

TONGUE RIVER WATERSHED PLAN

2018 UPDATE

This is an update to the Tongue River Watershed-Based Plan, which was adopted in November 2012. This document 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. More detailed information on the background, resource descriptions, and methods are available in the 2012 Tongue River Watershed-Based Plan.

INTRODUCTION

Background. The Sheridan County Conservation District (SCCD), in partnership with the USDA Natural Resources Conservation Service (NRCS) have had an active watershed program in the Tongue River watershed since 1996. The 1996-1999 Tongue River Watershed Assessment was completed in September 2000 resulted in the development of the initial Tongue River Watershed Plan, which was subsequently updated in 2007 and again in 2012. The initial Plan outlined the goals, objectives, and action items for addressing bacteria concerns within the watershed. The 2012 Tongue River Watershed-Based Plan characterized subwatersheds within the project area, quantified existing pollutant loads from previous monitoring efforts, estimated load reductions needed to meet water quality standards, and recommended action items to achieve needed reductions. The 2012 Tongue River Watershed-Based Plan delineated four subwatersheds based upon boundaries defined by the United States Geological Survey. This division did not separate drainages of individual tributaries that were historically monitored by SCCD. For the 2018 Plan Update, SCCD further divided two of the subwatersheds to include tributary drainages. In addition, in 2013, SCCD expanded the monitoring boundary of the Tongue River Watershed, which resulted in three additional subwatersheds.

Table 1. Subwatersheds included in the 2012 Tongue River Watershed-Based Plan and 2018 Tongue River Watershed Plan Update

Subwatersheds in 2012 Plan	Subwatersheds in 2018 Plan
Upper Tongue River Smith Creek Little Tongue River	Upper Tongue River
	Smith Creek
	Little Tongue River
Five Mile/Columbus Creek Middle Tongue River	Columbus Creek
	Middle Tongue River
	Five Mile Creek
Wolf Creek	Wolf Creek
Lower Tongue River	Lower Tongue River
	Expanded/New Tongue River
	Lower Goose Creek
	Lower Prairie Dog Creek

Planning Authority and Public Participation. The development of the original and subsequent watershed plans on the Tongue River watershed were facilitated by 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 Wyoming Department of Environmental Quality. All planning activities and meetings facilitated by the SCCD were (and continue to be) open to the public; anyone with an interest in the watershed was encouraged to participate. Recommendations, based on consensus of the participants in attendance, were considered by the SCCD Board and staff. A public comment period, as required by the Wyoming Administrative Procedures Act (W.S. 16-3-101) was held for the 2012 Plan.

RESOURCE DESCRIPTION

The Tongue River originates in Wyoming on the eastern side of the Big Horn Mountains and flows through the Towns of Dayton and Ranchester east and north into Montana. The project area, which begins at the Wyoming-Montana state line, consists of approximately 463,990 acres. Annual precipitation ranges from 32 inches in the headwaters to 12 inches near the state line. Major tributaries of the Tongue River above the Town of Ranchester include Little Tongue River, Smith Creek, Columbus Creek, Five Mile Creek, and Wolf Creek. Goose Creek and Prairie Dog Creek are the primary perennial tributaries in the lower portion of the project area, however intermittent draws may contribute stormwater run-off during precipitation or snowmelt events. The Goose Creek and Prairie Dog Creek watersheds have their own, separate, planning and improvement efforts. Tributaries provide irrigation water and make up a portion of the water supply to rural residents in the watershed. The project area includes a combination of private, state, and federal lands, with private lands dominating the portion of the watershed downstream of the Bighorn National Forest (BNF). Land uses include irrigated and non-irrigated hay and crop lands, pasture, livestock grazing, energy development, recreation, the Towns of Dayton and Ranchester, and wildlife habitat. The Tongue River and major tributaries are perennial waterbodies expected to support drinking water supplies (when treated), fish and aquatic life, recreation, wildlife, industry and agriculture uses. Five Mile Creek and other draws are not expected to support fish populations or drinking water supplies. The State of Wyoming has identified the Tongue River and several tributaries as impaired for recreational use because of bacteria concentrations. Some lower Tongue River segments have also been identified as impaired for Cold Water fisheries because of high water temperatures.

The original 1996 Tongue River project area consisted of eight sites in approximately 313,121 acres upstream of the Town of Ranchester. The project boundary was expanded twice, but still includes the initial eight sites. The first expansion extended the boundary below the Town of Ranchester to just upstream of the confluence with Goose Creek. The section from Goose Creek to the Montana State Line was added in 2013 to tie into existing efforts on adjacent watersheds.

Table 2. Impaired stream segments within the Tongue River watershed (WDEQ, 2016)

Name	Class	Location	Miles	Uses	Impairment	List Date
Tongue River	2AB	From Monarch Road upstream to Wolf Creek Road	13.5	Recreation	<i>E. coli</i>	2010
Tongue River	2AB	From Goose Creek downstream to the Montana border	22.1	Cold Water Fishery	Temperature	2002
Prairie Dog Creek	2AB	From I-90 to a point 47.2 miles downstream	47.2	Recreation	Fecal Coliform	2004
Prairie Dog Creek	2AB	From I-90 to a point 47.2 miles downstream	47.2	Drinking Water	Manganese	2012
Prairie Dog Creek	2AB	From I-90 to a point 47.2 miles downstream	47.2	Cold Water Fishery	Temperature	2012
Prairie Dog Creek	2AB	From Tongue River to a point 6.7 miles upstream	6.7	Recreation	Fecal Coliform	2004
Prairie Dog Creek	2AB	From Tongue River a point 6.7 miles upstream	6.7	Drinking Water	Manganese	2002
Prairie Dog Creek	2AB	From Tongue River a point 6.7 miles upstream	6.7	Cold Water Fishery	Temperature	2012
Goose Creek	2AB	From Little Goose Creek downstream to the Tongue River	12.7	Aquatic life, Cold Water Fishery	Habitat Alterations, Sediment	2006
Goose Creek	2AB	From Little Goose Creek downstream to the Tongue River	12.7	Recreation	Fecal Coliform	2000
Wolf Creek	2AB	From Tongue River upstream to East Wolf Creek	10.6	Recreation	Fecal Coliform	2002
Five Mile Creek	3B	From Tongue River upstream to Hanover Ditch	2.1	Recreation	Fecal Coliform	2002
Columbus Creek	2AB	From Tongue River to a point 3.1 miles upstream	3.1	Recreation	Fecal Coliform	2002
Little Tongue River	2AB	From Tongue River upstream to Frisbee Ditch	4.8	Recreation	<i>E. coli</i>	2002
Smith Creek	2AB	From Tongue River to a point 5.8 miles upstream	5.8	Recreation	Fecal Coliform	2002
North Tongue River (Bighorn National Forest)	1	From Road 171 upstream to Pole Creek	11.1	Recreation	Fecal Coliform	2004

WATERSHED ASSESSMENT AND CONCERNS

The SCCD initiated water quality monitoring in the Tongue River Watershed in 1996, in partnership with the USDA Natural Resources Conservation Service (NRCS) and the Tongue River Watershed steering committee. The original 1996 project area consisted of approximately 313,121 acres and contained eight water quality monitoring sites; three mainstem sites and five tributary sites. The 1996-1999 Tongue River Watershed Assessment Final Report was completed in September 2000 and identified fecal coliform impairments on Five Mile Creek, Columbus Creek, Smith Creek, Little Tongue River, and Wolf Creek. The Lower Tongue River station, near the Ranchester Water Treatment Plant intake, also exceeded the fecal coliform standard on some occasions. Other water quality parameters monitored during this assessment (including nutrients and pesticides) were found at low or non-detectable levels, suggesting fertilizers and pesticides are well managed within the watershed.

Interim water quality monitoring was conducted in 2003, 2006, 2010, 2013, and 2016 utilizing many of the same monitoring sites, water quality parameters, and sampling periods. Interim monitoring includes water quality monitoring along with benthic macroinvertebrates and habitat assessments at a limited number of stations. In 2003 and 2006, SCCD collected fecal coliform and *E. coli* samples to correspond with changes in WDEQ water quality standards. Additional sampled parameters included: water temperature, pH, conductivity, dissolved oxygen, discharge, and turbidity. Upper tributary stations were not monitored in subsequent years because no water quality impairments were identified at these stations during the initial assessment. In addition, SCCD did not collect nutrient, pesticide, or herbicide data because these parameters were found at low or non-detectable levels during the initial assessment.

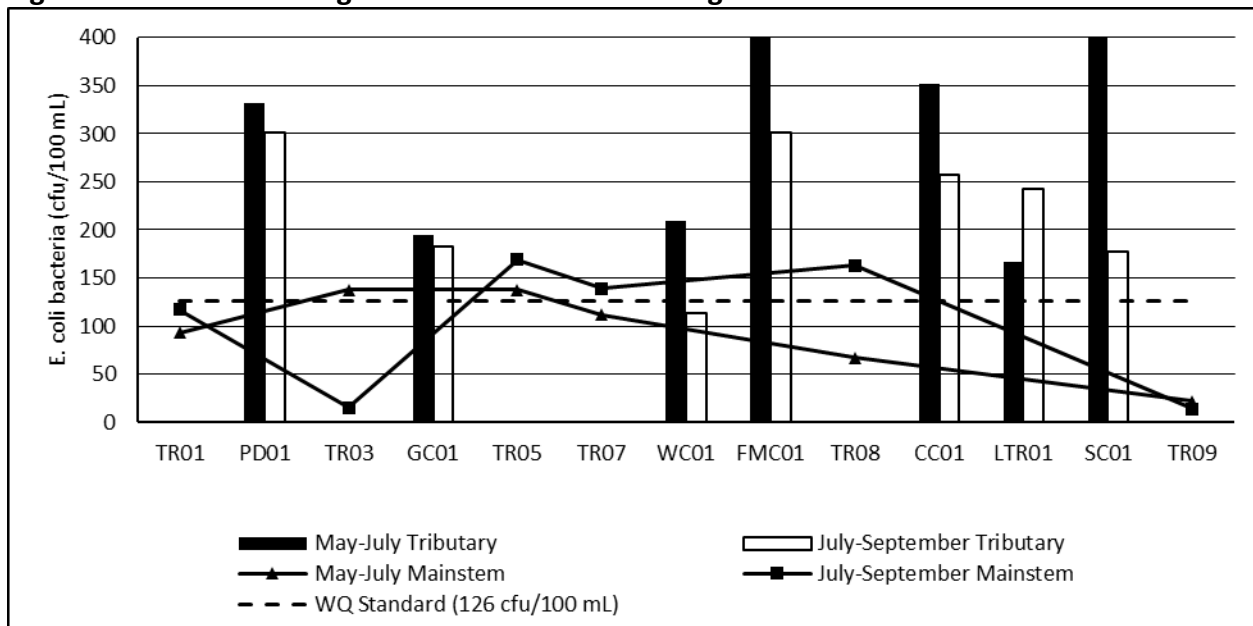
The project boundary was expanded in 2006 and again in 2013. The 2006 expansion included two new sites on the Tongue River between the Town of Ranchester and the confluence with Goose Creek. The section from Goose Creek to the Montana State Line was added in 2013 to tie into existing efforts on adjacent watersheds. SCCD added four new Tongue River sites, along with sites on Goose Creek (GC01) and Prairie Dog Creek (PD01), which are the primary tributaries in the lower watershed. Two of the 2013 and one of the 2006 Tongue River sites were retained in 2016; the others were discontinued due to limited staff and funding resources.

The general trend in bacteria concentrations on Tongue River stations were typically higher in the early season than in the late season; while tributaries were much more variable. Relatively high bacteria concentrations in May of 2010 were followed by sharp decreases in 2013 at most stations, which may have resulted from higher than normal precipitation and early season flows in 2010. Extremes in short and long-term weather conditions have produced bacteria data that are not directly comparable among years. Nonetheless, values that exceed bacteria standards were observed on essentially the same stream reaches year after year and indicate water quality impairments continue to exist, regardless of hydrologic conditions.

In 2016, the most recent monitoring season, bacteria geometric mean concentrations in the early season were typically higher than in the late season on tributary sites. In contrast, mainstem sites had higher bacteria concentrations in the late season except on TR03 and TR09. While some mainstem sites did not meet Wyoming water quality standards, the highest bacteria concentration observed at a mainstem site was 169 cfu/100 mL or 25% above the

standard. Bacteria concentrations at tributary stations appeared to contribute to bacteria increases on the Tongue River at adjacent downstream stations in the upper portion of the watershed during the early season. Except for Wolf Creek during the late season, bacteria concentrations at all tributary stations exceeded Wyoming water quality standards in both the early season and the late season. On tributary stations, bacteria concentrations were up to 80% above water quality standards.

Figure 1. E. coli bacteria geometric means in the Tongue River watershed in 2016.



For the most part, bacteria concentrations decreased from 2003-2016 and from 2013-2016 at all mainstem sites in the early season but increased in the late season. In contrast, bacteria concentrations at TR09 in the early season increased since 2003 but were still well below Wyoming water quality standards.

Three tributary stations, Goose Creek, Columbus Creek, and Five Mile Creek had decreases in early season bacteria concentrations from 2013-2016. The decrease on Five Mile Creek represented a change from 2399 cfu/100 mL in 2013 to 641 cfu/100 mL in 2016. All tributary stations showed decreases in late season bacteria concentrations from 2003-2016. However, late season increases were observed from 2013-2016 at Prairie Dog Creek, Goose Creek and Columbus Creek.

LOAD REDUCTION SUMMARIES AND PRIORITY RANKINGS

The primary regulatory concern for the Tongue River watershed is *E. coli* bacteria, which has concentrations in excess of Wyoming water quality standards for primary contact recreation. In the 2012 Tongue River Watershed-Based Plan, bacteria levels needed to be reduced by a minimum of 19% on mainstem sites and up to nearly 90% on tributaries. The committee did not feel this was achievable in 5 years but targeted a 20-year goal of full attainment.

Based on monitoring completed in 2016, bacteria levels need to be reduced by 16%-29% on Tongue River sites and up to 71% on tributary sites. For this update, the committee continued to target a 20-year goal for attainment of water quality standards. Subwatershed priorities were assigned based on required load reductions and the location. Tributaries were generally assigned higher priorities than mainstem locations. Subwatersheds in the lower portion of the project area were assigned a lower priority than upper segments based on the assumption that load reductions upstream would have downstream benefits. Prairie Dog Creek and Goose Creek subwatersheds were assigned a low priority because of existing on-going efforts.

Table 3. Bacteria load reductions needed to meet primary contact recreation standards on the Tongue River Watershed in 2012 and 2016

Subwatershed	2012 Load Reduction Requirement (%)				2016 Load Reduction Requirement (%)				Assigned Priority	
	Moist	Mid	Dry	All	Moist	Mid	Dry	All	2012	2018
New Tongue River (Sites TR01 & TR03)	NA ¹	NA ¹	NA ¹	NA ¹	27	22	5	17		L ³
Prairie Dog Creek (Site PD01)	NA ¹	NA ¹	NA ¹	NA ¹	40	50	57	59		L ⁴
Goose Creek (Site GC01)	NA ¹	NA ¹	NA ¹	NA ¹	65	ND ²	25	43		L ⁴
Lower Tongue River (Site TR05)	88	14	0	34	30	24	35	29	L	L ³
Wolf Creek (Site WC01)	55	61	40	52	48	57	11	31	M	M
Five Mile Creek (Site FMC01)	95	83	87	88	87	63	87	71	H	H
Middle Tongue River (Sites TR07 & TR08)	58	0	0	19	14	6	8	16	M	M
Columbus Creek (Site CC01)	73	50	38	54	67	25	72	57	H	H
Little Tongue River (Site LTR01)	0	62	78	47	34	57	42	42	H	H
Smith Creek (Site SC01)	56	75	80	70	52	0	ND ²	52	H	H
Upper Tongue River (TR09)	0	0	0	0	0	0	0	0	L	L

¹ The "New" or expanded boundary was not added until 2013; there were no samples prior to the 2012 plan

² None of the 2016 samples for the site were collected from the associated flow condition

³ Low Priority in lower reaches of the Tongue River based on the assumption that upstream reductions would also affect downstream reaches

⁴ Low priority in the Goose Creek and Prairie Dog Creek subwatersheds because of separate on-going efforts in those watersheds

The SCCD, with input from the committee, considered potential pollutant sources for each subwatershed based on information related to measured bacteria loads, critical flow conditions, segment priorities, land uses and parcel sizes, and location within the watershed. Within each subwatershed, the potential pollutant source category was assigned a high, medium or low priority. Overall, domestic animals (including livestock) and septic systems were determined to be a priority and the most important item to be addressed in all subwatersheds.

Table 4. Pollutant Sources and Priority Rankings by Subwatershed for 2012 and 2018

Subwatershed	Critical Condition	2018 Priority Load Level	Pollutant Sources	2012 Priority Ranking	2018 Priority Ranking
Upper Tongue ¹	Mid	Low	Septic Systems Domestic Animals ² Run-off/Sediment ³	High Medium-High Medium	High High Medium
Smith	Moist	High	Domestic Animals ² Septic Systems		High + High +
Little Tongue	Mid	High	Septic Systems Domestic Animals ²		High + High +
Middle Tongue ¹	Moist	Medium	Domestic Animals ² Septic Systems Run-off/Sediment ³		Medium-High High Medium-High
Columbus	Dry	High	Domestic Animals ² Septic Systems		High + High +
File Mile	Moist/Dry	High	Septic Systems Domestic Animals ²		High + High +
Wolf Creek	Mid-Range	Medium	Domestic Animals ² Septic Systems Run-off/Sediment ³	Medium Low Low-Medium	Medium Medium Low
Lower Tongue	Dry	Low	Septic Systems Domestic Animals ² Run-off/Sediment ³	Medium Medium Low	Low Low Low
Goose Creek	Moist	Low	Domestic Animals ² Septic Systems		Low Low
Prairie Dog Creek	Dry	Low	Domestic Animals ² Septic Systems		Low Low
Expanded Tongue	Moist	Low	Domestic Animals ² Septic Systems		Low Low

¹ In the 2012 Tongue River Watershed-Based Plan the Upper Tongue Subwatershed included Smith Creek and Little Tongue River and the Middle Tongue, Five Mile Creek and Columbus Creek Subwatersheds were combined.

²In the 2012 Tongue River Watershed-Based Plan, Domestic Animals were separated into Large Acreage, Small Acreage, and Rural Ranchettes. These were combined for the 2018 Update.

³ The 2012 Tongue River Watershed-Based Plan sources for Run-off (Irrigation and Stormwater), Sediment from Streambanks and Sediment from Diversions, were combined for the 2018 Update.

Table 5. Actual (2013-2017) and targeted (2018-2022) contribution reductions by subwatershed

	Upper Tongue			Five Mile/Columbus			Wolf	Lower Tongue	Goose	Prairie Dog	New Tongue
	Upper Tongue	Smith	Little Tongue	Columbus	Middle Tongue	Five Mile					
Phase 1 Critical Flow Condition (2013-2017)	Dry			Moist			Mid	Moist			
Maximum Reduction Required	80%			95%			61%	90%			
Phase 1 Targeted Reduction (2013-2017)	20%			25%			15%	10%			
Phase 1 Actual Reduction (2016 monitoring)	0%	26%	11%	Up 6%	15%	19%	40%	15%			
Phase 2 Critical Flow Condition (2018-2022)	Mid	Moist	Mid	Dry	Moist	Moist & Dry	Mid	Dry	Moist	Dry	Moist
Maximum Reduction Required	0%	52%	57%	67%	14%	87%	57%	35%	65%	57%	27%
Phase 2 Targeted Reduction (2018-2022)	5%	25%	25%	25%	5%	25%	15%	5%	0%	0%	5%
Direct Contributions											
Phase 1 Septic System Goal (#)	9			9			2	8			
Phase 1 Septic System Actual Completed (#)					2		1	1			
Phase 2 Septic Systems Goal (#)	1	3	4	1	0	7	2	4	0	0	9
Phase 1 Animal Units Addressed Goal (#AUs)	496			801			337	550			
Phase 1 Actual Animal Units Addressed (#AUs)						8	400	200			
Phase 1 Actual Stream Length Protected (feet)						175	15840	5280			
Phase 2 Animal Units Addressed Goal (#AUs)	54	119	198	333	28	329	337	275	0	0	582
Phase 2 Stream length protected Goal (feet)	2500	10,000	8000	15,500	1700	12,000	8500	4500	0	0	5500
Indirect Contributions											
Phase 1 Actual Diversions Addressed											
Phase 2 Diversions Addressed Goal (#)	1										1
Phase 1 Actual Stabilization Addressed (#/ft)	1/200							2/675			1/450
Phase 2 Stabilization Addressed Goal (#/ft)	2/2000										

Watershed Plan Implementation Action Items

Objective 1: Maintain a viable watershed improvement effort by providing leadership and project oversight.

Action Item/Interim Item	2018	2019	2020	2021	2022
1. Maintain an active steering committee					
Meet annually to review progress and milestones	Feb/Mar	Feb/Mar	Feb/Mar	Feb/Mar	
Review and update plan	Feb/Mar				Feb/Mar
2. Continue interim water quality					
Develop monitoring plan		Feb/Mar			Feb/Mar
Conduct field sampling and data management		Summer			Summer
Complete and submit monitoring report		Dec	Jan		Dec
3. Maintain Progress Register					
Update GIS projects layer and spreadsheet	Dec	Dec	Dec	Dec	Dec
Develop and include layer for applicable USDA NRCS and/or partner water quality projects		May			
Update load reduction estimates and priorities and/or identify areas that need additional attention	Feb	Feb	Feb	Feb	Feb
4. Follow-up on completed projects					
Send letters/form to past participants		May			
Assist with sample collection, if requested/needed		ON-GOING AS NEEDED			
5. Engage/Coordinate with other agencies/community organizations					
Participate in discussions with others as needed <ul style="list-style-type: none"> • Ditch Companies • Stockgrowers/Cattlewomen • Sheridan County Weed and Pest • UW Cooperative Extension • Sheridan College • Chamber of Commerce Ag & Natural Resources • USDA NRCS • WY Game and Fish • Nature Conservancy • Sheridan Community Land Trust • Towns • Sheridan County • Tongue River Valley Community Center • Realtors/Contractors 	ON-GOING AS NEEDED				

Objective 2: Reduce bacteria contributions by up to 25% by 2022

Action Item/Interim Item	2018	2019	2020	2021	2022
6. Reduce contributions from septic systems					
Provide technical and cost-share assistance program including site visits to determine eligibility	ON-GOING AS REQUESTED				
Coordinate with County to conduct a mailing to permitted and potentially unpermitted septic system owners			April		
Provide septic system and program information through Realtors, Title Companies, etc.		May			
Repair/replace septic systems (number of systems)		7	8	8	8
7. Reduce contributions from livestock/domestic animals					
Provide technical and cost-share assistance to relocate corrals/feeding grounds, provide off-channel stockwater and fencing to improve management, and emphasize importance of riparian buffers	ON-GOING AS REQUESTED				
Install structures/implement practices (AUs included)		563	564	564	564
Reduce livestock access to waterbodies (stream length)		17,050	17,050	17,050	17,050

Objective 3: Reduce water quality impacts, other than bacteria, such as nutrient concentrations, organic matter, temperature, and sediment loads.

Action Item/Interim Item	2018	2019	2020	2021	2022
8. Reduce sediment contributions from irrigation diversions and bank/channel erosion					
Provide technical and cost-share assistance to improve vegetation cover in upland areas and riparian corridors	ON-GOING AS REQUESTED				
Provide technical and cost-share assistance to replace irrigation diversions and stabilize stream banks/channels	ON-GOING AS REQUESTED				
Replace irrigation diversion structures (#)	1				1
Install structures/bank enhancements (streambank length)	500	1500			
Establish willow cuttings/bank vegetation (bank length)		250	250		500

Objective 4: Increase awareness of and encourage participation in the watershed improvement efforts and activities through positive and consistent outreach strategies.

Action Item/Interim Item	2018	2019	2020	2021	2022
9. Publicize programs and projects in newsletters, website, social media, and presentations					
Distribute annual watershed newsletter to residents	Jan/Feb	Jan/Feb	Jan/Feb	Jan/Feb	Jan/Feb
Include information in District newsletters as appropriate	May,Nov	May,Nov	May,Nov	May,Nov	May,Nov
Provide updates to Rancheater and Dayton Town Councils	Mar/Apr	Mar/Apr	Mar/Apr	Mar/Apr	Mar/Apr
Provide updates to County Commissioners	Jan, Apr July, Oct	Jan, Apr July, Oct	Jan, Apr July, Oct	Jan, Apr July, Oct	Jan, Apr July, Oct
Provide other presentations/programs as requested	ON-GOING AS REQUESTED				
10. Use past participants and partners to encourage participation					
Provide "Pay it Downstream" postcards to participants	ON-GOING AS NEEDED				
Provide information to partners/groups for their members <ul style="list-style-type: none"> • Stockgrowers/Cattlegrowers • Sheridan Community Land Trust • The Nature Conservancy • Towns • Contractors/Consultants 	ON-GOING AS NEEDED				
Provide information through other local media as needed <ul style="list-style-type: none"> • Sheridan Press • Sheridan Media/Public Pulse • Bighorn Mountain Radio Network • Tongue River Happenings 	ON-GOING AS NEEDED				
Provide information during community events <ul style="list-style-type: none"> • Dayton Days • Third Thursday 	July	July	July	July	July
11. Provide education on other activities and topics through workshops, newsletters and other avenues					
<ul style="list-style-type: none"> • Horse/Livestock Management • Winter Feeding Grounds/Stormwater run-off • Septic Systems/permitting and standards • Manure/Nutrient/Pesticide Management • Riparian Buffers • Upland vegetation cover/invasive weeds • Irrigation Management • Pet/Domestic Animal contributions • Wildlife Impacts-discourage feeding near water • Water Quality/Quantity Information • New technologies/alternatives/practices • Feature spotlights on projects-testimonies 	ON-GOING AS NEEDED				