

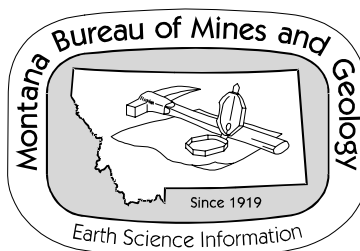
Open-File Report MBMG 493-B

Spring and Well Inventory for the Powder River and
Tongue River Watersheds,
Southeastern Montana

By

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Produced in cooperation with the
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Custer County Conservation District

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Contents

Introduction	1
Well, spring and water-rights information on the Internet	2
Acknowledgements	3
Geology	4
Field procedures	6
Database	7
Spring hydrology	8
Vulnerability to development	9
Ongoing work.....	10
References.....	11

Figure

Figure 1 Location map and regional setting for the Powder River Basin.....	5
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Appendices

A	Bibliography on coal and methane for the northern Powder River Basin
B	Spring inventory data for the Powder River and Tongue River watersheds
C	Well inventory data for the Powder River and Tongue River watersheds

Plate

1	Map of springs and wells inventoried in the Powder River and Tongue River watersheds, southeastern Montana
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Spring and Well Inventory for the Powder River and Tongue River Watersheds, Southeastern Montana

Introduction

Production of coalbed methane (CBM) began in Montana during 1998 in the Squirrel Creek drainage near Decker. The potential for CBM production covers portions of southeastern Montana, including an area south of Ashland in ranges 37 east through 48 east (Van Voast and Thale, 2001). Much of the Powder River and Tongue River watersheds are located in an area of potential CBM production. Communities within the project area include Ashland, Birney, Decker, and Broadus. Coal deposits within the area have been used locally since the time the area was first settled. Currently commercial mining of coal includes the Rosebud mine at Colstrip and the Decker and Spring Creek mines near Decker. The potential exists for future development of coal resources in the area for both solid fuel and coalbed methane.

The geology and hydrogeology of the area has been described in numerous reports. Particularly, during coal exploration work and coal-mine impact assessments during the 1970's and 1980's, reports were published that provided extensive background information. The coalbeds in the area have been mapped and studied by investigators from the U. S. Geological Survey and Montana Bureau of Mines and Geology. A list of applicable publications is provided in Appendix A.

Well, Spring, and Water-Rights Information on the Internet

Well and spring data may be obtained from the Montana Groundwater Information Center (GWIC) at url address: <http://mbmggwic.mtech.edu/>. The first time a user enters this database he/she will be asked to create a username. After successfully logging in the user is directed to a query page that allows the user to search by location, site name, subdivision, or county. The location and site name queries will return information on the water-right number (if on-file in GWIC), full site name, location, type of water feature (i.e., well, spring, or pond), total depth, pumping water level, static water level, yield, date drilled, and water use. These data can be downloaded by copying and pasting into a spreadsheet program. The GWIC ID hyperlink will take the user to the well log for that particular well or spring. The county download retrieval will create a zipped file that can be downloaded to the user's computer. Different reports are available for the county download option and include well data, lithology, water quality and field visit reports.

Information and listings of water rights in Montana are available from the regional Montana Department of Natural Resources and Conservation (DNRC) office and may be accessed through the internet in two different ways. To access the data from the DNRC web page the user must type the following url in the address window: <http://www.dnrc.state.mt.us/wrd/home.htm>. Choose "Water Rights" from the left-hand column. This action will bring the "Water Rights Bureau" page into view. Users may access water rights information by choosing "Water Right Information and Indexes by Region" and selecting a region such as Billings. The water-rights data are downloaded in one of several text formats. The text retrievals include all water rights on file for surface

water, ground water and springs, but they are lengthy as the entire region is included. An alternate method is to choose “NRIS – Water Right Query System” from this same website. This action will direct the user to the Montana State Library Natural Resource Information System website which houses the DNRC Water Right Query System. The url address for this site is <http://nris.state.mt.us/wis/data/waterrights.htm>. From this site users may select water rights information based on county, basin, stream, or owner. Searches on water right numbers and types of water rights are also available. There are two important points to remember when using this site. First, this site is case-specific so the data are only retrievable in upper case; therefore, the Caps Lock button should always be on. Secondly, if the user has a pop-up blocker then the user must hold down the control key along with the mouse when submitting requests for data.

Acknowledgments

The authors wish to acknowledge the assistance and support that was received during this project. Many landowners allowed much welcomed access across their property. The Powder River and Custer conservation districts helped coordinate with landowners, and the U. S. Environmental Protection Agency and the Montana Bureau of Mines and Geology provided financial support. Many of the spring site visits were done by Mr. Monte Smith.

Geology

The Tongue and Powder River watersheds are underlain by continental sedimentary rock of the Paleocene Fort Union Formation. The area is in the northern one-third of the southward-plunging Powder River Basin (Figure 1). The basin extends from near Casper, Wyoming to Miles City, Montana and is bounded on the west by the Big Horn uplift, on the east by the Black Hills uplift, and on the north by the Miles City Arch. The sedimentary beds are gently dipping. The axis of the Powder River Basin roughly parallels the Tongue River from the Montana – Wyoming state line to Miles City. The land surface slopes generally downward toward the north, consequently the youngest rock units are exposed at the surface in the southern part of the region and progressively older beds are exposed toward the north.

The main exposed rock units in the area are interbedded pale yellow to gray sandstone, mudstone, coalbeds, and carbonaceous shale of the Tongue River Member of the Fort Union Formation. Much of the near-surface coal has burned by natural ignition. The burning of the coal has baked and thermally metamorphosed the overlying sediments, forming clinker beds of variable thickness. The orange-red clinker beds often form prominent cliff faces and are used as stratigraphic marker horizons for the surface mapping of coal. Overlying the Fort Union Formation, in the southwest corner of the inventory area, are sandstone and mudstone units of the Eocene Wasatch Formation.

Strippable coal resources in southeastern Montana total more than 32,000,000,000 tons (Matson and Blumer, 1973). In some areas the correlations of coal beds have

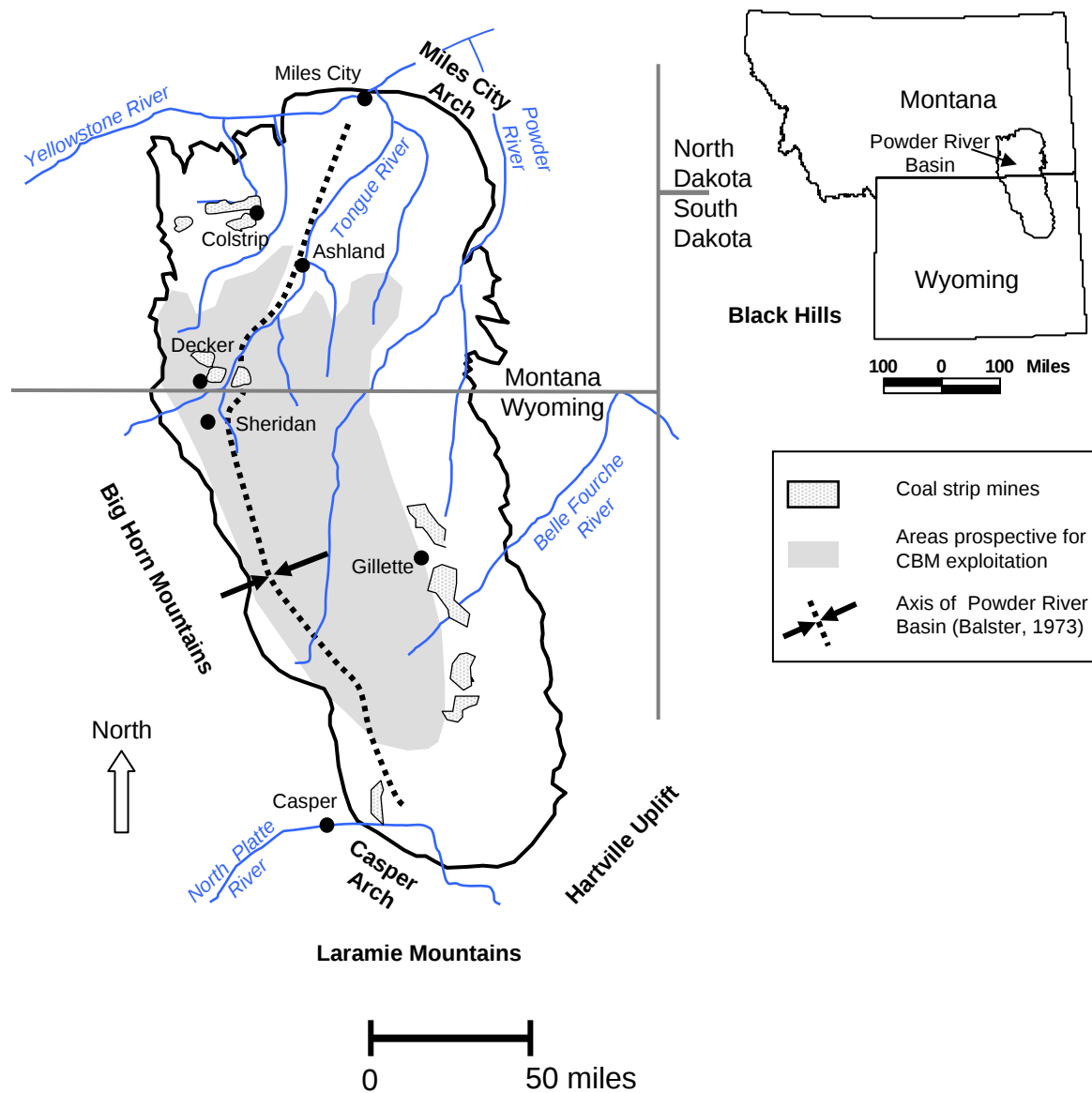


Figure 1. The Powder River Basin is in southeastern Montana and northeastern Wyoming. Vast quantities of coal and coalbed methane exist in the Fort Union Formation within the Basin.

been well defined by previous investigators. In other areas the correlation is ambiguous at best. The lowest principle coal bed in the Tongue River Member is the Knobloch and the upper-most is the Anderson. The intervening section is approximately 1,000 feet thick (Heffern and others, 1993).

Field Procedures

An inventory of springs and wells within the area began in May, 2001 and continued through November, 2003. Letters were sent to landowners, and announcements published by the conservation districts, inviting landowners to provide locations of springs they wished to have inventoried. Site visits were scheduled with interested landowners. Springs were not inventoried on private land if the landowner did not request a site visit.

Springs located on public land were identified according to responsible government agency (U. S. Bureau of Land Management and Montana Department of Natural Resources and Conservation). A separate inventory of springs on U. S. Department of Interior Forest Service was conducted and released as a data report (Donato and Wheaton, 2004).

Each site was visited and, where possible, physical and chemical attributes were measured and noted where flow was observed. Spring discharge rates were determined by the bucket-stopwatch (volumetric) method, and specific conductance and temperature were measured using hand-held field meters. Latitude and longitude coordinates were

determined for each site using a hand held, navigational GPS unit. The area surrounding the site was inspected and notes made on geologic associations and the nature and condition of any development as appropriate.

Database

Hydrogeologic data are presented in one plate and two appendices, and are stored in the Montana Ground-Water Information Center (GWIC) database (<http://mbmgwic.mtech.edu/>). A GIS compilation of spring and well locations, geology, coal and clinker outcrops and subcrops, forest boundary, roads, and drainages is shown on Plate 1. Appendix A is a bibliography of coal and methane publications relevant to Montana. Appendices B and C contain data collected during the 2001 through 2003 field seasons. The physical and chemical attributes of the springs and catchments, including criteria to assess vulnerability to mining or gas development, are in Appendix B; data for the inventoried wells are in Appendix C.

Locations for sites are recorded by latitude and longitude, and by township, range, section and tract. Tracts are identified by the letters A, B, C, and D, with A being the northeast quarter section and continuing counterclockwise so that D is the southeast quarter. Quarter sections are designated first, quarter-quarter sections second, and so forth. It is important to note that the location system used here is reversed from that commonly used by land surveyors; here, the letter designations begin with the largest quarter and progress to smaller ones. With the quarter-quarter system used by surveyors,

the tract designation DABC would be read backwards as the southwest quarter, of the northwest quarter, of the northeast quarter, of the southeast quarter.

Spring Hydrology

Springs typically issue from clinker beds, coal beds and sandstones near their contacts with underlying mudstone or shale units. In valleys the sources of springs are commonly obscured by alluvial or colluvial deposits. Aquifers that support springs are recharged along topographically high ridges covered by clinker, where stream channels cross subcrops and in areas of outcrop. In the Powder River and Tongue River watersheds there are both local and regional ground-water flow systems. Locally recharged springs may respond fairly quickly to weather patterns by exhibiting lower flow during droughts and increased flow during wet years. Some of the more persistent springs in the area are likely fed by ground water migrating along regional flow paths and discharging at the surface where the aquifer beds are exposed by erosion.

Ground-water quality can be used to identify regional flow paths. Regional ground water in the Powder River Basin has a moderate TDS content and is chemically very soft. Therefore, springs having TDS values in the range of 1,500 to 2,000 mg/L, and Ca plus Mg hardness values less than about 100 mg/L may be among springs that have the longest flow paths from recharge areas, perhaps of regional scale.

A total of 279 springs and 133 wells were visited and inventoried (Appendices B and C). Of the 279 springs, 164 had measurable discharge. Discharge rates ranged from 0.01 gpm to 82 gpm. A total of 55 springs had a discharge rate of 1 gpm or greater. Specific conductance values ranged from 123 umhos/cm@25C to 8,640 umhos/cm@25C and pH values ranged from 6.6 to 9.1.

Vulnerability to Development

Of special note on Appendix B are judgments of possible source coalbeds, based on Matson and Blumer (1973) and Van Voast and Thale (2001), and estimated proximities of recharge for each spring. These will be key indicators of spring-flow vulnerability to developments of mining or coalbed methane production. Both types of development are known to disrupt ground-water flow, but differing conditions of topography and geology characteristic of each type can create differing impacts.

In the case of mining, springs having local sources of recharge may be the most vulnerable to nearby development, while those fed by more regional recharge may be less affected. Coal mines operate in areas of lowest overburden and would be comparatively local developments in the rugged terrain of the area. These developments are not likely to penetrate regional flows characteristic of deeper aquifers farther from the outcrop areas.

In the case of coalbed methane development, springs fed by the regional flow system will be the most vulnerable. Methane does not occur in local flow systems

because of the attendant oxidizing conditions commonly evidenced by the presence of sulfate in the ground water. Gas production will be found farther from recharge areas, in deeper aquifers where reducing conditions encourage the stability and growth of methanogenic bacteria. In the Powder River Basin of Montana these conditions are optimum in Townships 8 and 9 South (Van Voast and Thale, 2001), but only moderately favorable in Township 7 South, and other areas within about 35 miles of the Montana-Wyoming state line.

Ongoing Work

All future data derived from landowner and MBMG monitoring and any new spring and well inventories will be added to the GWIC database and made immediately available on line. The data collected during this and other studies (Donato and Wheaton, 2004), (Wheaton and Donato, in press) are being further evaluated and compared to data from the surrounding region. Information obtained from this evaluation will be used to help refine interpretations of the geologic sources of ground water issuing from the springs, and to develop a hydrologic model. Flow measurements and field parameters from approximately 29 spring sites in the Powder River, Tongue River and Rosebud Creek watersheds are being obtained on a monthly basis as part of a basin-wide long-term monitoring program. This information will be used to evaluate impacts from energy development and from natural variations of climate.

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Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Spring Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle	Inventory Date
01S	44E	33	AABC	TONGUE RIVER FARMS	199552	-106.29820	45.71460	2850	ASHLAND NE	7/18/2002
01S	47E	20	CCCD	DICE-WEGNER RANCH BD-2	198898	-105.96250	45.72720	3700	STACEY	8/30/2002
01S	47E	29	ABAD	DICE-WEGNER RANCH BD-1	198897	-105.95020	45.72570	3590	STACEY	8/30/2002
01S	48E	33	DCBC	KIOWA SPRING #2	199104	-105.80740	45.70120	3360	ELK RIDGE	11/4/2002
02S	47E	13	ADAA	WILLIAMS PLACE SPRING	199107	-105.86010	45.66470	3520	ELK RIDGE	11/4/2002
02S	47E	14	DDBB	HORSE CREEK SPRING	199101	-105.88530	45.65720	3580	STACEY	11/4/2002
02S	47E	20	ACBB	UNCLES SPRING #2	198491	-105.95110	45.64920	3790	STACEY	9/30/2002
02S	47E	20	ABBA	UPPER UNCLES SPRING #1	198492	-105.94980	45.65260	3810	STACEY	9/30/2002
02S	47E	21	ABBA	UNCLES SPRING #1	198493	-105.94790	45.65140	3785	STACEY	9/30/2002
02S	47E	22	BDCC	22 SPRING	198490	-105.91610	45.64710	3815	STACEY	9/30/2002
02S	47E	23	ADCC	HORSE CREEK SPRING	198494	-105.88410	45.64700	3620	STACEY	9/30/2002
02S	47E	26	ABBC	BUFFALO SPRING	199109	-105.89030	45.63890	3790	STACEY	11/4/2002
02S	47E	36	CAAC	SCHOOL SECTION SPRING	199108	-105.87100	45.61540	3770	SAMUELSON RANCH	11/4/2002
02S	48E	4	ADBA	KIOWA SPRING #1	199102	-105.80080	45.69420	3350	ELK RIDGE	11/4/2002
03S	44E	27	ABDD	SPRING CREEK SPRING	199133	-106.28030	45.55010	3040	ASHLAND	11/7/2002
04S	45E	24	DBDB	FORTUNE SPRING	207254	-106.11940	45.47460	3240	YAGER BUTTE	10/1/2003
04S	46E	5	CBCA	DANIEL TARTER SPRING	204479	-106.09160	45.51200	3175	COLEMAN DRAW	6/18/2003
04S	46E	31	CDBB	LOWER TEN MILE CREEK	197230	-106.10720	45.43770	3180	YAGER BUTTE	7/18/2002
04S	48E	32	BBDC	LOWER SPRING	197221	-105.82740	45.44540	3690	SONNETTE	6/12/2002
05S	39E	36	BDCC	HEAD OF TRAIL CREEK (SMALL)	197255	-106.86600	45.36150	4523	TAINTOR DESERT	7/23/2002
05S	39E	36	BDCC	HEAD OF TRAIL CREEK	197249	-106.86840	45.36140	4480	TAINTOR DESERT	7/23/2002
05S	39E	36	DDCC	BATSON PLACE BELOW LEES FENCE	199538	-106.85570	45.35360	4455	TAINTOR DESERT	7/25/2002
05S	40E	31	BCAA	HEAD OF PRAIRIE DOG CREEK (EAST)	197251	-106.84760	45.36480	4445	TAINTOR DESERT	7/23/2002
05S	41E	31	CBBD	CONSOL INC.	204401	-106.72710	45.35700	3620	BIRNEY SW	6/21/2003
05S	41E	31	DDDA	NOVEMBER 5TH SPRING	207247	-106.64690	45.35350	3850	BIRNEY SW	11/4/2003
05S	41E	35	CBCC	CEDAR TREE SPRING	207246	-106.64630	45.35560		BIRNEY SW	10/4/2003
05S	41E	36	DDDA	UNNAMED SPRING	207248	-106.60630	45.35300	3990	BIRNEY	10/4/2003
05S	42E	26	AACA	COOK CREEK SPRING	199156	-106.50820	45.37810	3130	CLUBFOOT CREEK	3/15/2002
05S	42E	30	CCBB	MORELAND SPRING	207249	-106.60510	45.37000	3900	BIRNEY	10/4/2003

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Township	Range	Section	Tract	Spring Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle	Inventory Date
05S	47E									
	47E	4	CDA	SNODGRASS SPRING	199139	-105.93020	45.42370	3740	THREEMILE BUTTES	11/7/2002
05S		6	BADD	ALICES HOMESTEAD SPRING	199138	-105.97090	45.43180	3520	THREEMILE BUTTES	11/7/2002
05S	48E									
	48E	6	AACA	MIDDLE SPRING	197220	-105.83900	45.43200	3870	SONNETTE	6/16/2002
05S	48E	6	DDCA	UPPER SPRING (MELVILLE SPRING)	197219	-105.83930	45.42130	3865	SONNETTE	6/12/2002
05S	48E	10	ACAA	UNNAMED SPRING	207256	-105.78350	45.41500	3790	SONNETTE	10/1/2003
05S	48E	15	BBCB	SURGEON SPRING	199121	-105.79410	45.40240	3865	SONNETTE	11/5/2002
05S	48E	21	DADB	SURGEON SPRING	204478	-105.79630	45.37960	4010	SONNETTE	8/7/2002
05S	48E	29	AABB	BOTTLE SPRING	199162	-105.81930	45.37720	4025	SONNETTE	8/7/2002
06S	39E									
	39E	15	DCBD	CORRAL SPRING	197317	-106.93760	45.31490	4090	KIRBY	7/26/2002
06S	39E	15	DBBD	RESERVOIR SPRING	197318	-106.93540	45.31480	4105	KIRBY	7/26/2002
06S	39E	22	AAAB	LOWER-MIDDLE PASTURE SPRING	197319	-106.93360	45.31160	4150	KIRBY	7/26/2002
06S	39E	23	ADCB	BIG BUTTE SPRING	197321	-106.92190	45.30200	4260	KIRBY	7/26/2002
06S	39E	23	CABB	UPPER-MIDDLE PASTURE SPRING	197320	-106.92670	45.30450	4220	KIRBY	7/26/2002
06S	39E	24	BBBD	WINDMILL PASTURE	197323	-106.91020	45.31120	4330	KIRBY	7/26/2002
06S	40E									
	40E	1	AABD	CONSOL INC.	204021	-106.77210	45.35190	3990	TANITOR DESERT	6/21/2003
06S	40E	2	CACA	TURTLE SPRING	204015	-106.80240	45.34400	4030	TANITOR DESERT	6/21/2003
06S	40E	4	BAAC	HEAD OF PRAIRIE DOG CREEK	204018	-106.84240	45.35170	4290	TANITOR DESERT	6/21/2003
06S	40E	4	BBAC	BATSON PLACE	199541	-106.84720	45.35210	4325	TAINTOR DESERT	7/25/2002
06S	40E	4	BBAD	BATSON PLACE	199540	-106.84540	45.35220	4320	TAINTOR DESERT	7/25/2002
06S	40E	5	AABB	BATSON PLACE	199539	-106.85490	45.35270	4425	TAINTOR DESERT	7/25/2002
06S	40E	5	BBAD	ABOVE JONES FARM - UPPER	199537	-106.86750	45.35200	4605	TAINTOR DESERT	7/25/2002
06S	40E	5	BCAA	ABOVE JONES FENCE - LOWER	199287	-106.86670	45.34960	4480	TAINTOR DESERT	7/25/2002
06S	40E	5	DBCC	POND BELOW JONES FENCE	199286	-106.86010	45.34330	4365	TAINTOR DESERT	7/25/2002
06S	40E	5	DCDA	MAIN SPRING BENEATH WIND PLACE	199285	-106.85630	45.34040	4295	TAINTOR DESERT	7/25/2002
06S	40E	7	DDCB	STILL SPRING	197325	-106.87480	45.32550	4315	TAINTOR DESERT	7/26/2002
06S	40E	8	ABDC	DOUBLE TANK - MAIN FORK OF NORTH SIDE	199284	-106.85690	45.33600	4280	TAINTOR DESERT	7/25/2002
06S	40E	9	AACD	NORTH CANYON ABOVE COW CAMP (POND)	199542	-106.83240	45.33550	4265	TAINTOR DESERT	7/25/2002
06S	40E	9	BDDC	MIDDLE POND, NORTH SIDE	199283	-106.84620	45.33220	4165	TAINTOR DESERT	7/25/2002
06S	40E	15	BABC	HOSFORD/CONSOLIDATED SPRING	199277	-106.80330	45.30920	3865	TAINTOR DESERT	7/25/2002
06S	40E	15	BDDB	UPPER-LOWER HORSE PASTURE	199543	-106.82050	45.31900	3965	TAINTOR DESERT	7/25/2002
06S	40E	15	DABD	LOWER HORSE PASTURE	199546	-106.81350	45.31610	3920	TAINTOR DESERT	7/25/2002
06S	40E	15	DBAB	MIDDLE-LOWER HORSE PASTURE	199544	-106.81570	45.31700	3940	TAINTOR DESERT	7/25/2002
06S	40E	18	CDBD	RESERVOIR SPRING	197326	-106.88340	45.31090	4460	KIRBY	7/26/2002
06S	40E	22	BAA	CLARK PLACE HILLSIDE EAST	199281	-106.82060	45.30800	3880	TAINTOR DESERT	7/25/2002
06S	40E	22	BABD	MIDDLE SPRING AT CLARK PLACE	199282	-106.82230	45.30910	3890	TAINTOR DESERT	7/25/2002
06S	40E	22	BADB	CLARK PLACE HILLSIDE WEST	199280	-106.82100	45.30810	3880	TAINTOR DESERT	7/25/2002
06S	40E	23	BCCD	SOUTH CANYON ABOVE SWEENEY PLACE	199279	-106.80710	45.30290	3850	TAINTOR DESERT	7/25/2002

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Township	Range	Section	Tract	Spring Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle	Inventory Date
06S	40E	23	BDDC	SWEENEY PLACE SPRING	199278	-106.80110	45.30280	3770	TAINTOR DESERT	7/25/2002
06S	40E	29	CABD	HORSE PASTURE	197327	-106.86310	45.28690	4170	TAINTOR DESERT	7/26/2002
06S	40E	30	BCDC	UPPER MEADOW	197324	-106.88360	45.28860	4235	KIRBY	7/26/2002
06S	40E	31	BADA	COAL BANK SPRING	197312	-106.88090	45.27870	4290	KIRBY	7/26/2002
06S	40E	31	CADD	SOUTH SPRING	197329	-106.88120	45.27020	4215	KIRBY	7/26/2002
06S	40E	32	BADD	BATH TUB SPRING	197328	-106.86120	45.27820	4060	TAINTOR DESERT	7/26/2002
06s	41e	1	DCCB	BREWSTER RANCH 53	207241	-106.65394	45.38900	3580	BIRNEY SW	10/5/2003
06S	41E	13	BDDD	CONSOL INC.	204402	-106.65490	45.31600	3430	BIRNEY SW	6/21/2003
06S	42E	6	ABAC	BREWSTER SPRING 2	207243	-106.62960	45.35080	3740	BIRNEY SW	10/4/2003
06S	42E	6	BBDD	BREWSTER SPRING	207245	-106.63970	45.34830	3880	BIRNEY SW	10/4/2003
06S	42E	8	CACB	MAJOR RENO SPRING	207242	-106.61660	45.32870	3590	BIRNEY	10/5/2003
06S	42E	18	CDCA	CONSOL	204465	-106.63670	45.30990	3310	BIRNEY SW	6/21/2003
06S	43E	17	CBBA	HACKLEY CREEK SPRING	198324	-106.49780	45.31440	3374	BROWNS MOUNTAIN	9/17/2002
06S	43E	19	DACA	BROWN CATTLE CO	198275	-106.50290	45.29800	3330	BIRNEY	9/17/2002
06S	43E	20	DAAD	EAST FORK OF HANGING WOMAN CREEK	197082	-106.48060	45.29860	3240	BROWNS MOUNTAIN	5/21/2002
06S	43E	22	BCAC	BONSACK SPRING	197081	-106.45480	45.30260	3420	BROWNS MOUNTAIN	5/21/2001
06S	43E	22	CABD	UPPER BONSACK SPRING	197080	-106.45170	45.29940	3420	BROWNS MOUNTAIN	5/21/2002
06S	43E	33	ABBC	HOMESTEAD SPRING	197084	-106.46860	45.27780	3700	BROWNS MOUNTAIN	5/21/2002
06S	43E	33	BCCB	SOUTH HILL PASTURE SPRING	197083	-106.47850	45.27260	3340	BROWNS MOUNTAIN	5/21/2002
06S	44E	27	BDBA	PARISH PLACE SPRING	197076	-106.33200	45.28720	3980	POKER JIM BUTTE	5/21/2002
06S	44E	28	BDAB	3X BAR SPRING	197077	-106.35300	45.29160	3699	POKER JIM BUTTE	5/21/2002
06S	44E	29	BCDB	UPPER DANIELS PASTURE	197078	-106.37770	45.29010	3600	BROWNS MOUNTAIN	5/21/2002
06S	44E	30	BDAC	LOWER DANIELS PASTURE	197079	-106.39400	45.29060	3500	BROWNS MOUNTAIN	5/21/2002
06S	48E	5	ADCD	CARLET SPRING	199112	-105.86120	45.34130	3975	HODSON FLATS	11/5/2002
06S	48E	10	CBDD	NORTH FORK FIRE GULCH	199115	-105.83390	45.32320	3965	HODSON FLATS	11/5/2002
06S	48E	15	BCDC	FIRE GULCH SPRING	199116	-105.83530	45.31230	3840	HODSON FLATS	11/5/2002
06S	48E	16	ABBC	STATE SPRING	199119	-105.84850	45.31610	3910	HODSON FLATS	11/5/2002
07S	39E	12	CABA	GIBONS TIRE TANK	198248	-106.90420	45.25450	4340	KIRBY	9/18/2002
07S	39E	12	CACB	GIBONS SPRING	198247	-106.90500	45.25480	4340	KIRBY	9/18/2002
07S	40E	5	ACAC	NORTH PASTURE SPRING	198212	-106.85710	45.26200	4125	TAINTOR DESERT	8/21/2002
07S	40E	6	ACAC	NORTH PASTURE TIRE SPRING	198244	-106.87280	45.26290	4140	TAINTOR DESERT	8/21/2002
07S	40E	15	AAAC	EAST PASTURE RESERVOIR SPRING	198211	-106.81030	45.23690	4020	TONGUE RIVER DAM	8/21/2002
07S	40E	18	ADDB	FOUR-MILE * NARROW DRAW SPRING	198245	-106.87250	45.23150	4140	TONGUE RIVER DAM	8/21/2002
07S	40E	18	BBDD	FOUR MILE * MAIN DRAW SPRING	198246	-106.88620	45.23520	4142	HALF MOON HILL	8/21/2002

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Spring Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle	Inventory Date
07S	40E	20	DBAB	MONTAYLOR *STINKING SPRINGS	192988	-106.85720	45.21500	4010	TONGUE RIVER DAM	1/10/2002
07S	40E	28	ACBC	MONTAYLOR *CROSSROADS	192998	-106.83850	45.20340	3835	TONGUE RIVER DAM	1/10/2002
07S	40E	29	DABD	MONTAYLOR *POST CREEK ORCHARD	192999	-106.85200	45.20000	3950	TONGUE RIVER DAM	1/10/2002
07S	40E	32	CCDC	MONTAYLOR *LEAF ROCK SPRING	192993	-106.86670	45.17050	3760	TONGUE RIVER DAM	1/10/2002
07S	40E	35	BDAC	POST CREEK SPRING	210421	-106.80030	45.18940	3620	TONGUE RIVER DAM	6/9/2003
07S	41E	2	ABDB	SPRING CREEK	204474	-106.67260	45.26260	3325	BIRNEY SW	6/20/2003
07S	41E	7	CAAB	CANYON CREEK SPRING	207233	-106.76140	45.24410	3600	TONGUE RIVER DAM	10/5/2003
07S	41E	11	ACCD	CANYON CREEK WEST	204475	-106.67440	45.24390	3255	SPRING GULCH	6/20/2003
07S	41E	11	ACDB	CANYON CREEK EAST	204476	-106.67340	45.24390	3250	SPRING GULCH	6/20/2003
07S	41E	14	DCBC	DUTCH HOLLOW SPRING	197253	-106.67530	45.22350	3261	SPRING GULCH	7/23/2002
07S	41E	23	CCAB	MOUTH OF HARRIS CREEK	197243	-106.68370	45.21070	3241	SPRING GULCH	7/23/2002
07S	42E	1	BACB	LEACH SPRING	197075	-106.53810	45.26160	3800	BIRNEY	5/21/2002
07S	42E	1	CCCA	ROCK HOUSE SPRING	204489	-106.54060	45.25150	3760	BIRNEY	6/20/2002
07S	42E	1	CCCC	BELOW ROCK HOUSE SPRING	204490	-106.54200	45.25080	3720	BIRNEY	6/20/2003
07S	42E	2	ABBA	BATTLE BUTTE SPRING	197089	-106.55100	45.26050	3796	BIRNEY	5/21/2002
07S	42E	2	CADA	MIDDLE FORK BATTLE BUTTE	197088	-106.55390	45.25520	3780	BIRNEY	5/21/2002
07S	42E	2	CDCB	GREG CABIN SPRING	197087	-106.55760	45.25160	3860	BIRNEY	5/21/2002
07S	42E	10	BABC	CONSOL INC.	204013	-106.57850	45.23390	3550	LACEY GULCH	6/21/2003
07S	42E	10	DBDA	CONSOL INC.	204403	-106.56850	45.24020	3720	LACEY GULCH	7/21/2003
07S	42E	11	DBDD	UPPER DUGOUT HAYWOOD GULCH	197368	-106.54730	45.23960	3640	LACEY GULCH	6/20/2002
07S	42E	11	DCBB	HEAD HAYWOOD GULCH SPRING	197369	-106.55170	45.23810	3720	LACEY GULCH	6/20/2002
07S	42E	12	DDDC	HORSE PASTURE DRAW SPRING	197366	-106.52300	45.23560	3530	LACEY GULCH	6/20/2002
07S	42E	12		LOWER DUGOUT HAYWOOD GULCH	197367	-106.53230	45.24220	3520	LACEY GULCH	6/20/2002
07S	42E	13	DBAD	WEST UPPER SHORT DRAW SPRING	197349	-106.52980	45.22690	3690	LACEY GULCH	6/19/2002
07S	42E	13	DBBA	EAST UPPER SHORT DRAW SPRING	197350	-106.52950	45.22730	3730	LACEY GULCH	6/19/2002
07S	42E	14	AACA	DRY RESERVOIR SPRING	197370	-106.54520	45.23270	3780	LACEY GULCH	6/20/2002
07S	42E	15	BABD	CONSOL INC. 204459	204459	-106.57620	45.23440	3540	LACEY GULCH	6/21/2003
07S	42E	18	DAAA	HOLE IN THE ROCK SPRING	197380	-106.62570	45.22450	3395	SPRING GULCH	6/20/2002
07S	42E	20	ACDC	VAUDAVA SPRING	204477	-106.61140	45.21380	3570	LACEY GULCH	6/20/2003
07S	42E	21	CCDD	FOOT ROT SPRING	197379	-106.59980	45.20700	3600	LACEY GULCH	6/20/2002
07S	42E	22	CCAC	SWAMP SPRING	197373	-106.58040	45.20880	3775	LACEY GULCH	6/20/2002
07S	42E	23	AADC	VAN METER SPRING	197371	-106.54470	45.21740	3640	LACEY GULCH	6/20/2002
07S	42E	23	CBBD	UPPER VAN METER SPRING	197372	-106.56070	45.21220	3790	LACEY GULCH	6/20/2002
07S	42E	26	ACCC	LACEY GULCH SPRING	197342	-106.55160	45.19930	3640	LACEY GULCH	6/19/2002
07S	42E	26	CAAB	UPPER LACEY GULCH SPRING	197341	-106.55470	45.19890	3650	LACEY GULCH	6/19/2002
07S	42E	26	CBDB	WATER OVER ROCKS SPRING	197340	-106.56000	45.19700	3705	LACEY GULCH	6/19/2002
07S	42E	27	DAAC	TWO CABIN SPRING	197374	-106.56710	45.19770	3770	LACEY GULCH	6/20/2002
07S	42E	28	ACCA	COW ALLEY SPRING	197377	-106.59180	45.20050	3670	LACEY GULCH	6/20/2002

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Spring Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle	Inventory Date
07S	42E	28	ADBB	BENS SPRING	197376	-106.58700	45.20180	3760	LACEY GULCH	6/20/2002
07S	42E	28	CAAA	FARMER SPRING	197378	-106.59470	45.19900	3700	LACEY GULCH	6/20/2002
07S	42E	28	DABD	DEADMAN SPRING	197375	-106.58630	45.19770	3720	LACEY GULCH	6/20/2002
07S	42E	30	DAAA	COX RANCH - PASS SPRING	207252	-106.62580	45.19890	3780	SPRING GULCH	10/2/2003
07S	42E	31	DCAD	RICHARDS PLACE DUGOUT	197227	-106.62940	45.17950	3545	SPRING GULCH	6/19/2002
07S	42E	31	DAAA	HEFER PASTURE SPRING	197244	-106.62500	45.18020	3580	SPRING GULCH	6/19/2002
07S	42E	31	DDCC	CAMP SPRINGS LOWER	197228	-106.62800	45.17810	3590	SPRING GULCH	6/19/2002
07S	42E	31	DDCD	CAMP SPRINGS UPPER	197229	-106.62800	45.17790	3600	SPRING GULCH	6/19/2002
07S	42E	32	BDAC	TWO BUCK SPRING	197381	-106.61630	45.18710	3765	LACEY GULCH	6/20/2002
07S	42E	32	DABC	DUGOUT SPRING NO. FORK HARRIS CREEK	197384	-106.60870	45.18300	3695	LACEY GULCH	6/20/2002
07S	42E	32	DACB	LOWER TANK NO. FORK HARRIS CREEK	197383	-106.60850	45.18220	3695	LACEY GULCH	6/20/2002
07S	42E	32	DBBA	STEER PASTURE SPRING	197382	-106.61260	45.18430	3655	LACEY GULCH	6/20/2002
07S	42E	33	CACC	NORTH FORK HARRIS CREEK TANK	197385	-106.59780	45.18110	3750	LACEY GULCH	6/20/2002
07S	42E	34	AACA	BOX ELDER SPRING	197339	-106.56630	45.18980	3790	LACEY GULCH	6/19/2002
07S	43E	7	CDA	HAYWOOD SPRING	197365	-106.51230	45.23870	3415	LACEY GULCH	6/20/2002
07S	43E	13	DADD	SHORT DRAW SPRING	197351	-106.52300	45.22470	3520	LACEY GULCH	6/19/2002
07S	43E	24	CCDD	CLARK SPRING	204471	-106.41470	45.20680	3805	STROUD CREEK	7/1/2003
07S	43E	27	DCCB	DUTCHMEN SPRING	204470	-106.44930	45.19350	3750	STROUD CREEK	7/1/2003
07S	43E	31	BBCB	BULL PASTURE SPRING	197337	-106.51800	45.18940	3775	LACEY GULCH	6/19/2002
07S	43E	34	BAAA	UPPER ROSEBUD TANK	199271	-106.45030	45.19130	3735	STROUD CREEK	5/13/2002
07S	43E	35	CDBA	MIDDLE SPRING IN ROSEBUD	199240	-106.43200	45.18100	3620	STROUD CREEK	5/13/2002
07S	44E	14	BAAA	DOMESTIC AND STOCK SPRING (PL-25)	198976	-106.30980	45.23760	3890	HAMILTON DRAW	8/15/2002
07S	44E	17	ACCD	HERTZLER DRAW SPRING	198249	-106.36920	45.23110	3560	HAMILTON DRAW	9/17/2002
07S	44E	23	CDBC	PATRICK LOHOFF (PL-4S)	198987	-106.31480	45.21050	3860	HAMILTON DRAW	8/14/2002
07S	44E	24	ACAC	DEVELOPED STOCK SPRING (PL-35)	198977	-106.28670	45.21720	3840	HAMILTON DRAW	8/15/2002
07S	44E	28	BAAC	KNOBLOCK SPRING	204473	-106.35250	45.20730	3690	HAMILTON DRAW	6/6/2003
07S	44E	30	CABC	STOCKER SPRING	204472	-106.39220	45.20020	3790	STROUD CREEK	7/1/2003
07S	44E	33	BBCA	ET SPRING	204467	-106.35950	45.19200	3790	HAMILTON DRAW	6/6/2003
07S	45E	13	DCBD	OTTER CREEK SPRING	199227	-106.16570	45.22510	3390	OTTER	10/14/2002
07S	46E	10	ABBC	WILBAR SPRING	197211	-106.08450	45.25400	3470	GOODSPEED BUTTE	6/14/2002
07S	46E	14	AADA	UPPER TAYLOR CREEK SPRING	197212	-106.05500	45.23610	3575	GOODSPEED BUTTE	6/14/2002
07S	46E	31	BADD	ROSS SPRING	199163	-106.14860	45.19050	3470	OTTER	10/14/2002
07S	47E	32	BBCA	KEN HEINSCH	197213	-106.01290	45.19260	3655	REANUS CONE	6/14/2002
07S	47E	33	BBDD	INDIAN SPRINGS	197197	-105.98810	45.19110	3740	SAYLE	6/14/2002
07-1/2S	40E	32	CCDB	MONTAYLOR *LEAF ROCK SPRING	192995	-106.86560	45.17060	3760	TONGUE RIVER DAM	1/10/2002

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Spring Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle	Inventory Date
07-1/2S	40E	32	DBAA	MONTAYLOR *LEAF ROCK HOUSE	193000	-106.85450	45.17610	3775	TONGUE RIVER DAM	1/10/2002
07-1/2S	40E	32	DBDD	MONTAYLOR *LEAF ROCK HOUSE	193001	-106.85470	45.17350	3755	TONGUE RIVER DAM	1/10/2002
07-1/2S	40E	35	DCDC	THREE MILE SPRINGS	199231	-106.79560	45.16920	3770	TONGUE RIVER DAM	10/13/2002
08S	38E	12	DCBB	LOWER WATER GAP	198170	-106.99890	45.15620	4130	HALF MOON HILL	8/6/2002
08S	38E	13	ABAA	DAVIS SPRING	198205	-106.99600	45.15250	4205	HALF MOON HILL	8/6/2002
08S	38E	24	DCDD	SEKORA SPRING	204466	-106.99510	45.12580	4205	HALF MOON HILL	8/8/2002
08S	39E	4	CBBC	SNOOK SPRING	198208	-106.96850	45.15980	4015	HALF MOON HILL	8/8/2002
08S	39E	8	CCAC	BARTOT SPRING	198209	-106.98600	45.14210	4250	HALF MOON HILL	8/8/2002
08S	40E	1	CCCD	ASPEN SPRINGS	199232	-106.78650	45.15460	3700	TONGUE RIVER DAM	10/13/2002
08S	40E	11	BDAA	INDIAN SPRING	199233	-106.80080	45.15320	3740	TONGUE RIVER DAM	10/13/2002
08S	40E	15	CBAD	MONTAYLOR	193054	-106.82300	45.13120	3540	TONGUE RIVER DAM	1/11/2002
08S	41E	1	ADAA	HOGAN SPRING	197224	-106.64160	45.16520	3710	SPRING GULCH	6/19/2002
08S	41E	2	BDAA	SPRING GULCH SPRING	197223	-106.67810	45.16540	3680	SPRING GULCH	6/19/2002
08S	41E	10	DBBB	HORSESHOE SPRING	197386	-106.69260	45.14560	3715	SPRING GULCH	6/18/2002
08S	41E	12	CDCC	WEBSTER RANCH	197357	-106.65490	45.13810	3730	SPRING GULCH	6/18/2002
08S	41E	13	BCBA	FLOREY SPRING	197392	-106.66020	45.13510	3685	SPRING GULCH	6/18/2002
08S	41E	14	BBDD	UPPER ANDERSON CREEK SPRING	197391	-106.67810	45.13610	3665	SPRING GULCH	6/18/2002
08S	41E	15	ABCB	HILLSIDE SPRING	197387	-106.69130	45.13730	3650	SPRING GULCH	6/18/2002
08S	41E	15	ADBD	UPPER DUGOUT	197390	-106.68750	45.13480	3590	SPRING GULCH	6/18/2002
08S	41E	15	BDCA	MIDDLE DUGOUT	197389	-106.69710	45.13350	3565	SPRING GULCH	6/18/2002
08S	41E	16	BACA	LOWER DUGOUT	197388	-106.71870	45.13730	3470	SPRING GULCH	6/18/2002
08S	42E	1	BBBB	VERLEY SPRING	197355	-106.54110	45.17720	3715	LACEY GULCH	6/18/2002
08S	42E	2	BABD	NO. FORK WRENCH CREEK TRAP SPRING	197250	-106.55540	45.17560	3715	LACEY GULCH	6/19/2002
08S	42E	2	BADD	FENCELINE NO FORK WRENCH CRK TRAP	197252	-106.55270	45.17380	3725	LACEY GULCH	6/19/2002
08S	42E	2	CADD	SO. FORK WRENCH CRK TRAP SPRING	199236	-106.55310	45.16710	3710	LACEY GULCH	6/19/2002
08S	42E	3	AAAD	WRENCH CREEK TRAP SPRING	197248	-106.56340	45.17580	3740	LACEY GULCH	6/19/2002
08S	42E	5	DBDD	SCALES SPRING	197245	-106.61960	45.17540	3780	LACEY GULCH	6/19/2002
08S	42E	5	DDDB	SOUTH FORK HARRIS CREEK	197247	-106.60530	45.16420	3690	LACEY GULCH	6/19/2002
08S	42E	6	BCBB	RICHARD SPRING	197226	-106.64390	45.17370	3615	SPRING GULCH	6/19/2002
08S	42E	6	BCBC	SADDLE HORSE BUTTE SPRING	197225	-106.64380	45.17200	3630	SPRING GULCH	6/19/2002
08S	42E	8	AACC	MEFFORD SPRING	197246	-106.60920	45.15970	3730	LACEY GULCH	6/19/2002
08S	42E	10	ADAA	DALTON SPRING	199272	-106.56380	45.15900	3845	LACEY GULCH	5/13/2002
08S	42E	12	BABD	RANCH CREEK FIBERGLASS TANK	197354	-106.53540	45.16100	3690	LACEY GULCH	6/18/2002
08S	42E	16	DDDB	NORTH SPRING	198333	-106.58570	45.13470	3930	LACEY GULCH	9/24/2002
08S	42E	21	AAAB	HOME SPRING	198331	-106.58540	45.13320	3960	LACEY GULCH	9/24/2002
08S	42E	23	BCAD	ELDER HOUSE SPRING	199273	-106.55830	45.12860	3870	LACEY GULCH	5/13/2002

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Spring Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle	Inventory Date
08S	42E	30	ADBB	PIKES UPPER ANDERSON CREEK	197358	-106.62610	45.11550	3915	HOLMES RANCH	6/18/2002
08S	43E	1	BAAB	EAST SPRING	199276	-106.41050	45.17700	3710	STROUD CREEK	5/13/2002
08S	43E	6	BBCA	BILL BASIN SPRING	197330	-106.51920	45.17490	3732	LACEY GULCH	6/19/2002
08S	43E	6	CBBD	LOWER RANCH CREEK SPRING	197356	-106.51990	45.16890	3500	LACEY GULCH	6/18/2002
08S	43E	7	ADCB	RANCH CREEK FLAT	197352	-106.50410	45.15630	3650	LACEY GULCH	6/18/2002
08S	43E	7	ADCD	RANCH CREEK FLAT	197353	-106.50400	45.15580	3650	LACEY GULCH	6/18/2002
08S	43E	7	DCBA	RANCH CREEK FLAT	197362	-106.50920	45.15120	3670	LACEY GULCH	6/18/2002
08S	43E	7	DDDD	RANCH CREEK FLAT	197363	-106.50220	45.14880	3580	LACEY GULCH	6/18/2002
08S	43E	9	ABCC	FEEBACK SPRING	207250	-106.46890	45.16060	3600	STROUD CREEK	10/2/2003
08S	43E	15	CCAC	SPRING IN HORSE PASTURE	199238	-106.45580	45.13630	3615	STROUD CREEK	5/13/2002
08S	43E	16	CDBD	OW RANCH * MAIN BUILDINGS	199237	-106.47300	45.13580	3605	STROUD CREEK	5/13/2002
08S	43E	18	DDCB	PK CREEK	197361	-106.50570	45.13670	3540	LACEY GULCH	6/18/2002
08S	43E	20	BCCD	HUGHES SPRING	197360	-106.49800	45.12680	3585	STROUD CREEK	6/18/2002
08S	44E	2	ABDC	TANNER SPRING	204468	-106.30090	45.17180	3755	HAMILTON DRAW	7/1/2003
08S	44E	12	ACAB	DAVIDSON DRAW SPRING	204469	-106.26960	45.15590	3740	HAMILTON DRAW	7/1/2003
08S	44E	25	DBDB	ALLEN LLOYD	8179	-106.27060	45.10710	3925	QUIETUS	11/28/2001
08S	44E	28	CDBD	CANYON SPRINGS	199275	-106.33660	45.10360	3850	QUIETUS	5/13/2002
08S	44E	30	DADC	UPPER HORSE CREEK	199239	-106.36770	45.10550	3855	QUIETUS	5/13/2002
08S	45E	1	BBAD	MIDDLE PASTURE	199226	-106.15600	45.17340	3670	OTTER	10/14/2002
08S	45E	13	DAAA	DECKER SPRING	207255	-106.14200	45.13780	3700	OTTER	10/1/2003
08S	45E	13	DAAB	KB-25	198993	-106.14260	45.13770	3700	OTTER	7/10/2002
08S	45E	24	DBCB	NICHOLS SPRING	199228	-106.15120	45.12100	3830	BEAR CREEK SCHOOL	10/14/2002
08S	45E	30	BCDD	LLOYD ALLEN	191630	-106.25900	45.10930	3955	QUIETUS	11/28/2001
08S	46E	11	BDCB	SAWMILL SPRING	197210	-106.05280	45.15350	3890	REANUS CONE	6/14/2002
08S	46E	12	BBAC	WINDMILL SPRING	197201	-106.03600	45.15870	3840	REANUS CONE	6/14/2002
08S	46E	12	BBAD	ROCK SPRING	197200	-106.03440	45.15840	3830	REANUS CONE	6/14/2002
08S	46E	13	AADB	RATTLESNAKE SPRING	197207	-106.02030	45.14280	3840	REANUS CONE	6/14/2002
08S	46E	13	BAAD	YANKEE SPRING	197208	-106.03030	45.14380	3895	REANUS CONE	6/14/2002
08S	46E	15	CBDB	KB-38	198994	-106.07790	45.13540	3710	SAYLE HALL	7/10/2002
08S	46E	15	CDBA	IVA KAY MARTINI	204486	-106.07370	45.13380	3720	REANUS CONE	6/19/2003
08S	46E	19	ADAB	KB-5	197431	-106.12330	45.12540	3640	SAYLE HALL	7/9/2002
08S	46E	22	ABDB	IVA KAY MARTINI	204485	-106.06710	45.12810	3710	REANUS CONE	6/19/2003
08S	46E	23	ACBD	BILLOP SPRING	197209	-106.04790	45.12620	3855	REANUS CONE	6/14/2002
08S	46E	23	BCCC	IVA KAY MARTINI	204484	-106.05920	45.12380	3785	SAYLE HALL	6/19/2003
08S	46E	23	CBBB	IVA KEY MARTINI	204483	-106.05890	45.12260	3780	SAYLE HALL	6/19/2003
08S	46E	23	CCAA	CRESTED PASTURE SPRING	204482	-106.05570	45.11890	3810	SAYLE HALL	6/19/2003
08S	46E	23	CDCC	IVA KAY MARTINI	204481	-106.05420	45.11700	3830	SAYLE HALL	6/19/2003

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Spring Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle	Inventory Date
08S	46E	26	ACBB	NEW PASTURE SPRING	204480	-106.04860	45.11190	3820	SAYLE HALL	6/19/2003
08S	46E	29	BBBA	OTTER CREEK TERRACE (KB-4)	209576	-106.11820	45.11550	3680	SAYLE HALL	7/9/2002
08S	46E	30	CCCB	BILLUP CREEK DEVELOPED SPRING (KB-17)	198992	-106.14130	45.10340	3770	BEAR CREEK SCHOOL	7/10/2002
08S	46E	34	DBCA	KEITH BALES KB-27	197442	-106.06980	45.09200	3815	SAYLE HALL	7/10/2002
08S	47E	3	DBBD	I/A KAY MARTINI	204487	-105.95730	45.17320	3950	SAYLE	6/19/2003
08S	47E	4	AAAB	I/A KAY MARTINI	204488	-105.96170	45.17480	3940	SAYLE	6/19/2003
08S	47E	5	DAAC	NORTHEAST SPRING	197198	-105.98010	45.16600	3860	SAYLE	6/14/2002
08S	47E	6	BCCC	LOWER INDIAN CREEK	197199	-106.01670	45.16970	3690	REANUS CONE	6/14/2002
08S	47E	7	AABC	INDIAN CREEK	197205	-106.01090	45.15830	3740	REANUS CONE	6/14/2002
08S	47E	7	BABD	HEINSCH KEN	197204	-106.01130	45.15920	3730	REANUS CONE	6/14/2002
08S	47E	7	BCBA	TURTLE SPRING	197206	-106.01740	45.15580	3790	REANUS CONE	6/14/2002
08S	47E	8	DBCC	FTY SPRING	197203	-105.98760	45.14960	3810	SAYLE	6/14/2002
08S	47E	16	ACAC	STATE SPRING	197202	-105.96560	45.14020	3910	SAYLE	6/14/2002
09S	39E	16	AAAD	CX RANCH	197196	-106.95010	45.05180	3800	PEARL SCHOOL	6/25/2002
09S	41E	34	CBAB	44 MAGNUM	207253	-106.70170	45.00120	4040	HOLMES RANCH	10/2/2003
09S	42E	20	BBDC	LOWER HOME SPRING	198329	-106.62000	45.04350	3838	PINE BUTTE SCHOOL	9/24/2002
09S	42E	20	BDAD	HOME SPRING	198326	-106.61400	45.04230	3810	PINE BUTTE SCHOOL	9/24/2002
09S	43E	25	BABA	LOWER DEEP CREEK	198335	-106.41110	45.03200	3670	FORKS RANCH	10/1/2002
09S	44E	1	DCAC	BRONC PASTURE SPRING	199274	-106.27000	45.07460	3925	QUIETUS	5/13/2002
09S	44E	11	ABCB	LLOYD ALLEN	191629	-106.29220	45.07070	3790	QUIETUS	11/28/2001
09S	44E	28	CDBD	76 CREEK HOUSE	198337	-106.33770	45.01710	3730	QUIETUS	10/1/2002
09S	44E	30	CDCB	DEEP CREEK SPRING	198334	-106.39250	45.01620	3795	FORKS RANCH	10/1/2002
09S	44E	32	ABBB	WOODS DRAW * LOWER	198397	-106.35320	45.01420	3750	QUIETUS	10/1/2002
09S	44E	32	BDBB	WOODS DRAW * UPPER	198398	-106.35900	45.01070	3800	QUIETUS	10/1/2002
09S	44E	33	CCCD	UPPER 76 CREEK	198395	-106.34290	44.99970	3879	BOX ELDER DRAW	10/1/2002
09S	44E	33	DCDC	LOWER 76 CREEK	198340	-106.32850	45.00050	3760	QUIETUS	10/1/2002
09S	45E	20	DBAB	LLOYD ALLEN	191635	-106.22970	45.03590	4060	BEAR CREEK SCHOOL	12/11/2001
09S	45E	30	DBDD	LLOYD ALLEN	191636	-106.24780	45.01920	3880	BEAR CREEK SCHOOL	12/11/2001
09S	45E	35	DCCC	KB-12	198990	-106.16870	44.99760	4100	CABIN CREEK NW	7/9/2002
09S	46E	23	AADB	BLISS RANCH * WINTER PASTURE SPRING	197449	-106.05360	45.04100	4040	SAYLE HALL	6/13/2002
09S	47E	19	CADD	BLISS RANCH - SOUTH PASTURE SPRING	197093	-106.00950	45.03360	3860	SAYLE HALL	6/13/2002
09S	47E	28	AAAD	BLISS RANCH - LINE CREEK SPRING	197091	-105.96330	45.01860	3600	BRADSHAW CREEK	6/13/2002

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Spring Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle	Inventory Date
09S	47E	28	DBCB	BLISS RANCH - LINE CREEK SPRING	197092	-105.96790	45.01960	3660	BRADSHAW CREEK	6/13/2002

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Measured Discharge (gpm)	Discharge Notes	Discharge Method	Field pH	Water Temperature (Degrees C)	Specific Conductance (umhos/cm ₂ 25C)	Nearest Overlying Coalbed Association	Recharge Origin
199552	2.3		VOLUMETRIC	7.03	13.3	2654	NOBLOCH	LOCAL
198898		DRY						
198897	0.3		VOLUMETRIC		19.2	2200	CD	LOCAL
199104	0.9		VOLUMETRIC		9.9	2285	SAWYER-CLINKER	LOCAL
199107	0.3		VOLUMETRIC		7	2806	X	REGIONAL
199101	0.9		VOLUMETRIC		9.8	2980	X	LOCAL
198491	2.7		VOLUMETRIC	6.96	10.2	1042	FERRY	LOCAL
198492	0.6		VOLUMETRIC	6.93	11.5	1230	FERRY	LOCAL
198493	3.5		VOLUMETRIC	6.75	11.8	1035	E	LOCAL
198490	3.1		VOLUMETRIC	6.96	10.9	1420	E COAL - PART OF SAWYER	LOCAL
198494	0.3		VOLUMETRIC	6.76	12.3	3139	FERRY	LOCAL
199109	0.3		VOLUMETRIC			3224	FERRY	LOCAL
199108	0.5		VOLUMETRIC		7.4	1434	WALL	REGIONAL
199102	3.1		VOLUMETRIC		9.6	3191	C	LOCAL
199133	4.1		VOLUMETRIC		9.4	566	NOBLOCH	LOCAL
207254	0.76	STOCK TANK INLET	VOLUMETRIC	6.77	13.5	5620	SAWYER	LOCAL
204479	7.5		VOLUMETRIC	7.8	11.3	2434	SAWYER	LOCAL
197230		NO FLOW					NOBLOCH	REGIONAL
197221	0.5		VOLUMETRIC	7.14	11.3	1562	PAWNEE	REGIONAL
197255	0.09		VOLUMETRIC	6.9	16.3	571	ROLAND	LOCAL
197249	0.3		VOLUMETRIC	6.9	19.6	538	ROLAND	LOCAL
199538		NO FLOW					ANDERSON	LOCAL
197251	0.5		VOLUMETRIC	6.9	13	728	ANDERSON	
204401		NO FLOW					WALL	LOCAL
207247		NO FLOW - DRIP					WALL	LOCAL
207246	0.2	MOUTH OF SPRING	VOLUMETRIC	7.08	15.7	477	ANDERSON	LOCAL
207248	0.5	STOCK TANK INLET	VOLUMETRIC	6.7	12.2	392	DIETZ	LOCAL
199156	82		VOLUMETRIC		12.5	1735	NOBLOCH	REGIONAL
207249	0.14	TANK INLET	VOLUMETRIC	6.62	13.2	1440	CANYON	LOCAL

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Measured Discharge (gpm)	Discharge Notes	Discharge Method	Field pH	Water Temperature (Degrees C)	Specific Conductance (umhos/cm ₂ 25C)	Nearest Overlying Coalbed Association	Recharge Origin
199139	0.3		VOLUMETRIC		5.9	2863	WALL	REGIONAL
199138	0.3		VOLUMETRIC		7.1	2905	ELK	LOCAL
197220	0.5		VOLUMETRIC	6.92	12.1	2786	CANYON	LOCAL
197219	0.575		VOLUMETRIC	7.01	13.5	1841	COOK	LOCAL
207256	0.22		VOLUMETRIC	6.66	15.7	2504	COOK	LOCAL
199121	0.7		VOLUMETRIC		7	2108	COOK	LOCAL
204478	0.05		VOLUMETRIC		14.9	2119	CANYON	LOCAL
199162	1.8		VOLUMETRIC		13.6	2865	CANYON	LOCAL
197317	1.4		VOLUMETRIC	7.26	14	1360	CANYON	REGIONAL
197318		NO FLOW					CANYON	REGIONAL
197319		NO FLOW					DIETZ	LOCAL
197321	2.1		VOLUMETRIC	7.26	11.4	1292	DIETZ	LOCAL
197320	0.125		VOLUMETRIC	7.12	17.3	1424	DIETZ	LOCAL
197323		DRY					DIETZ	LOCAL
204021		NO FLOW					CANYON	REGIONAL
204015	6.9		VOLUMETRIC	7.62	14.9	1739	CANYON	REGIONAL
204018		NO FLOW					DIETZ	LOCAL
199541		NO FLOW					DIETZ	LOCAL
199540	3		VOLUMETRIC	7.01	17.4	918	DIETZ	LOCAL
199539	0.1		VOLUMETRIC	6.85	18.5	1123	ANDERSON	LOCAL
199537		NO FLOW					WASATCH FORMATION	LOCAL
199287		DRY					ROLAND	LOCAL
199286		NO FLOW					ANDERSON	LOCAL
199285	2		VOLUMETRIC	7.37	20.5	975	DIETZ	LOCAL
197325	2.1		VOLUMETRIC	7.08	14.5	1092	DIETZ	LOCAL
199284	1.1		VOLUMETRIC	7.29	18.7	1170	DIETZ	LOCAL
199542	1.2		VOLUMETRIC	7	20	690	DIETZ	LOCAL
199283	0.5		VOLUMETRIC	7.23	17.7	1200	DIETZ	LOCAL
199277	0.1		VOLUMETRIC	7.66	18.9	3258	CANYON	LOCAL
199543		NO FLOW					CANYON	LOCAL
199546	0.8		VOLUMETRIC	6.9	17	1552	CANYON	LOCAL
199544		NO FLOW					CANYON	LOCAL
197326	0.3		VOLUMETRIC	6.96	15.3	1973	ROLAND	LOCAL
199281	0.3		VOLUMETRIC	7.65	11.2	1808	CANYON	LOCAL
199282	2.3		VOLUMETRIC	7.86	23	1321	CANYON	LOCAL
199280	0.7		VOLUMETRIC	7.77	12.2	1882	CANYON	LOCAL
199279		NO FLOW					CANYON	LOCAL

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Measured Discharge (gpm)	Discharge Notes	Discharge Method	Field pH	Water Temperature (Degrees C)	Specific Conductance (umhos/cm ₂ 25C)	Nearest Overlying Coalbed Association	Recharge Origin
199278		NO FLOW					CANYON	LOCAL
197327	0.16		VOLUMETRIC	7.2	15.9	666	DIETZ	LOCAL
197324	1		VOLUMETRIC	7.2	14.2	1210	DIETZ	LOCAL
197312	2		VOLUMETRIC	6.79	11.3	1827	DIETZ	LOCAL
197329	1.7		VOLUMETRIC	6.8	11.7	1955	DIETZ	LOCAL
197328	0.04		VOLUMETRIC	7.16	17.9	1034	DIETZ	LOCAL
207241		DRY. DAMP SPOTS						
204402	0.3		VOLUMETRIC	7.82	16.2	2665	WALL	REGIONAL
207243								LOCAL
207245		NO FLOW					CANYON	LOCAL
207242	0.05	TANK INLET	VOLUMETRIC	7.26	11.8	3534	CANYON	LOCAL
204465		NO FLOW					WALL	LOCAL
198324	0.1		VOLUMETRIC	8.81	18.1	3352	BREWSTER-ARNOLD	REGIONAL
198275	9		VOLUMETRIC	8.4	16	1668	BREWSTER-ARNOLD	REGIONAL
197082		NO MEASURABLE FLOW. STOCK TANK FULL.					WALL	REGIONAL
197081		NO MEASURABLE FLOW. STOCK TANK FULL.					CANYON	LOCAL
197080		NO FLOW					CANYON	LOCAL
197084	0.4		VOLUMETRIC		8.4	635	CANYON	LOCAL
197083		NO FLOW					CANYON	LOCAL
197076	0.6		VOLUMETRIC		8.6	455	ANDERSON	LOCAL
197077	1.8		VOLUMETRIC		11	745	ANDERSON	LOCAL
197078		NO FLOW					CANYON	LOCAL
197079		NO FLOW					CANYON	LOCAL
199112	0.5		VOLUMETRIC		7.3	2204	CANYON	LOCAL
199115	0.2		VOLUMETRIC		9	1850	CANYON	LOCAL
199116	0.3		VOLUMETRIC		6.1	3018	CANYON	LOCAL
199119	0.8		VOLUMETRIC		10.8	1835	CANYON	LOCAL
198248	0.3		VOLUMETRIC	7.52	15	1090	ROLAND	LOCAL
198247	0.2		VOLUMETRIC	6.72	13.4	1194	ROLAND	LOCAL
198212		NO FLOW					DIETZ	LOCAL
198244		NO FLOW					DIETZ	LOCAL
198211		NO FLOW					DIETZ	LOCAL
198245		NO FLOW					DIETZ	LOCAL
198246		NO FLOW					DIETZ	LOCAL

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Measured Discharge (gpm)	Discharge Notes	Discharge Method	Field pH	Water Temperature (Degrees C)	Specific Conductance (umhos/cm ₂ 25C)	Nearest Overlying Coalbed Association	Recharge Origin
192988	1.2		VOLUMETRIC		5.2	557	DIETZ	LOCAL
192998	1.9		VOLUMETRIC		4.5	879	ANDERSON	LOCAL
192999	32.3		VOLUMETRIC		9.9	794	ANDERSON	LOCAL
192993	2.3		VOLUMETRIC		7.6	504	DIETZ	LOCAL
210421	12.5		VOLUMETRIC	7.93	13.4	991	DIETZ	LOCAL
204474	3.6		VOLUMETRIC		11	2331	WALL	LOCAL
207233		NO FLOW					CANYON	LOCAL
204475		NO FLOW					WALL	LOCAL
204476	0.3		VOLUMETRIC		16.8	2590	WALL	LOCAL
197253	30		PUMPED	6.8	11.9	1671	WALL	LOCAL
197243	0.4		VOLUMETRIC	7.1	16.2	5128	WALL	LOCAL
197075	0.3		VOLUMETRIC		16.1	447.8	ANDERSON	LOCAL
204489		NO FLOW					ANDERSON	LOCAL
204490	0.1		VOLUMETRIC	7.6	17.5	904	ANDERSON	LOCAL
197089	0.6		VOLUMETRIC		8.1	566	ANDERSON	LOCAL
197088	0.7		VOLUMETRIC		8.3	905	ANDERSON	LOCAL
197087		NO FLOW					ANDERSON	LOCAL
204013	1.7		VOLUMETRIC	7.8	15.8	4614	CANYON	LOCAL
204403	0.3		VOLUMETRIC	7.42	15.1	788	ANDERSON	LOCAL
197368		NO FLOW					ANDERSON	LOCAL
197369	0.3		VOLUMETRIC	7.07	11.5	862	ANDERSON	LOCAL
197366		NO FLOW					CANYON	LOCAL
197367		NO FLOW					CANYON	LOCAL
197349		NO FLOW					DIETZ	LOCAL
197350		NO FLOW					DIETZ	LOCAL
197370		DRY					ANDERSON	LOCAL
204459	2		VOLUMETRIC	8.1	15.7	3350	CANYON	LOCAL
197380	0.06		VOLUMETRIC	7.3	16.5	4119	CANYON	LOCAL
204477		NO FLOW					CANYON	LOCAL
197379	0.2		ESTIMATED	8	22.7	4648	DIETZ	LOCAL
197373		NO FLOW					ANDERSON	LOCAL
197371		NO FLOW					DIETZ	LOCAL
197372		DRY					ANDERSON	LOCAL
197342		NO FLOW					DIETZ	LOCAL
197341		NO FLOW					DIETZ	LOCAL
197340		NO FLOW					DIETZ	LOCAL
197374	1.1		VOLUMETRIC	8.06	13.4	1234	ANDERSON	LOCAL
197377		NO FLOW					ANDERSON	LOCAL

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Measured Discharge (gpm)	Discharge Notes	Discharge Method	Field pH	Water Temperature (Degrees C)	Specific Conductance (umhos/cm ₂ 25C)	Nearest Overlying Coalbed Association	Recharge Origin
197376		NO FLOW					ANDERSON	LOCAL
197378		NO FLOW					ANDERSON	LOCAL
197375	1		VOLUMETRIC	7.06	11.1	3148	ANDERSON	LOCAL
207252		NO FLOW					ANDERSON	LOCAL
197227		NO FLOW					DIETZ	LOCAL
197244	0.5		VOLUMETRIC	7.52	13.3	3790	DIETZ	LOCAL
197228				8.04	16.8	123	DIETZ	LOCAL
197229				7.14	11.4	1836	DIETZ	LOCAL
197381	0.2		ESTIMATED	7.39	13.6	704	ANDERSON	LOCAL
197384		NO FLOW					DIETZ	LOCAL
197383		NO FLOW					DIETZ	LOCAL
197382	2		VOLUMETRIC	7.37	12.9	3844	DIETZ	LOCAL
197385	0.6		VOLUMETRIC	6.92	12.7	3956	ANDERSON	LOCAL
197339	1		VOLUMETRIC	7.25	14.1	1050	ANDERSON	LOCAL
197365	0.1		VOLUMETRIC	7.11	15.1	4526	CANYON	LOCAL
197351		NO FLOW					CANYON	LOCAL
204471	0.9		VOLUMETRIC		13.1	1392	DIETZ	LOCAL
204470	3.1		VOLUMETRIC		13.4	850	ANDERSON	LOCAL
197337		NO FLOW					ANDERSON	LOCAL
199271	0.3		VOLUMETRIC		8.6	636	ANDERSON	LOCAL
199240	0.3		VOLUMETRIC		8.6		DIETZ	LOCAL
198976	0.8		VOLUMETRIC			826	ANDERSON	LOCAL
198249		NO FLOW					CANYON	LOCAL
198987	0.5		VOLUMETRIC			1563	ANDERSON	LOCAL
198977							DIETZ	LOCAL
204473	3		VOLUMETRIC	7.81	8.9	2836	DIETZ	LOCAL
204472	1.1		VOLUMETRIC		14.2	1288	ANDERSON	LOCAL
204467	4.2		VOLUMETRIC	8.19	9.2	1586	ANDERSON	LOCAL
199227	20		VOLUMETRIC		11.4	3545	CANYON	REGIONAL
197211		NO FLOW					COOK	LOCAL
197212		NO FLOW					COOK	LOCAL
199163	0.5		VOLUMETRIC		9.7	2624	CANYON	REGIONAL
197213	0.45		VOLUMETRIC	6.74	12.2	2747	CANYON	LOCAL
197197	2		VOLUMETRIC	7.08	9.6	2974	CANYON	LOCAL
192995	3.8		VOLUMETRIC		8.5	782	DIETZ	LOCAL

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Measured Discharge (gpm)	Discharge Notes	Discharge Method	Field pH	Water Temperature (Degrees C)	Specific Conductance (umhos/cm ₂ 25C)	Nearest Overlying Coalbed Association	Recharge Origin
193000	1.5		VOLUMETRIC		9	454	ANDERSON	LOCAL
193001	3.2		VOLUMETRIC		5.3	714	ANDERSON	LOCAL
199231	5.6		VOLUMETRIC		10.3	454	ANDERSON	LOCAL
198170		NO FLOW					ROLAND	LOCAL
198205	0.5		VOLUMETRIC	7.89	18.9	1185	ROLAND	LOCAL
204466		NO FLOW					ROLAND	LOCAL
198208	0.2		VOLUMETRIC		14.6	1533	ANDERSON	LOCAL
198209	0.3		VOLUMETRIC		17.1	2549		LOCAL
199232		NO FLOW					DIETZ	LOCAL
199233	0.12		VOLUMETRIC		11.3	683	DIETZ	LOCAL
193054	2.1		VOLUMETRIC		7	557	DIETZ	LOCAL
197224	0.8		VOLUMETRIC	7.59	15.8	8640	ANDERSON	REGIONAL
197223	0.13		VOLUMETRIC	7.42	16.7	2289	ANDERSON	LOCAL
197386	0.3		VOLUMETRIC	7.1	12.8	1413	ANDERSON	LOCAL
197357	0.3		VOLUMETRIC	6.94	16.6	4663	ROLAND	LOCAL
197392		NO FLOW					ANDERSON	REGIONAL
197391	0.3		VOLUMETRIC	6.63		5360	ANDERSON	REGIONAL
197387	0.3		VOLUMETRIC	6.95	14.9	1890	ANDERSON	REGIONAL
197390		DRY					ANDERSON	REGIONAL
197389		DRY					ANDERSON	REGIONAL
197388		DRY					DIETZ	REGIONAL
197355	8.5		VOLUMETRIC	7.21	10.4	587	ANDERSON	LOCAL
197250		NO FLOW					ANDERSON	LOCAL
197252		DRY					ANDERSON	LOCAL
199236		NO FLOW					ANDERSON	LOCAL
197248	0.35		VOLUMETRIC	7.4	15.2	7250	ANDERSON	LOCAL
197245	0.5		VOLUMETRIC	7.4	13.9	3149	ANDERSON	LOCAL
197247	0.6		VOLUMETRIC	6.98	12.9	3940	ANDERSON	REGIONAL
197226	0.38		VOLUMETRIC	7.19	14.3	6930	DIETZ	REGIONAL
197225		NO FLOW					DIETZ	REGIONAL
197246		NO FLOW					ANDERSON	REGIONAL
199272	0.3		VOLUMETRIC		9.4	1739	ROLAND	LOCAL
197354	2.38		VOLUMETRIC	7.69	11.9	868	ANDERSON	REGIONAL
198333		NO FLOW					WASATCH FORMATION	LOCAL
198331		SPRING HAS NO DIRECT OUTFLOW.					WASATCH FORMATION	LOCAL
199273	0.2		VOLUMETRIC		9.2	2662	WASATCH FORMATION	LOCAL

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Measured Discharge (gpm)	Discharge Notes	Discharge Method	Field pH	Water Temperature (Degrees C)	Specific Conductance		Nearest Overlying Coalbed Association	Recharge Origin
						(umhos/cm ₂)	25C)		
197358	0.3		VOLUMETRIC	7.01	14.7	4278	ROLAND		LOCAL
199276	0.9		VOLUMETRIC		7.9	1307	DIETZ		LOCAL
197330		NO FLOW					ANDERSON		LOCAL
197356	0.38		VOLUMETRIC	7.21	8.6	2192	DIETZ		LOCAL
197352		NO FLOW					ANDERSON		LOCAL
197353		NO FLOW					DIETZ		LOCAL
197362	0.38		VOLUMETRIC	7.33	18.2	445	ANDERSON		LOCAL
197363	0.13		VOLUMETRIC	7.58	20.7	1027	DIETZ		LOCAL
207250		NO FLOW					DIETZ		LOCAL
199238	0.8		VOLUMETRIC		17.3	894	ANDERSON		LOCAL
199237	0.9		VOLUMETRIC		8.1	278.4	DIETZ		LOCAL
197361		NO FLOW					DIETZ		LOCAL
197360	0.5		VOLUMETRIC	7.29	12.1	581	DIETZ		LOCAL
204468	1.2		VOLUMETRIC	7.96	12.4	1960	ANDERSON		REGIONAL
204469	3.8		VOLUMETRIC	7.27	11.7	3341	ANDERSON		REGIONAL
8179	1.25		VOLUMETRIC	6.95	10.1	2980	WASATCH FORMATION		LOCAL
199275	0.1		VOLUMETRIC		9.7	5140	ROLAND		LOCAL
199239	0.2		VOLUMETRIC		10.7	1739	WASATCH FORMATION		LOCAL
199226	0.2		VOLUMETRIC		11.2	2760	CANYON		LOCAL
207255	0.01		VOLUMETRIC	6.67		3886	DIETZ		REGIONAL
198993	0.57		VOLUMETRIC		19.4	3858	DIETZ		REGIONAL
199228	0.3		VOLUMETRIC		10.3	4725	ANDERSON		LOCAL
191630	0.9		VOLUMETRIC	7.5	7.3	4811	ROLAND		LOCAL
197210	0.2		VOLUMETRIC	7.01	9.3	1356	DIETZ		REGIONAL
197201		NO FLOW					DIETZ		REGIONAL
197200		NO FLOW					DIETZ		REGIONAL
197207		NO FLOW					DIETZ		REGIONAL
197208	0.13		VOLUMETRIC	6.95	12.9	308	ANDERSON		LOCAL
198994					19.3	3570	CANYON		LOCAL
204486		NO FLOW					CANYON		LOCAL
197431	0.6		VOLUMETRIC		9.9	3082	CANYON		LOCAL
204485		NO FLOW					CANYON		REGIONAL
197209		NO FLOW					ANDERSON		LOCAL
204484		NO FLOW					CANYON		REGIONAL
204483		NO FLOW					CANYON		REGIONAL
204482		NO FLOW					DIETZ		REGIONAL
204481		NO FLOW					DIETZ		REGIONAL

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Measured Discharge (gpm)	Discharge Notes	Discharge Method	Field pH	Water Temperature (Degrees C)	Specific Conductance (umhos/cm ₂ 25C)	Nearest Overlying Coalbed Association	Recharge Origin
204480		NO FLOW					DIETZ	REGIONAL
209576	0.25		ESTIMATED		13.7		CANYON	REGIONAL
198992	0.54		VOLUMETRIC		23.2	2970	DIETZ	REGIONAL
197442							DIETZ	REGIONAL
204487		NO FLOW					ANDERSON	LOCAL
204488		NO FLOW					ANDERSON	LOCAL
197198		NO FLOW					CANYON	LOCAL
197199				8.93	30.5	3040	CANYON	LOCAL
197205		NO FLOW					CANYON	REGIONAL
197204	0.6		VOLUMETRIC	7.14	11.8	3096	CANYON	REGIONAL
197206		NO FLOW					CANYON	REGIONAL
197203		NO FLOW					CANYON	REGIONAL
197202		NO FLOW					ANDERSON	LOCAL
197196		NO FLOW					ANDERSON	LOCAL
207253		NO FLOW					WASATCH FORMATION	LOCAL
198329		NO FLOW					WASATCH FORMATION	LOCAL
198326	0.3		VOLUMETRIC	7.12	12.2	3219	WASATCH FORMATION	LOCAL
198335		NO FLOW					ROLAND	LOCAL
199274	0.2		VOLUMETRIC		8.9	4948	WASATCH FORMATION	LOCAL
191629	1		VOLUMETRIC	7.33	6.8	5114	ROLAND	LOCAL
198337	0.6		VOLUMETRIC		12.1	2426	ROLAND	LOCAL
198334		NO FLOW					WASATCH FORMATION	LOCAL
198397	3.8		VOLUMETRIC		13	1306	ANDERSON	REGIONAL
198398	0.8		VOLUMETRIC			842	WASATCH FORMATION	LOCAL
198395	0.1		VOLUMETRIC		11.1	5240	WASATCH FORMATION	LOCAL
198340	1.3		VOLUMETRIC			1190	ROLAND	LOCAL
191635		NO FLOW					WASATCH FORMATION	LOCAL
191636	0.9	100 FEET FROM SPRING BOX	VOLUMETRIC	7.74	4.7	4779	ROLAND	LOCAL
198990		INFLOW IS BELOW SURFACE			19	1670	WASATCH FORMATION	LOCAL
197449		NO FLOW					ROLAND	LOCAL
197093	0.06		VOLUMETRIC	6.72	13.7	5180	ANDERSON	REGIONAL
197091		NO FLOW					ANDERSON	LOCAL

Appendix B. Spring inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Measured Discharge (gpm)	Discharge Notes	Discharge Method	Field pH	Water Temperature (Degrees C)	Specific Conductance (umhos/cm ₂ 25C)	Nearest Overlying Coalbed Association	Recharge Origin
197092		NO FLOW					DIETZ	REGIONAL

Appendix C. Well inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Well Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle
01S	44E	33	ACAB	TONGUE RIVER FARMS	199547	-106.30090	45.71150	2845	ASHLAND NE
01S	44E	34	CABC	TONGUE RIVER FARMS	199548	-106.28810	45.70670	2840	ASHLAND NE
01S	46E	1	D	WILTSE GARY L.*WELL#3 (MW1)	94658	-106.00190	45.77840	3380	NORTH STACEY SCHOOL
01S	46E	3	CCCA	MW-2	198900	-106.04350	45.77230	3500	HAYES POINT
02S	44E	3	CAAD	TONGUE RIVER FARMS (BROWN ROOF)	199550	-106.28470	45.69240	2855	ASHLAND NE
02S	44E	4	ADAC	JOES ARTESIAN	199551	-106.29610	45.69610	2865	ASHLAND NE
02S	44E	4	DBDC	TONGUE RIVER FARMS	199549	-106.30180	45.69040	2885	ASHLAND NE
03S	44E	33	BDAB	BRUCE HALEY FLOWING WELL	199127	-106.30760	45.53570	2975	ASHLAND
04S	44E	5	AAAB	BRUCE HALEY HOME WELL	199130	-106.31800	45.52380	2970	ASHLAND
04S	45E	4	BDDB	USGS RESEARCH WELL WO-15	7573	-106.18550	45.51860	3022	WILLOW CROSSING
04S	45E	4	BDDB	WO-14	210094	-106.18490	45.51830	3010	WILLOW CROSSING
04S	45E	4	CAAC	USGS OBS WELL WO-16	7574	-106.18610	45.51580	3040	WILLOW CROSSING
04S	45E	26	CABD	ROSS DENSON	197214	-106.14520	45.45980	3255	KING MOUNTAIN
05S	42E	22	DADD	COOK CREEK WELL	198318	-106.52370	45.38470	3185	CLUBFOOT CREEK
05S	42E	25	CCAB	PATS HOUSE WELL	198317	-106.49940	45.36970	3105	BROWNS MOUNTAIN
05S	42E	27	ACDD	COOK CREEK	199150	-106.53220	45.37660	3280	CLUBFOOT CREEK
05S	42E	34	ABCB	COAL BANK CREEK WELL	198319	-106.53340	45.36380	3190	BIRNEY
05S	45E	4	ABCC	MBMG MONITORING WELL * 77-26 O-22	7755	-106.18390	45.43520	3284	KING MOUNTAIN
05S	45E	26	CBCD	JUNE PERSONS	199145	-106.15170	45.37060	3210	FORT HOWES
05S	48E	6	DCB	RILEY LEROY	144966	-105.83870	45.42080	3840	SONNETTE
05S	48E	8	BCCD	SONNETTE JAIL	199142	-105.83340	45.41360	3804	SONNETTE
06S	39E	25	B	JORDAN RANCHES LTD.	197322	-106.91700	45.29780	4350	KIRBY
06S	41E	33	BBBD	USGS OBS WELL *37-W (BM 1- EAS WELL)	191175	-106.72470	45.27750	3715	BIRNEY SW
06S	41E	33	BBBD	USGS OBS WELL *38-SS (BM 1-WEST WELL)	191176	-106.72470	45.27750	3715	BIRNEY SW
06S	42E	1	AACB	EAST SIDE ARTESIAN WELL	198323	-106.52070	45.34970	3115	BIRNEY
06S	42E	12	ABAC	3 CIRCLE HOUSE WELL	198320	-106.52590	45.33610	3130	BIRNEY
06S	43E	6	CBCA	EAST SIDE PIPELINE WELL	198322	-106.51610	45.34220	3135	BIRNEY
06S	43E	6	CCDD	OLD OIL WELL	199154	-106.51580	45.33760	3170	BIRNEY
06S	43E	6	DDBD	ART HAYES	199151	-106.50240	45.33850	3250	BIRNEY

Appendix C. Well inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Well Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle
06S	43E	7	BABB	BROWN CATTLE COMPANY	198321	-106.51460	45.32720	3130	BIRNEY
06S	43E	17	DCAB	HACKLEY CREEK WELL	197086	-106.48740	45.31060	3320	BROWNS MOUNTAIN
06S	43E	20	CDA	BONES BROTHERS ARTESIAN WELL	197085	-106.49140	45.29610	3195	BROWNS MOUNTAIN
07S	39E	11	DDBA	BIG BEND RANCH * INC.	198210	-106.91450	45.24370	4500	HALF MOON HILL
07S	40E	32	DBDA	MONTAYLOR *LEAF ROCK HOUSE	192997	-106.85510	45.17460	3780	TONGUE RIVER DAM
07S	42E	20	CAAA	DEADMAN CREEK	197364	-106.61520	45.21310	3520	LACEY GULCH
07S	43E	19	ADBA	VAN METER WELL	197222	-106.50300	45.21530	3345	LACEY GULCH
07S	44E	14	ABD	PIPELINE WELL 7(PL-1W)	144969	-106.30740	45.23540	3850	HAMILTON DRAW
08S	37E	1	ACCC	CARTER MIKLOVICH	197308	-107.12140	45.16680	4805	BAR V RANCH NE
08S	38E	12	DBCD	SCHOOL HOUSE WELL	198207	-106.99780	45.15670	4125	HALF MOON HILL
08S	40E	1	BBCD	FOREST DUNNING	199234	-106.78550	45.16540	3780	TONGUE RIVER DAM
08S	40E	10	ACAA	LEAF ROCK SPRINGS	199235	-106.81190	45.15080	3550	TONGUE RIVER DAM
08S	40E	22	ACBA	MONTAYLOR *TOWNSITE	193055	-106.81640	45.12070	3605	DECKER QUAD
08S	40E	23	DCDC	MONTAYLOR *SEWER SITE	193056	-106.79410	45.11160	3460	DECKER QUAD
08S	42E	1	ACBC	WRENCH CREEK DRAINAGE	197258	-106.53190	45.17190	3580	LACEY GULCH
08S	42E	19	BDAC	ANDERSON CREEK WELL	197359	-106.63600	45.12910	3920	SPRING GULCH
08S	44E	34	DAAB	ALLEN LLOYD	191622	-106.30580	45.09410	3860	QUIETUS
08S	44E	35	ADDC	LLOYD M	8181	-106.28530	45.09480	4010	QUIETUS
08S	45E	25	DACC	BALES KEITH * OBS WELL UOP-23 (KB-18)	8197	-106.14540	45.10600	3825	BEAR CREEK SCHOOL
08S	45E	25	DACC	KEITH BALES KB-19	197433	-106.14540	45.10600	3825	BEAR CREEK SCHOOL
08S	45E	28	DDDC	LLOYD ALLEN	191631	-106.20420	45.10220	3750	BEAR CREEK SCHOOL
08S	45E	33	BAAD	ALLEN LLOYD	191623	-106.21360	45.09980	3770	BEAR CREEK SCHOOL
08S	45E	33	BAAD	LLOYD ALLEN	191627	-106.21360	45.09900	3765	BEAR CREEK SCHOOL
08S	45E	33	BDAA	LLOYD ALLEN	191628	-106.21280	45.09770	3760	BEAR CREEK SCHOOL
08S	45E	34	ABDD	LLOYD ALLEN	191633	-106.18710	45.09890	3865	BEAR CREEK SCHOOL
08S	45E	34	BBBB	LLOYD ALLEN	191632	-106.20230	45.10130	3745	BEAR CREEK SCHOOL
08S	45E	34	BDBC	LLOYD ALLEN	191634	-106.20110	45.09660	3780	BEAR CREEK SCHOOL
08S	45E	36	BCCC	BALES WALTER B-13 (KB-20)	191457	-106.16130	45.09530	3910	BEAR CREEK SCHOOL
08S	46E	4	DDDB	KEITH BALES (KB 41)	209612	-106.08340	45.16120	3720	REANUS CONE

Appendix C. Well inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Well Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle
08S	46E	16	DAAC	DECKER AUGUST 3 (KB-39)	105700	-106.08290	45.13670	3690	REANUS CONE
08S	46E	16	DAAC	KEITH BALES - KB-40	209611	-106.08270	45.13640	3700	REANUS CONE
08S	46E	20	CCCA	KB-3 BALES RANCH INC (FU-254)	8221	-106.12030	45.11820	3670	SAYLE HALL
08S	46E	24	CCDB	DECKER AUGUST (KB-42)	8225	-106.03660	45.11740	3919	SAYLE HALL
08S	46E	28	ACDA	DECKER AUGUST (KB-37)	8229	-106.08580	45.11010	3770	SAYLE HALL
08S	46E	28	ACDA	DECKER AUGUST (KB-35)	105706	-106.08560	45.11020	3755	SAYLE HALL
08S	46E	28	ADCB	KB 36	209579	-106.08560	45.11020	3765	SAYLE HALL
08S	46E	32	ABBA	KB-1 BALES RANCH INC. (FU-250)	8231	-106.10960	45.10060	3727	SAYLE HALL
08S	46E	32	BDBA	KB-2 BALES KEITH	8232	-106.11420	45.09800	3740	SAYLE HALL
09S	36E	11	CCDB	SEISMIC WELL	199122	-107.26810	45.06000	4180	PASS CREEK EAST
09S	36E	15	BBDA	H. BURTON HOFFMAN	199125	-107.28740	45.05570	4345	PASS CREEK EAST
09S	38E	21	AAAB	YS-104	192909	-107.05210	45.05090	4180	BAR V RANCH
09S	38E	21	ADAC	YA-10	192871	-107.05280	45.04670	4030	BAR V RANCH
09S	38E	21	ADBD	YA-106	192869	-107.05310	45.04640	4010	BAR V RANCH
09S	38E	22	DADC	MBMG MONITORING WELL * 391	8368	-107.03200	45.04130	3987	BAR V RANCH
09S	38E	22	DADC	YA-109	192874	-107.03120	45.04070	3830	BAR V RANCH
09S	38E	22	DBAC	PADLOCK RANCH	192861	-107.03720	45.04220	4010	BAR V RANCH
09S	38E	23	CCCC	YA-102	192878	-107.02960	45.03750	3925	BAR V RANCH
09S	38E	26	AACD	MBMG MONITORING WELL * YA-108	192901	-107.01240	45.03300	3830	BAR V RANCH
09S	38E	26	AADC	MBMG MONITORING WELL * YA-107	192898	-107.01190	45.03370	3840	BAR V RANCH
09S	38E	26	ABAB	MBMG 395	8387	-107.06180	45.03610	3900	BAR V RANCH
09S	38E	26	ABAB	PADLOCK RANCH	192886	-107.01730	45.03620	3900	BAR V RANCH
09S	38E	26	ADAB	PADLOCK RANCH	192903	-107.01240	45.03290	3830	BAR V RANCH
09S	38E	26	BAAB	OB-100	192881	-107.02380	45.03660	3925	BAR V RANCH
09S	43E	4	ABDB	CC#5 OBS WELL	8753	-106.46610	45.08780	3510	FORKS RANCH
09S	43E	4	ABDD	CC#4 OBS WELL	8757	-106.46590	45.08740	3511	FORKS RANCH
09S	43E	4	ACAA	USGS OBS WELL * CC-3	8758	-106.46540	45.08640	3521	FORKS RANCH
09S	43E	7	CADB	MBMG MONITORING WELL * CC-24 O-28 TR-67	8771	-106.51160	45.06640	3656	PINE BUTTE SCHOOL
09S	43E	7	CADB	USGS OBS. WELL U.S. 77-70	190906	-106.51150	45.06590	3655	PINE BUTTE SCHOOL
09S	43E	13	BCAA	HWC-17 TR-70	8778	-106.41330	45.05700	3610	FORKS RANCH
09S	43E	13	CAAA	MBMG OBS WELL * HWC-07	8779	-106.40940	45.05370	3595	FORKS RANCH
09S	43E	13	CAAA	MBMG MONITORING WELL * HWC-6	198465	-106.40930	45.05360	3595	FORKS RANCH
09S	43E	21	BADA	HWC-10 O-29	190902	-106.46950	45.04440	3610	FORKS RANCH
09S	43E	21	BADA	MBMG MONITORING WELL * HWC-11 TR-77	190904	-106.46960	45.04440	3615	FORKS RANCH
09S	43E	22	ACCA	MBMG MONITORING WELL * HWC-15	8782	-106.44680	45.04120	3600	FORKS RANCH
09S	43E	27	DABB	MBMG MONITORING WELL * HWC-16	8786	-106.44470	45.02470	3665	FORKS RANCH
09S	43E	31	CCDA	SIGN WELL	197216	-106.51820	45.00480	3870	PINE BUTTE SCHOOL

Appendix C. Well inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Well Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle
09S	44E		9 BCCB	BEAR CREEK PIT PIPELINE WELL (KB-10)	198988	-106.34390	45.06720	3710	QUIETUS
09S	45E		3 ACDD	USGS OBS WELL DH 76-102 (KB-14)	190897	-106.18720	45.08000	3815	BEAR CREEK SCHOOL
09S	45E		11 BCDA	BEAR CREEK PIPELINE WELL (KB-9)	198989	-106.17750	45.06720	3855	BEAR CREAK SCHOOL
09S	45E		11 CCAA	USGS *DH 75-103 KB-13	191568	-106.17760	45.06170	3880	BEAR CREEK SCHOOL
09S	45E		14 BBDA	BALES RANCH INC. KB-11	106352	-106.17720	45.05580	3900	BEAR CREEK SCHOOL
09S	45E		30 DDDC	LLOYD ALLEN	191637	-106.25430	45.01510	3825	QUIETUS
09S	46E		3 AABB	DECKER AUGUST *NO.1	106362	-106.06440	45.08410	3850	SAYLE HALL
09S	46E		3 ABBA	DECKER AUGUST-1 (KB-28)	8812	-106.06610	45.08680	3850	SAYLE HALL
09S	46E		4 BDAD	DECKER AUGUST NO. 4 (KB-26)	8815	-106.09100	45.08250	3822	SAYLE HALL
09S	46E		4 BDAD	DECKER AUGUST *NO.4	106363	-106.09160	45.07950	3820	SAYLE HALL
09S	46E		5 BCBA	KEITH BALES KB-7 (PIPELINE WELL HQ)	197432	-106.11950	45.08320	3810	SAYLE HALL
09S	46E		5 BCBD	BALES RANCH INC.	106367	-106.12020	45.07970	3810	SAYLE HALL
09S	46E		5 BCCB	WALTER BALES KB-8	8820	-106.12030	45.08120	3810	SAYLE HALL
09S	46E		6 ADAC	(KB-15)	198991	-106.12240	45.08260	3815	SAYLE HALL
09S	46E		6 ADDA	KB-6 KEITH BALES HOUSE WELL (FU-246)	189182	-106.12200	45.08130	3828	SAYLE HALL
09S	46E		7 AADA	BALES KEITH UOP NO.20 (KB-24)	8833	-106.12220	45.06780	3880	SAYLE HALL
09S	46E		7 DCBB	KEITH BALES OBS M75-38A (KB-21)	8834	-106.13080	45.06140	4030	BEAR CREEK SCHOOL
09S	46E		7 DCBB	KEITH BALES (KB-22)	197434	-106.13080	45.06140	4025	BEAR CREEK SCHOOL
09S	46E		7 DDCB	BALES WALTER B-5 (KB-23)	106370	-106.12550	45.05930	3950	BEAR CREEK SCHOOL
09S	46E		11 BACC	BLISS DAVEBROWNS MOUNTAIN (KB-32)	8844	-106.05380	45.07030	3952	SAYLE HALL
09S	46E		11 BACC	BLISS DAVEBROWNS MOUNTAIN (KB-31)	8845	-106.05420	45.07010	3930	SAYLE HALL
09S	46E		11 BBBA	MBMG MON WELL * UOP-09 KB-33 O-35	8846	-106.05780	45.07200	3929	SAYLE HALL
09S	46E		11 BBBA	MBMG MON WELL * UOP-10 KB-34 O-36	8847	-106.05780	45.07200	3930	SAYLE HALL
09S	46E		11 BDCB	BLISS RANCH	197193	-106.05250	45.06640	3940	SAYLE HALL
09S	46E		11 BDCB	BLISS RANCH	197194	-106.05400	45.06620	3950	SAYLE HALL
09S	46E		11 BDCB	BLISS RANCH	197195	-106.05380	45.06630	3950	SAYLE HALL
09S	46E		11 BDCC	BLISS RANCH	197192	-106.05450	45.06580	3970	SAYLE HALL
09S	46E		11 CACA	CROSBY DECKER NO. 03 (KB-29)	8849	-106.05300	45.06300	3955	SAYLE HALL
09S	46E		11 CACC	KEITH BALES KB-30	209610	-106.05320	45.06260	3960	SAYLE HALL
09S	46E		12 DABA	BLISS DAVE * 4 MI SE SAYLE HALL	8850	-106.02190	45.06520	4079	SAYLE HALL
09S	47E		34 BBBB	BLISS RANCH LLC	197169	-105.95810	45.01490	3940	BRADSHAW CREEK
09S	47E		36 CDBC	BLISS RANCH - RIVER ARTESIAN WELL	197090	-105.91190	45.00280	3410	BRADSHAW CREEK
10S	42E		1 AADA	PORTER * 9 MI S PINE BUTTE SCHOOL.	8885	-106.52250	45.00020	3920	PINE BUTTE SCHOOL
10S	43E		2 AABC	USGS RESEARCH WELL * HWC 86-15	8887	-106.42360	45.00250	3650	FORKS RANCH
10S	43E		2 ABCA	USGS RESEARCH WELL * HWC 86-13	8888	-106.42620	45.00200	3630	FORKS RANCH
10S	43E		5 BACD	SOUTH FORK OF WADDLE CREEK	197218	-106.49260	44.99890	3700	ROUNDUP DRAW

Appendix C. Well inventory data for the Powder River and Tongue River watersheds, southeastern Montana

Township	Range	Section	Tract	Well Name	GWIC ID Number	Longitude	Latitude	Altitude (feet)	USGS Quadrangle
10S	43E	5	BBCC	SHEEP PASTURE WELL	197217	-106.49980	44.99870	3780	ROUNDUP DRAW
10S	43E	6	ABBD	FARMSTEAD WELL	197215	-106.50780	45.00240	3800	PINE BUTTE SCHOOL

Appendix C. Well inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Inventory Date	Yield (gpm)	Yield Method	Temperature (Degrees C)	Specific Conductance (umhos/ cm @25cm)	Field pH	Static Water Level (ft)	Measuring Point Description	Measuring Point Above Land Surface (ft)	Casing Diameter (Inches)
199547	7/18/2002	2.1	VOLUMETRIC	16.2	1845	8.1				
199548	7/18/2002	1.5	VOLUMETRIC	14.4	1779	8.2				
94658	8/30/2002			19.4	1218					
198900	8/30/2002	2.4	VOLUMETRIC	11.4	1253					
199550	7/18/2002	1.1	VOLUMETRIC	14.8	1756	8.2				
199551	7/18/2002	2.3	VOLUMETRIC	14	1741	8.1				
199549	7/18/2002	10	REPORTED							
199127	11/7/2002	7.2	VOLUMETRIC	12.5	1185					
199130	11/7/2002	0.3	VOLUMETRIC	11.9	1153					
7573	4/9/2003						8.15		1.70	4.00
210094	4/9/2003						6.43		1.55	
7574	4/9/2003						51.60		1.00	4.00
197214	7/18/2002						115.75	TOP OF CASING	1.50	2.00
198318	9/17/2002	0.5	VOLUMETRIC		900					
198317	9/17/2002			19.5	1686					
199150	3/15/2002						164.80	TOP OF CASING	1.20	4.00
198319	9/17/2002	3.1	VOLUMETRIC	17.7	903					
7755	7/18/2002						151.50	TOP OF CASING	2.15	4.00
199145	6/12/2002									
144966	6/12/2002									
199142	6/11/2002						116.75	TOP OF CASING	1.50	4.00
							52.00	LAND SURFACE	0.00	4.00
197322	7/26/2002						71.33	TOP OF CASING	1.65	4.00
191175	7/12/2002						248.57	TOP OF CASING	1.50	4.00
191176	7/12/2002									
198323	9/17/2002	4	VOLUMETRIC	13.3	1942	8.18				
198320	9/17/2002	3.3	VOLUMETRIC	13.9	1926					
198322	9/17/2002	0.4	VOLUMETRIC	13.9	1470	8.73				
199154	3/15/2002						15.85	TOP OF CASING	4.30	16.00
199151	3/15/2002						102.45	TOP OF CASING		4.00

Appendix C. Well inventory data for the Powder River and Tongue River watersheds, southeastern Montana

GWIC ID Number	Inventory Date	Yield (gpm)	Yield Method	Temperature (Degrees C)	Specific Conductance (umhos/ cm @25cm)	Field pH	Static Water Level (ft)	Measuring Point Description	Measuring Point Above Land Surface (ft)	Casing Diameter (Inches)
198321	9/17/2002	2	VOLUMETRIC	10.8	1458					4.00
197086	5/21/2002			12.4	2484					
197085	5/21/2002			17.1	1803					
198210	8/21/2002						291.20	TOP OF CASING	1.00	2.00
192997	1/10/2002						76.87	MARKED ON CAS	1.50	4.00
197364	6/20/2002						107.80	TOP OF CASING	2.00	4.00
197222	6/18/2002			11.2	2436	7.37	40.64	TOP OF CASING	1.60	4.00
144969	8/14/2002	15	ESTIMATED	12.2	1941	7.5				
197308	7/19/2002									
198207	8/6/2002	0.12	VOLUMETRIC	17	1405					
199234	10/13/2002						254.75	TOP OF CASING	1.80	2.00
199235	10/13/2002	4.2	VOLUMETRIC	11	926					
193055	1/11/2002						DRY	TOP OF CASING	0.80	6.00
193056	1/11/2002						52.57	TOP OF CASING	1.50	6.00
197258	6/19/2002						144.55	TOP OF CASING	1.10	4.00
197359	6/18/2002						106.70	TOP OF CASING	0.50	4.00
191622	11/28/2001									
8181	12/1/2001			10.6	784	7.44	18.30	GROUND LEVEL	0.00	
8197	7/9/2002						241.63		0.70	4.00
197433	7/9/2002						DRY			4.00
191631	12/11/2001	10	VOLUMETRIC	9.3	3510	7.2	15.80	TOP OF CASING	1.80	6.00
191623	11/28/2001			10.5	3762	7.77	72.57	TOP OF CASING		
191627	11/28/2001						86.00			
191628	11/28/2001			12.6	1828	7.91	115.30	TOP OF CASING		
191633	12/11/2001						90.45	TOP OF CASING	1.10	4.00
191632	12/11/2001						29.10	TOP OF CASING	1.20	6.00
191634	12/11/2001						131.35	TOP OF CASING	1.80	4.00
191457	7/9/2002									
209612	7/10/2002			19.8	3310					

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105700	7/10/2002			10.1	790		11.76	TOP OF CASING	2.50	4.00
209611	7/10/2002			17.8	1610					
8221	7/9/2002									
8225	7/10/2002									
8229	7/10/2002						23.55	TOP OF CASING	2.10	4.00
105706	7/10/2002						21.94	TOP OF CASING	1.10	4.00
209579	7/10/2002						22.92	TOP OF CASING	2.10	4.00
8231	7/9/2002									
8232	7/9/2002						26.92		0.00	
199122	11/6/2002			12.4	576					
199125	11/6/2002	0.2	VOLUMETRIC	9.3	508		NO FLOW			
192909	11/7/2001						DRY			4.00
192871	10/12/2001				454		13.10	TOP OF CASING		
192869	10/12/2001				448		15.57	TOP OF CASING		4.00
8368	10/12/2001						60.90	TOP OF CASING	1.84	4.00
192874	10/12/2001				326		40.90	TOP OF CASING		4.00
192861	10/12/2001						DRY	TOP OF CASING		2.00
192878	10/12/2001			12.1	620		5.30	TOP OF CASING		4.00
192901	10/12/2001			10.9	162		18.70		2.09	4.00
192898	10/12/2001			10.1	700		26.50		2.40	4.00
8387	10/12/2001						64.60	TOP OF CASING	1.61	4.00
192886	10/12/2001			11.2	197		40.50			4.00
192903	10/12/2001			12.2	798		7.95			4.00
192881	10/12/2001									
8753	10/1/2002						6.96	TOP OF CASING	1.90	4.00
8757	10/1/2002						8.38	TOP OF CASING	1.85	4.00
8758	10/1/2002						14.95	TOP OF CASING	1.55	4.00
8771	10/2/2002						90.00	TOP OF CASING	1.90	4.00
190906	10/2/2002						65.38	TOP OF CASING	1.50	4.00
8778	10/1/2002						52.13	TOP OF CASING	1.80	4.00
8779	10/1/2002						30.79	TOP OF CASING	1.85	4.00
198465	10/1/2002						70.73	TOP OF CASING	1.80	4.00
190902	10/2/2002						96.05	TOP OF CASING	1.70	4.00
190904	10/2/2002						54.01	TOP OF CASING	1.80	4.00
8782	10/1/2002						32.72	TOP OF CASING	1.65	4.00
8786	10/1/2002						60.61	TOP OF CASING	1.15	4.00
197216	6/26/2002									

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198988	7/9/2002						92.94	TOP OF CULVERT	0.50	
190897	7/9/2002						20.41		0.30	4.00
198989	7/9/2002									
191568	7/9/2002						70.26		1.50	
106352	7/9/2002									
191637	12/11/2001						95.00	TOP OF CASING	2.20	4.00
106362	7/10/2002						24.15	TOP OF CASING	1.30	4.00
8812	7/10/2002						24.15		1.30	4.00
8815	7/10/2002						52.04		1.30	4.00
106363	7/10/2003						52.04	TOP OF CASING	1.30	
197432	7/9/2002	10	PUMPED				240.94		1.00	
106367	7/9/2002									
8820	7/9/2002									
198991	7/10/2002						27.79	TOP OF CULVERT	0.50	
189182	7/9/2002						147.40		1.00	
8833	7/10/2002						30.84	TOP OF CASING	1.50	4.00
8834	7/9/2002						279.38	TOP OF CASING	2.00	4.00
197434	7/9/2002						DRY		1.70	4.00
106370	7/9/2002						63.36	TOP OF CASING	0.50	
8844	6/13/2002						13.26	TOP OF CASING	2.05	4.00
8845	6/13/2002						16.51	TOP OF CASING	2.75	4.00
8846	6/13/2002						154.40	TOP OF CASING	1.90	4.00
8847	6/13/2002						143.80	TOP OF CASING	2.00	4.00
197193	6/13/2002						95.00	LAND SURFACE	0.00	5.00
197194	6/13/2002						400.00	LAND SURFACE	0.00	5.00
197195	6/13/2002									
197192	6/13/2002						85.00	LAND SURFACE	0.00	5.00
8849	7/10/2002						115.60	TOP OF CASING	2.00	4.00
209610	7/10/2002						122.40	TOP OF CASING	1.60	4.00
8850	6/13/2002			10.7	3745		14.75	LAND SURFACE	0.00	
197169	6/13/2002						127.85	TOP OF CASING	4.00	6.00
197090	6/13/2002			11.3	1183	8.2				
8885	6/26/2002									
8887	10/1/2002									
8888	10/1/2002						15.78			
197218	6/26/2002						12.10	TOP OF CASING	1.10	4.00

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197217	6/26/2002						40.00	TOP OF CASING	1.60	6.00
197215	6/26/2002									

Plate 1. Map of springs and wells inventoried in Powder River and Tongue River watersheds, southeastern Montana

- Explanation
- Spring, tail pointing downstream
 - Well
 - Ground Water Information Center (GWIC) ID number
 - Anderson coal outcrop
 - Knobloch coal outcrop
 - Clinker
 - Montana Route
 - U.S. Route
 - Section boundary
 - Township boundary
 - Town
 - Stream
 - County boundary
 - U.S. Forest Service Area

