

PRAIRIE DOG CREEK WATERSHED PLAN 2016 UPDATE

This is an update to the Prairie Dog Creek Watershed Plan, adopted in January of 2011 and includes updated load reductions needed to meet State of Wyoming Water Quality Standards for primary contact recreation as well as proposed action items for meeting those requirements. For this update, separate load estimates and priority rankings were included for tributary drainages; in the original plan, these were included within the subwatershed averages. For more detailed information on the background and resource descriptions, as well as methods for determining load reduction estimates, please refer to the original Prairie Dog Creek Watershed Plan, which was approved in January 2011.

INTRODUCTION

Background. When levels of a pollutant, such as bacteria, exceed water quality standards, the stream is considered “impaired” and states are required by the Clean Water Act to establish a Total Maximum Daily Load (TMDL) for that pollutant. In 2004, Wyoming Department of Environmental Quality listed the entire length of Prairie Dog Creek on the 303 (d) list of waterbodies for fecal coliform impairments related to recreational uses. In 2007, the Sheridan County Conservation District (SCCD) in partnership with the USDA Natural Resources Conservation Service (NRCS) initiated a watershed assessment and planning effort on the Prairie Dog Creek Watershed. The Prairie Dog Creek Watershed Group (PDWG), including landowners and residents, used the information collected in the assessment and local knowledge of the watershed to develop the Prairie Dog Creek Watershed Plan (PDWP), including calculation of initial load estimates and load reduction needs. The PDWP contained a variety of objectives and action items to address bacteria and other water quality concerns from septic systems, domestic animals and livestock, and stormwater run-off. Several of the action items were directed toward increasing awareness of issues and programs.

Subwatershed divisions within the Prairie Dog Creek watershed were made based upon boundaries defined by the United States Geological Survey (USGS). SCCD used the smallest of the HUC divisions, the 12 digit HUCs or 6th level subwatershed divisions, to characterize the Prairie Dog Creek Watershed. The Prairie Dog Creek Watershed Plan includes four subwatersheds; Upper Prairie Dog Creek, Middle Prairie Dog Creek, Lower Prairie Dog Creek, and Dutch Creek. The Dutch Creek subwatershed consisted of three 12-digit HUC divisions, which were combined into one.

Planning Authority and Public Participation. The development of the original PDWP and subsequent documents was facilitated by the SCCD under Wyoming Statutes 11-16-103 and 11-16-122. In addition, the process was guided by the Watershed Strategic Plan updated in 2000 by the Wyoming Association of Conservation Districts, the USDA Natural Resources Conservation Service and the Wyoming Department of Agriculture and the Wyoming Non-Point Source Management Plan Update developed by the WDEQ. All planning activities and meetings facilitated by the SCCD were (and continue to be) open to the public and anyone with an interest in the watershed was encouraged to participate. Decisions were based on the consensus of the participants in attendance. A public comment period, as required by the Wyoming Administrative Procedures Act (W.S. 16-3-101) was held for the 2011 PDWP.

RESOURCE DESCRIPTION

The Prairie Dog Creek watershed originates in the foothills of the Big Horn Mountains and flows into the Tongue River near the Montana border. Prairie Dog Creek includes Meade, Jenks, SR, Jim, Arkansas, Coutant, Wildcat, and Dutch Creeks. Most of these streams are ephemeral throughout much of their length. Streamflow in Jenks and Meade Creek is augmented during the irrigation season by trans-basin diversions from the Piney Creek drainage. During the recreation season, as much as 100 cubic feet per second (cfs) can be diverted from the Piney Creek drainage into Prairie Dog Creek through these diversions. Most of these streams are classified by the Wyoming Department of Environmental Quality (WDEQ) as Class 2AB-Coldwater Fisheries. The exceptions to this are Wildcat Creek and Dutch Creek, which are classified as Class 3B and not expected to support fish populations or drinking water supplies.

Section 303 (d) of the Clean Water Act requires states to identify waters that are not supporting their designated uses, and/or need to have a Total Maximum Daily Load (TMDL) established and is included on the Wyoming 303 (d) list of Waters Requiring TMDLs (Table 1).

Table 1. Summary of the 303(d) Prairie Dog Creek Watershed impairments as of 2016

Waterbody	Location	Listing Date	Uses Not Supported	Pollutant
Prairie Dog Creek (tributary to Tongue River)	From the confluence of Tongue River to an undetermined point upstream	2004	Recreation	Bacteria
Prairie Dog Creek (tributary to Tongue River)	From the confluence of Tongue River to an undetermined point upstream	2002	Drinking Water	Manganese
Prairie Dog Creek (tributary to Tongue River)	From the confluence of Tongue River to an undetermined point upstream	2012	Cold Water Fishery	Temperature
Meade Creek (tributary to Prairie Dog)	From the confluence of Prairie Dog Creek to an unnamed tributary	2012	Recreation	Bacteria
Meade Creek (tributary to Prairie Dog)	From the confluence of Prairie Dog Creek to an unnamed tributary	2012	Drinking Water	Manganese
Wildcat Creek (tributary to Prairie Dog)	From the confluence of Prairie Dog Creek to an undetermined point upstream	2012	Recreation	Bacteria
Dutch Creek (tributary to Prairie Dog)	From the confluence of Prairie Dog Creek to an undetermined point upstream	2012	Recreation	Bacteria
Prairie Dog Creek (tributary to Tongue River)	From the confluence of Tongue River to an undetermined point upstream	2002	Drinking Water	Manganese
Prairie Dog Creek (tributary to Tongue River)	From the confluence of Tongue River to an undetermined point upstream	2004	Recreation	Bacteria
Prairie Dog Creek (tributary to Tongue River)	From the confluence of Tongue River to an undetermined point upstream	2012	Cold Water Game Fish	Temperature

WATERSHED ASSESSMENT AND CONCERNS

The Sheridan County Conservation District (SCCD), with support from the USDA Natural Resources Conservation Service (NRCS) and the WDEQ, conducted the Prairie Dog Creek Watershed Assessment in 2007-2008 with a grant through Section 319 of the Clean Water Act. Non-federal cash and in-kind matching funds were provided by the Wyoming Department of Agriculture and other local sources. In 2007, credible data (chemical, physical, and biological) was collected from a total of 11 locations on the mainstem, three tributaries and Prairie Dog Ditch. In 2008, sampling was conducted at 14 locations (10 on the mainstem, three on the major tributaries, and one on Prairie Dog Ditch). SCCD added the three sites in 2008 to fill in geographical gaps within the watershed. The 2007-2008 Prairie Dog Creek Watershed Assessment included 19 chemical, physical, and biological parameters, including bacteria. Interim monitoring was conducted in 2011 and 2014 for a smaller suite of parameters, including bacteria.

Based on the 2007-2008 Assessment, there were no issues with nutrients, pesticides, or concerns with urban run-off in the watershed. There were *E. coli* bacteria concentrations in excess of Wyoming water quality standards for primary contact recreation. Water temperatures were recorded in excess of 20°C in portions of the watershed. Dissolved manganese concentrations exceeded the aesthetic drinking water standard, though levels were not so high as to be of concern for human health or aquatic life. Although there are no numeric standards for sediment and turbidity, Prairie Dog Creek does contain high levels of sediment, which may contribute to bacteria and temperature concerns. Increased flow from trans-basin diversions may contribute to channel instability.

Interim water quality monitoring was conducted in 2011 and 2014. All stations had *E. coli* bacteria concentrations that exceeded Wyoming water quality standards for primary contact recreation for at least one sampling period. All but the uppermost station (PD10) recorded water temperatures in excess of 20°C. Bacteria decreases were observed at the majority of monitoring stations in 2014 and instantaneous temperature samples were below the maximum 20°C instream temperature standard. Continuous temperature data loggers, however, recorded temperature exceedances above the temperature standard of 20°C at all but the uppermost station (PD10).

LOAD REDUCTION SUMMARIES AND PRIORITY RANKINGS

The primary regulatory concern for the Prairie Dog Creek Watershed is *E. coli* bacteria, which has concentrations in excess of Wyoming Water Quality Standards for primary contact recreation. In the initial PDWP, bacteria levels needed to be reduced by over 70% to fully achieve the primary contact recreation standard of 126 cfu/100 ml. The PDWG did not feel this was reasonably achievable in the short term and developed the initial PDWP to reduce bacteria loads by 10% over five years.

Based on data collected during the 2007-2008 watershed assessment, a load duration curve was developed for each sample station on the Prairie Dog Creek watershed. The curves provide a visual representation of the individual data points in relation to water quality standards. The curves were used to determine the critical flow condition for each station, to designate priority reaches, and demonstrate how daily loads vary across flow regimes. SCCD updated the curves to determine load reduction estimates following the 2011 and 2014 interim monitoring seasons (Table 2). The critical flow condition for a sample site is the flow condition requiring the greatest *E. coli* load reduction. The critical flow conditions correspond to types of run-off and/or precipitation scenarios and provide information about the pollutant sources (Table 2).

Table 2. Load reductions necessary to meet primary contact recreation standards

Subwatershed	2007-2008 reduction required (%)	2014 reduction required (%)
LOWER SUBWATERSHED		
<u>Lower Prairie Dog Creek Average (PD01 and PD02)</u>		
Moist conditions	78	58
Mid range conditions	68	49
Dry conditions	53	--No Samples
DUTCH SUBWATERSHED		
<u>Dutch Creek (DC01)</u>		
Moist conditions	43	22
Mid range conditions	50	94
Dry conditions	75	0
MIDDLE SUBWATERSHED		
<u>Prairie Dog Creek Average (PD3A, PD05, PD5A, PD06)</u>		
Moist conditions	82	56
Mid range conditions	76	49
Dry conditions	68	44
<u>Wildcat Creek (WCC01)</u>		
Moist conditions	81	72
Mid range conditions	83	0
Dry conditions	60	--No Samples
UPPER SUBWATERSHED		
<u>Prairie Dog Creek Average (PD08, PD09, PD10)</u>		
Moist conditions	74	59
Mid range conditions	76	35
Dry conditions	70	17
<u>Meade Creek (MC01)</u>		
Moist conditions	82	56
Mid range conditions	86	54
Dry conditions	87	73
<u>Jenks Creek Creek (JC01)</u>		
Moist conditions	NA*	54
Mid range conditions	NA*	64
Dry conditions	NA*	12

*Jenks creek was not sampled prior to 2014.

In the initial PDWP, the PDWG identified septic systems, domestic animals and livestock from large and small acreages, and wildlife as the more direct bacteria contributors in the watershed. Additionally, the PDWG identified indirect sources, including irrigation wastewater/run-off, instream sediment through unstable eroding streambanks and irrigation diversions, and stormwater run-off. In the 2016 plan update, the group decided to prioritize efforts to reduce bacteria contributions to the watershed based on pollutant sources within subwatersheds and drainages within those subwatersheds (Table 3). Priorities are used to compare similar competing project applications when funding sources are limited; they are not intended to prevent otherwise viable projects from being completed.

Table 3. Pollutant Sources and Priority Rankings by drainage

Subwatershed/Drainage	Pollutant Sources	2007-2008 Priority	2014 Priority
LOWER SUBWATERSHED			
Lower Prairie Dog Creek	Large Acre Domestic Animals	High-5	High-8
	Septic Systems	Medium	Medium
	Irrigation/Stormwater Run-off	Medium	Medium
	Sediment-Streambanks	Low	Low
	Sediment-Diversions	Low	Low
DUTCH CREEK SUBWATERSHED			
Dutch Creek	Septic Systems	Low	Low
	Domestic Animals	Low	Low
MIDDLE SUBWATERSHED			
Middle Prairie Dog Creek	Small Acre Domestic Animals	High-1	High-6
	Septic Systems	High-2	High-7
	Large Acre Domestic Animals	Medium-6	Medium
	Irrigation/Stormwater Run-off	Medium	Low
	Sediment-Streambanks	Medium	Low
	Sediment-Diversions	Medium	Low
Wildcat Creek	Small Acre Domestic Animals		High-3
	Large Acre Domestic Animals		Medium
	Septic Systems		Medium
UPPER SUBWATERSHED			
Upper Prairie Dog Creek	Small Acre Domestic Animals	High-3	High-4
	Septic Systems	High-4	High-5
	Large Acre Domestic Animals	Medium-6	Medium
	Sediment Streambanks	Medium	Low
	Sediment-Diversions	Medium	Low
	Irrigation/Stormwater Run-off	Medium	Low
Meade Creek	Small Acre Domestic Animals		High-1
	Septic Systems		High-2
	Large Acre Domestic Animals		Medium
Jenks Creek	Large Acre Domestic Animals		Low

The entire length of Prairie Dog Creek was placed on the 303 (d) List for fecal coliform impairments related to recreational uses in 2004. Since that time, SCCD has provided cost-share incentives for 16 water quality improvements projects (10 septic system replacements, 4 livestock/stockwater projects, 2 erosion/diversion projects), within the watershed. While the actual number of projects is below the targeted number of projects in the initial Prairie Dog Creek Watershed Plan, the overall *E. coli* load reductions exceed the 10% targeted reduction established by the PDWG in 2011 (Table 4).

Table 4. Targeted and actual contribution reductions by subwatershed.

Description	Lower	Dutch	Middle		Upper		
			Prairie Dog Creek	Wildcat Creek	Prairie Dog Creek	Meade Creek	Jenks Creek
Phase I Critical Condition (2011)	Moist	Dry	Moist	Mid	Mid	Dry	NA
Reduction required to meet standards at critical condition	78%	75%	82%	83%	76%	87%	NA
Phase I targeted reduction (2011-2015)	10%	10%	10%		10%		
Phase I average actual reduction (as of 2014 monitoring)	27%	20%	45%		39%		
Phase II							
Phase II Critical Condition (2016)	Moist	Mid	Moist	Moist	Moist	Dry	Mid
Reduction required to meet standards at critical condition	58%	94%	56%	72%	59%	73%	64%
Phase II Targeted Reduction (2016-2020)	10%	10%	10%		10%		
SEPTIC SYSTEMS							
Phase I Targeted Septic systems to be addressed	1	1	3		8		
Phase I Actual Completed (# systems)	0	2	3		5		
Phase II Targeted Septic Systems addressed (# systems)	1	0	4		5		
DOMESTIC ANIMALS							
Phase I Animal Units to be addressed	207	780	256		247		
Phase I Actual Completed (AUs)	0	0	0		200		
Phase II Targeted structures and practices implemented (AUs)	0	100	75		75		
Phase II Targeted Streambank protected (Feet)	0	200	150		150		
IRRIGATION DIVERSIONS							
Phase I targeted diversions addressed (# projects)	TBD	TBD	TBD		TBD		
Phase I Actual Completed (# projects)	0	0	0		2		
RIPARIAN CORRIDORS							
Phase I targeted riparian corridors protected	TBD	TBD	TBD		TBD		
Phase I Actual Completed (feet)	0	0	0		2238		

WATERSHED IMPROVEMENT ACTIONS AND RECOMMENDATIONS

The bacteria impairments in the Prairie Dog Creek Watershed are the result of contributions from a combination of sources, including humans, domestic animals, and wildlife; it is impossible to address impairments by focusing on single sources. It is necessary to address as many potential contributors as possible through an incentive-based, voluntary program that encourages widespread cooperation, and participation from landowners. In the 2016 update, SCCD, with input from committee members continued and/or modified action items from the original plan.

Objective: Maintain a viable watershed improvement program for the Prairie Dog Creek watershed

Action Item/Milestone	2016	2017	2018	2019	2020
Action 1. Maintain watershed steering committee to provide leadership and coordination with other entities					
Meet annually to review progress and milestones and adjust as needed	Feb/ Mar	Feb/ Mar	Feb/ Mar	Feb/ Mar	Feb/ Mar
Review and update watershed plan	Feb/ Mar				Feb/ Mar
Action 2. Conduct interim and follow-up monitoring to evaluate progress and long-term trends in water quality					
Establish and implement project follow-up procedures	Oct	Oct	Oct	Oct	Oct
Complete interim water quality monitoring to include SAP development, sample collection and reporting		Apr- Oct			Apr- Oct
Complete Prairie Dog Creek data validation procedures in the SCCD database		June			
Document projects on Prairie Dog Creek Watershed Progress Register	Feb	Feb	Feb	Feb	Feb
Update Load Reduction estimates by sub-watershed as new data are collected	Feb		Feb		
Action 3. Engage/Coordinate with other community organization/efforts					
Coordinate discussions with other agencies and organizations, as needed <ul style="list-style-type: none"> • UW Cooperative Extension • Small Acreage Issues Team • Sheridan County Weed and Pest • Stockgrower's/Cattlemen • Ditch Companies • Others 	← ON-GOING →				

Objective: Reduce direct bacteria contributions to waterbodies 10% by 2020

Action Item/Milestone	2016	2017	2018	2019	2020
Action 4. Reduce bacteria contributions from septic systems					
Provide technical and cost-share assistance program for septic systems to include site visits to determine eligibility and program coordination	← ON-GOING →				
Repair or replace eligible septic systems (number per year)	2	2	2	2	2
Distribute Septic Homeowner Packets with septic permits and to others (realtors, contractors) as requested	← ON-GOING →				
Action 5. Reduce bacteria contributions from livestock/domestic animals					
Provide technical and cost-share assistance program to relocate livestock facilities and feedgrounds, provide off-channel stockwater and fencing to improve management, and assist with development of grazing plans	← ON-GOING →				
Implement structures and management practices (animal units per year)	50	50	50	50	50
Reduce livestock access to waterbodies (feet stream protected per year)	100	100	100	100	100
Document existing projects/grazing plans, as appropriate	Oct				

Objective: Reduce sediment contributions and other indirect bacteria contributions

Action Item/Milestone	2016	2017	2018	2019	2020
Action 6. Reduce sediment and/or bacteria contributions from overland run-off through stormwater, seasonal run-off, and/or irrigation					
Provide technical and cost-share assistance to improve/establish riparian buffers and upland vegetation cover	← ON-GOING →				
Provide technical and cost-share assistance to improve irrigation practices to minimize run-off from on-field irrigation	← ON-GOING →				
Action 7. Reduce sediment contributions from other sources					
Consider partnering with other agencies (WGF, NRCS, etc.) to provide cost-share funding to replace/modify irrigation diversion structures, as warranted	← TO BE DETERMINED →				
Consider partnering with other agencies (WGF, NRCS, etc.) to provide cost-share funding to stabilize eroding streambanks and address channel instability, as warranted	← TO BE DETERMINED →				

Objective: Increase awareness of and participation in watershed improvement programs and activities through positive and consistent outreach strategies

Action Item/Milestone	2016	2017	2018	2019	2020
Action 8. Promote program participation and provide updates on issues/events					
Distribute annual watershed newsletter to Prairie Dog Creek residents	Jan-Feb	Jan-Feb	Jan-Feb	Jan-Feb	Jan-Feb
Distribute Progress Register/Load Maps to residents through newsletters, direct mail, and/or other media		Jan-Feb			
Include information in SCCD semi-annual newsletter as appropriate	May Nov	May Nov	May Nov	May Nov	May Nov
Distribute "Pay it Downstream" postcards or similar to program participants (maybe with project payments)	← ON-GOING →				
Provide information through other local media and events, as needed <ul style="list-style-type: none"> • Sheridan Press • Sheridan Media • Public Pulse • Facebook/Websites • Booths/Presence at Community Events 	← ON-GOING →				
Provide education on other activities and topics, such as: <ul style="list-style-type: none"> • WACD Suitewater tool/outreach with teachers • Water Quality/Quantity information (Monitoring Results) • Pet/Domestic animal contributions • Septic systems • Horse/Livestock management • Winter feeding grounds • Manure/Nutrient/Pesticide management • Riparian buffers • Stormwater /run-off management • Irrigation management • Wildlife impacts-discourage feeding near waterways • Oil Recycling • New technologies/alternatives/best management practices • Feature spotlights on completed projects 	← ON-GOING →				