the Colorado Water Quality Control Commission as required under the control regulation.

Policy 20 Preferred Management Strategies EGL and BCR. The Association has some existing operational management strategies for Evergreen Lake and Bear Creek Reservoir. The Association has also identified a set of preferred strategies and options for these waterbodies that have the greatest potential to protect or enhance water quality. The Association is actively considering the preferred options for future implementation.

Policy 21 Online Management Process. The Association considers the [Adaptive Co-Management Decision Support System](#) (ACM DSS) as a BCWA best management practice. This online management process is an interactive decision support tool to help manage natural resources and protect water and environmental quality in the watershed.

Policy 27 Source Water Protection. The Association recommends the development of source water protection plans for all water suppliers and particularly for those water supplies located within higher priority areas of concern in the watershed.

Policy 28 BCWA Watershed Plan. The BCWA Watershed Plan is comprised of multiple documents maintained on the Association Web site (www.bearcreekwatershed.org) and the designated Web site as part of the ACM DSS online management process (BCWA Policy 21 – Online Management Process).

Policy 29 BCWA Integration with Other Planning Efforts. The BCWA integrates its watershed program at the local, county, state and federal levels. The BCWA is a referral agency for land use development applications submitted to Jefferson and Clear Creek Counties, and potentially Park County. Additionally, there are a number of agencies and groups that can be consulted in the watershed planning and implementation processes. The BCWA will also integrate its watershed plan with other local and state planning programs (e.g., county comprehensive plans, community plans, State Water Plan, SWQMP, and Source Water Protection Plans).

List of Management Strategies and Implementation Tools Used by Association Membership.

Association Management Strategies	Implementation Tools/ Activities
1. Local Organization, Education, Training, Public Outreach, Technology and Information Transfer	1. Local involvement in programs & activities; presentations; information source 2. Provide data and information to other agencies 3. Identify and conduct special projects and studies 4. Provide educational support materials & information 5. Watershed training classes (Watershed 101), Junior Watershed Manager Program 6. Annual involvement in Earthday activities 7. Participation in fairs and events 8. Partnerships with other groups and agencies 9. Provide technology information and data transfer 10. Review, promote and provide program support policies 11. Involvement in Fire Risk Assessments 12. Involvement in Source Water Protection efforts 13. Promote Forest Health 14. Invasive species management support and tracking 15. Recreational use management 16. Sign education project, sign-cache
2. Stable funding source; Member support	17. Member funding support 18. Seek nonmember funding and grants 19. Provide a forum for issue discussions 20. Maintain an active membership program
3. Provide recommendations to Counties on projects (Referral Agency); Lakewood, Jefferson and Clear Creek County stormwater program support	21. Referral agency for land use projects in Jefferson County and Clear Creek County 22. Policy and guideline review 23. Support and use Urban Drainage and Flood Control (UDFCD) <i>4-Step Planning Process</i> ¹ (http://www.udfcd.org); Association Low Impact Development Policy 24. Review community plans 25. Promote and encourage sediment and erosion control

Association Management Strategies	Implementation Tools/ Activities
	26. Manure management Policy 27. Onsite System Management 28. Vault and site-specific disposal system policy 29. Stormwater runoff management support 30. Maintain a list of appropriate best management practices for use in review processes
4. Characterize water and environmental quality; Sedimentation and sediment quality studies	31. Maintain water quality monitoring network in watershed (stream, reservoirs, lakes) 32. Participate in Fishery surveys 33. Do Macroinvertebrate collections and determinations 34. Perform Habitat characterization 35. Perform Pebble counts instream 36. Identify and monitor site-specific nonpoint sources of pollution and promote restoration efforts 37. Sediment study Bear Creek Reservoir
5. Track nonpoint source nutrient loading in Bear Creek & Turkey drainage systems	38. Characterize nutrient loading from the two major drainage systems: Turkey Creek & Bear Creek 39. Conduct long-term Coyote Gulch restoration study, load reductions, and effectiveness of BMP research 40. Develop and maintain nonpoint source trading program 41. Conduct special septic system studies and load contribution predictions 42. E. coli impact studies; Cub Creek, Kerr and Swede Gulch 43. Establish water quality monitoring tier system to focus on high impact areas 44. Map non-point source potential problem areas 45. Map severe sediment and erosion features
6. Maintain lake and reservoir water quality (See Policy 20 Preferred Management Strategies EGL and BCR)	46. Routine water quality monitoring & reporting 47. Maintain & use water quality prediction tools 48. Reservoir aeration and artificial circulation 49. Sediment dredging 50. Sediment quality measurements and models 51. Lake Chemical Sediment Treatment 52. PhosLock program for sediment phosphorus management 53. Alum program for sediment phosphorus management 54. Bio-domes for phosphorus management 55. Lake aquatic plant harvesting, pulling, and cutting 56. Biomanipulation 57. Partitioning for pollutant or sediment capture 58. Lake aquatic nuisance species protection 59. Lakeshore and park management
7. Support and use established best management practices; evaluate new green infrastructure BMPs	60. Update BMPs as appropriate 61. Use Jefferson County and Clear Creek manuals for small site sediment and erosion control, mountain best management practices, driveway practices

Association Management Strategies	Implementation Tools/ Activities
	62. Promote unpaved roads BMPs 63. Promote Forest Service and BLM BMPs 64. Promote Golf course BMPs 65. Promote 401 certification BMPs 66. Promote Colorado urban and construction BMPs 67. Develop and promote green infrastructure BMPs 68. Support stream restoration practices, Rosgen 69. Support Rosgen Geomorphic Channel Designs 70. Promote stream habitat improvement practices 71. Promote snow removal and storage BMPs
8. Actively promote the implementation of water quality projects & activities; Support other watershed efforts and groups	72. Maintain a repository of documents, data & other information; support local water quality plans and efforts as feasible 73. Continued involvement in groundwater studies, On-site regulation review & sediment & erosion control 74. Program integration 75. Watershed planning
9. Waste Stream Collection & Disposal	76. Lakewood and Jefferson County collect waste products for proper disposal (includes oil, paint, antifreeze, misc. chemicals, and solid wastes). This process keeps materials out of septic systems and reduces illegal dumping in watershed 77. Illegal dumping reporting

On-Site Wastewater Monitoring

The Association has policies related to septage management:

1. Policy 11a Supplemental ISDS Vault Regulations
2. Policy 11 Vault & SS Disposal Systems
3. Policy 25 Water Reuse and Conservation

The Association continued limited discussions with Jefferson County Health Department based on previous presentations made to the Jefferson County Board of Health and the Jefferson County Commissioners. Jefferson and Clear Creek counties reviewed their onsite wastewater treatment system (OWTS) regulations. The Association predicts OWTS in a number of specific areas in the Bear Creek Watershed contribute to water quality degradation. There are 9,000 +onsite systems in the watershed, depending on the estimation method. Based on existing county taxing records, there are an estimated 12,000+ lots where there is a permitted onsite system, un-permitted system or developable lot.

Bear Creek Watershed List of Available Best Management Practices (Not Inclusive)

Bear Creek Watershed Association Master List of Best Management Practices	
Structural Practices	
1.	Minimizing Directly Connected Impervious Areas
2.	Irrigated Grass Buffer Strips
3.	Grass-lined Swales
4.	Extended Detention Basins (dry basins)
5.	Retention Ponds (12-hr wet ponds)
6.	Long-term Retention Ponds (>12-hr wet ponds)
7.	Sand Filter Extended Detention Basin

Bear Creek Watershed Association Master List of Best Management Practices	
8.	Infiltration Trenches
9.	Constructed Wetlands/Basins/Channels
10.	Modular Block Porous Pavement
11.	Porous Pavement Detention
12.	Porous Landscape Detention
13.	Sediment Vaults, Water Quality Vaults & Inlets
14.	Covered Storage & Handling Areas
15.	Spill Containment & Control Barriers
Nonstructural Practices	
1.	Adoption of Criteria and Standards
2.	Disposal of Household Waste and Toxics
3.	Stormwater Quality Control Planning
4.	Stream Buffer Setbacks
5.	Landscaping and Vegetative Practices
6.	Use of Pesticides, Herbicides and Fertilizer
7.	Good Housekeeping & Maintenance
8.	Spill Prevention & Response Practices
9.	Painting Operations
10.	Above Ground Storage Tanks Operations
11.	Loading and Unloading Operations
12.	Fueling Operations
13.	Minimization of Exposure
14.	Mitigation of losses and Preservation of Native Species
15.	Public Education & Participation
16.	Outside Material Storage
17.	Storm Drain System Signs
18.	Dust Control
19.	Illicit Discharge Controls
20.	Outside manufacturing
21.	Vehicle & Equipment Washing
22.	Materials Inventory
Construction and /or Temporary Practices	
Erosion Control Practices	
1.	Surface roughening
2.	Mulching
3.	Revegetation
4.	Interim ground stabilization
5.	Roads and soil stockpiles
Sediment Control Practices	
1.	Vehicle tracking
2.	Slope-length & runoff considerations
3.	Slope diversion dikes
4.	Swales
5.	Sediment barriers
6.	Sediment entrapment facilities
Drainageway Protection Practices	
1.	Waterway crossing practices

Bear Creek Watershed Association Master List of Best Management Practices	
2.	Temporary crossing & diversions
3.	Stability practices
4.	Conveyance controls
5.	Outlet Protection
6.	Inlet Protection
Other Construction Site Practices	
1.	Topsoil Preservation and Reuse
2.	Material Storage and Petroleum Products
3.	Underground Utility Construction
4.	Maintenance & Housekeeping
5.	Disposition of Temporary Measures
Colorado Department of Transportation	
Erosion and Sediment	
1.	Seeding and Mulching
2.	Surface Roughening
3.	Erosion Bales and Silt Fence
4.	Berms, Diversions and Check Dams
5.	Inlet and Outlet Protection,
6.	Slope Drains
7.	Erosion Control Blankets
8.	Channel Linings
9.	Sediment Traps
10.	Sediment Basins
Stormwater Quality Control BMPs	
1.	Grass Swales
2.	Grass Buffer Strips
3.	Constructed Wetlands
4.	Extended Dry Ponds
5.	Wet Detention Ponds
6.	Infiltration Basins
Permanent Best Management Practices	
1.	Minimizing Directly Connected Impervious Areas
2.	Irrigated Grass Buffer Strips
3.	Grass-lined Swales
4.	Extended Detention Basins (dry basins)
5.	Retention Ponds (12-hr wet ponds)
6.	Sand Filter Extended Detention Basin
7.	Infiltration Trenches
8.	Constructed Wetlands/Basins/Channels
9.	Modular Block Porous Pavement
10.	Porous Pavement Detention
11.	Porous Landscape Detention
12.	Sediment Vaults, Water Quality Vaults & Inlets
13.	Stream Buffer Setbacks
14.	Adopted Criteria and/or Standards
15.	Landscaping and Vegetative Practices
16.	Use of Pesticides, Herbicides and Fertilizer

Bear Creek Watershed Association Master List of Best Management Practices	
17. Public Education & Participation	
Mountain Driveway Best Management Practices	
Pre-construction planning	
1. Site constraints (e.g., slope stability, drainage aspect and constructability)	
2. Emergency access	
3. Construction timing	
4. Local permitting	
Design	
1. Minimize Disturbance of Vegetation/Wetlands	
2. Winter Maintenance – Driveway Orientation, Sanding and Snow Removal	
Construction	
1. Stormwater Diversion During Construction	
2. Vehicle Tracking Pad	
3. Straw Bales	
4. Sand bags	
5. Silt Fence	
6. Sediment Traps	
7. Sediment Basins	
8. Brush Barriers	
9. Check Dams	
10. Vegetation Buffers	
11. Grass-lined Swales	
12. Revegetation (Special Seed Mixtures)	
13. Mulching	
14. Erosion Control Blankets	
15. Slope Stabilization	
16. Slope Drains	
17. Road Drainage	
18. Drainageway Protection	
19. Outlet Protection	
20. Infiltration Practices	
21. Stream Crossings	
22. Source Controls	
Golf Course Best Management Practices	
Design	
1. Pre-design natural Resources Inventory and Evaluation	
2. Pre-design Planning and Golf Superintendent Input	
3. Identify Applicable Source Controls	
4. Special Golf Course Drainage Design Considerations	
5. Wet Retention Ponds and Dry Ponds	
6. Edge Treatment Along Ponds and Waterways	
7. Grass Buffer Strips	
8. Grass-lined Swales	
9. Off-site Velocity Control Practices	
10. Stream Crossing Design	
11. Man-made Wetlands	
12. Conservation Easements	

Bear Creek Watershed Association Master List of Best Management Practices
13. Incorporation of Wildlife Habitat Features
14. Advanced Irrigation Design
Construction Practices
1. Erosion and Sediment Control
2. Minimize Disturbance of Areas Designated for native Species
3. Re-seeding with Desirable Mixes
4. Topsoil Preservation
Maintenance Practices
1. Integrated Pest Management and Use of Biological Treatments
2. Irrigation Management
3. Proper Use of Turf Grass Fertilizers
4. Landscape and Vegetative Practices
5. Turf Management Plan
6. Golf Course Lake Management
7. Source Controls and Spill Prevention
8. Monitoring Plan
9. Record Keeping
10. Regular Maintenance
Forest Service's Watershed Conservation Construction Practices
1. Standard 3 – Restrictions on Heavy Equipment Operations in Waters of the State
2. Standard 4 – Design & Construction of Stream Crossings and Instream Structures
3. Standard 6 – Management of Water-use Facilities including diversions and dams
4. Standard 9 – Limit Roads and Disturbed Sites (Sediment Controls for Roads)
5. Standard 10 – Construction of Roads and Development Sites
6. Standard 11 – Stabilize & Maintain Roads & Other Disturbed Sites During/After Construction to Control Erosion
7. Standard 12 – Reclaim Roads and Other Disturbed Sites When Use Ends
Bear Creek Watershed Association
1. Stream habitat improvements, pool and riffle development
2. Geomorphic Channel Design, including Rosgen concepts
3. Coyote Gulch Drop structure and wetland enhancement project
4. Green Infrastructure – snow management practices
5. Stream trash removal
6. Education and training

Nonpoint Source Management Activities

The Association is a nonpoint source water quality implementation organization for the Bear Creek Watershed. The Association will:

Water Quality Characterization

1. Monitor watershed quality with specific elements directed at non-point source loadings.
2. Identify causes and locations of nonpoint source pollution.
3. Track long-term water quality trends
4. Calculate load estimates of non-point source nutrients.
5. Address water quality degradation associated with onsite or similar disposal systems.

Management

6. Develop and maintain topic specific policies to assist with the review and implementation of non-point source projects.

7. Develop appropriate source water protection practices designed to reduce impact to water supplies from non-point sources.
8. Develop plans and projects to address nonpoint source pollution.
9. Identify and maintain list of appropriate best management practices.
10. Develop and implement site-specific management practices.
11. Recommend management strategies to reduce potential pollutant load from onsite systems.
12. Support fire risk assessment programs and identify practices needed to address sediment and erosion control following major wildfires.
13. Support sediment and erosion control programs, activities and regulations of membership.

Education, Information Transfer and Partnerships

14. Seek funding for projects and activities.
15. Develop, implement and promote education materials, training programs, classes, fairs, events and other appropriate education efforts.
16. Promote and support membership with activities, programs and education directed at nonpoint sources of pollutants.
17. Cooperate with outside organizations and agencies related to nonpoint source and stormwater monitoring and evaluation.
18. Serve as a referral agency for land-use disturbances.
19. Include information in annual reports on nonpoint source management efforts, programs and activities.
20. Make regulatory, standards and classification recommendations.
21. Participate in the state regulatory program affecting water quality management in the Bear Creek Watershed.