Statewide Fisheries Surveys, 2014
Survey of Public Waters
Part 1 – Streams
Region 1

By

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Completion Report

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PREFACE

Select streams were surveyed during May – September 2014 to monitor fish populations and to gain an understanding of the distribution and abundances of fish within the Black Hills Fish Management Area (BHFMA) watersheds. This is also the first year in a process to update the Black Hills Streams inventory and classification as part of the BHFMA Strategic Plan. Watersheds that were included in the survey were Rapid Creek, Boxelder Creek, Elk Creek, Bear Butte Creek, Whitewood Creek, False Bottom Creek and Beaver Creek-west (Figure 1). A few select streams were sampled in the watersheds of Spring Creek, Battle Creek, and Spearfish Creek. Efforts will continue for the next 1-2 years to complete the inventory for many BHFMA Streams. In 2008 and 2009 a similar effort was made to survey all streams in the Black Hills.

Copies of this report and references to the data can be made with permission from the authors or the Director of the Division of Wildlife. South Dakota Department of Game, Fish, and Parks, 523 E. Capitol, Pierre, South Dakota, 57501-3182.

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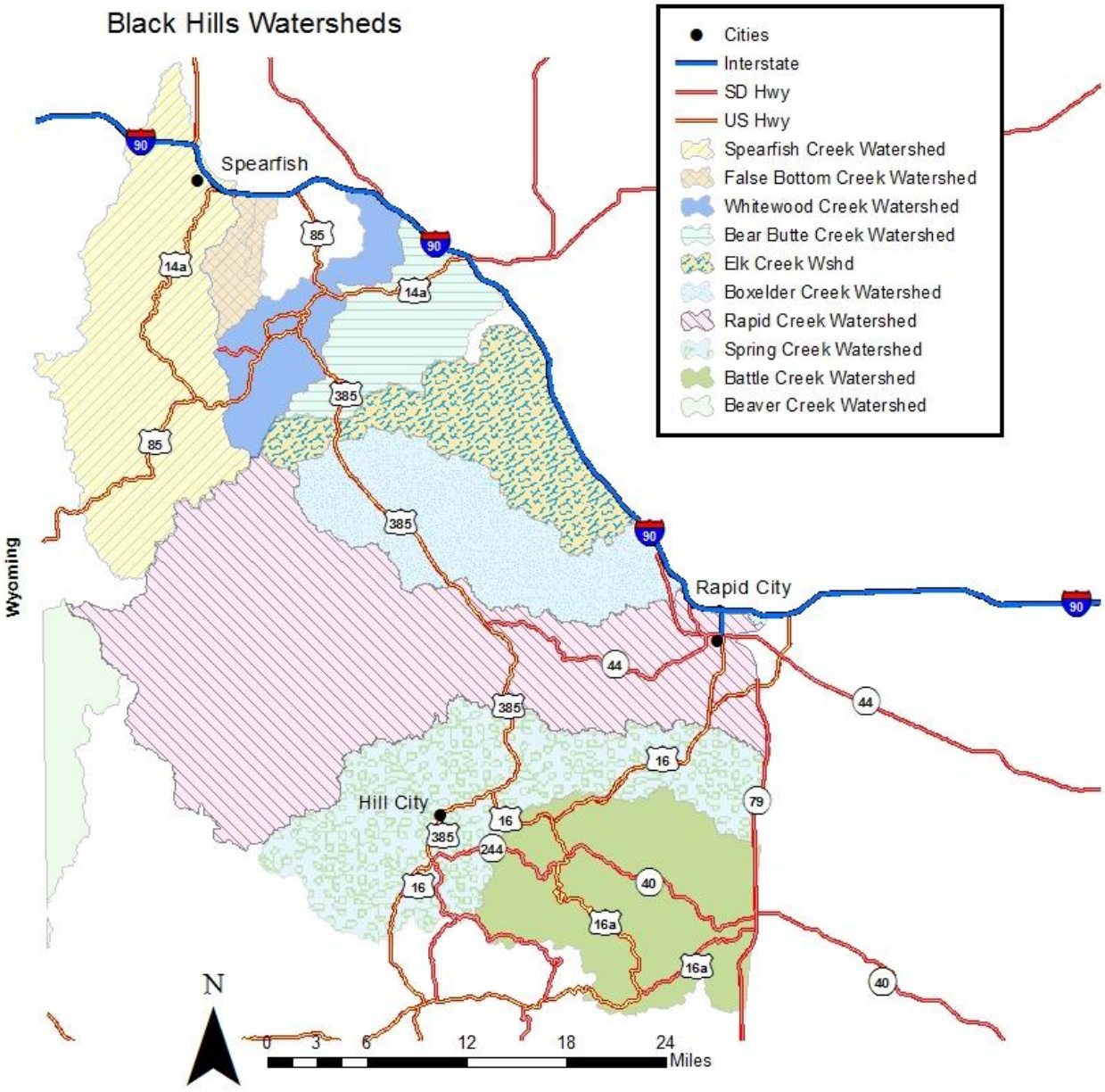

Figure 1. Watersheds surveyed within the Black Hills Fish Management Area, South Dakota, 2014.

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Survey Methods for All Watersheds

Sample Methods

Efforts were made to satisfy the assumptions 1) the population is static, 2) capture probability remained constant across sampling periods, and 3) all fish in the population are equally vulnerable to capture (Van Den Avyle and Hayward 1999; Hayes et al. 2007). All sample reaches were 100 meters (m) in length. Block nets at the upstream and downstream boundaries were used to prevent fish from emigrating or immigrating within the sample site. Initially, a single pass was conducted. If trout over 200 millimeters (mm) or mountain sucker were captured, then three passes were conducted. If average stream width was less than 6 m, one backpack electrofishing unit was used with crews of two to four people. Captured fish were usually anesthetized with carbon dioxide, measured to the nearest mm in total length, weighed to the nearest gram (g), and returned to the stream after recovery. After 50 individual lengths and weights were collected from small fish (<100mm) of a specific species, bulk counts were collected to expedite data collection. For three-pass surveys, a maximum-likelihood estimator was used to estimate catchability and population (Junge and Libosvarsky 1965; cited in Hayes et al. 2007). For single-pass surveys, relative abundance was calculated as CPUE (number of fish captured per 100 m of stream). Abundances and density were compared to past data from individual sites when historical sampling occurred within comparable months. For samples completed in May or June, previous samples in May and June were used for comparison. For samples completed in July or August, previous samples in July or August were used for comparison. As a result of the small sample size, caution must be given when interpreting the data and extrapolating it to the entire stream. Current stream classifications for Black Hills trout fisheries are found in table 1.

In addition to fish data, pH, temperature, and specific conductance were collected. Stream widths were measured every ten meters and averaged to obtain an estimate of total area sampled. Nine species of fish were surveyed during the 2014 season and they are included with their scientific name and species code in table 2.

Table 1. Current classifications for streams within the Black Hills Fish Management Area, South Dakota.

Brown trout fisheries -- based on number of fish greater than 200 mm total length (8 in).	
Class BR1	number of wild brown trout exceeds 150 per acre
Class BR2	number of wild brown trout ranges from 25 to 150 per acre
Class BR3	number of wild brown trout is less than 25 per acre
Brook trout fisheries-- based on number of fish greater than 200 mm total length (8 in).	
Class BK1	number of wild brook trout exceeds 150 per acre
Class BK2	number of wild brook trout ranges from 25 to 150 per acre
Class BK3	number of wild brook trout is less than 25 per acre
Rainbow trout fisheries -- based on number of fish greater than 200 mm total length (8 in).	
Class RB1	number of wild rainbow trout exceeds 25 per acre
Class RB2	number of wild rainbow trout is less than or equal to 25 per acre

Table 2. List of species captured in all watersheds during the 2014 survey of the Black Hills Fish Management Area, South Dakota.

Common name	Species code	Scientific name
Brook trout	BKT	*Salvelinus fontinalis*
Brown trout	BNT	*Salmo trutta*
Rainbow trout	RBT	*Oncorhynchus mykiss*
Hatchery rainbow trout	HRB	*Oncorhynchus mykiss*
Longnose dace	LND	*Rhinichthys cataractae*
White sucker	WHS	*Catostomus commersoni*
Mountain sucker	MTS	*Catostomus platyrhynchus*
Creek chub	CRC	*Semotilus atromaculatus*
Fathead minnow	FHM	*Pimephales promelas*
Rock bass	ROB	*Ambloplites rupestris*
Green sunfish	GSF	*Lepomis cyanellus*

Rapid Creek Watershed

Counties: Pennington and Lawrence

Stream reaches in Rapid Creek and its tributaries were surveyed during 2014 to monitor fish populations. Twenty-two sites in 20 tributary creeks were surveyed between May and September 2014. The Rapid Creek Watershed begins at the headwaters of the north and south forks of Rapid Creek, northwest of Rochford and at the north and south fork of Castle Creek west of Deerfield Lake (Figure 2). Castle Creek runs through Deerfield Lake and enters Rapid Creek near Mystic. Rapid Creek runs east through Pactola Reservoir and Canyon Lake before entering the Cheyenne River about 13 miles east of Farmingdale. A majority of the Rapid Creek Watershed is located in a pine/spruce forest which is managed by the US Forest Service. This Watershed is also the most populated watershed in the Black Hills and due to its proximity to Rapid City, serves as the main source of water for this population. Currently, more fish are stocked in the Rapid Creek Watershed than any other watershed within the BHFMA. A few sections of Rapid Creek and Castle Creek are stocked with catchable (250-370 mm) rainbow trout. Additionally, Deerfield Lake, Pactola Reservoir, Canyon Lake, and several small bodies of water within the town of Rapid City are also stocked with rainbow trout.

The majority of Rapid Creek and its tributaries are managed under standard BHFMA regulations with a daily limit of five trout (in any combination) with one allowed 14 inches or longer. Two sections of Rapid Creek are managed under catch-and-release regulations where the harvest of fish and possession of organic bait within 100 feet of the stream are prohibited. The section of stream from Pactola Dam downstream two miles to the Placerville foot bridge has been managed under catch-and-release regulations since 1991. Also, the section of stream from Park Drive to Jackson Boulevard in the town of Rapid City has been managed under catch-and-release regulations since 2006.

Sample Locations

During this sampling, efforts were made to check all drainages for presence of water. Reaches were sampled if they had flowing water, with two reaches attempted per creek. Sampled creeks in the Rapid Creek Watershed included: Lime Creek, Victoria Creek, Prairie Creek, Deer Creek, Slate Creek, Slate Creek South Fork, Gimlet Creek, East Gimlet Creek, Silver Creek (tributary of Rapid Creek), Rapid Creek North Fork, Swede Gulch, Tillson Creek, Buskala Creek, Cousin Jack Creek, Rapid Creek South Fork, Hop Creek, Rapid Creek Rhodes Fork, Gold Run Gulch, Silver Creek (tributary of Castle Creek), Castle Creek South Fork, Heely Creek, Nichols Creek, Ditch Creek, Pole Creek (Table 3). Drainages with no or too little water to sample included Brush Creek, Bittersweet Creek, and Dutchmen's Creek.

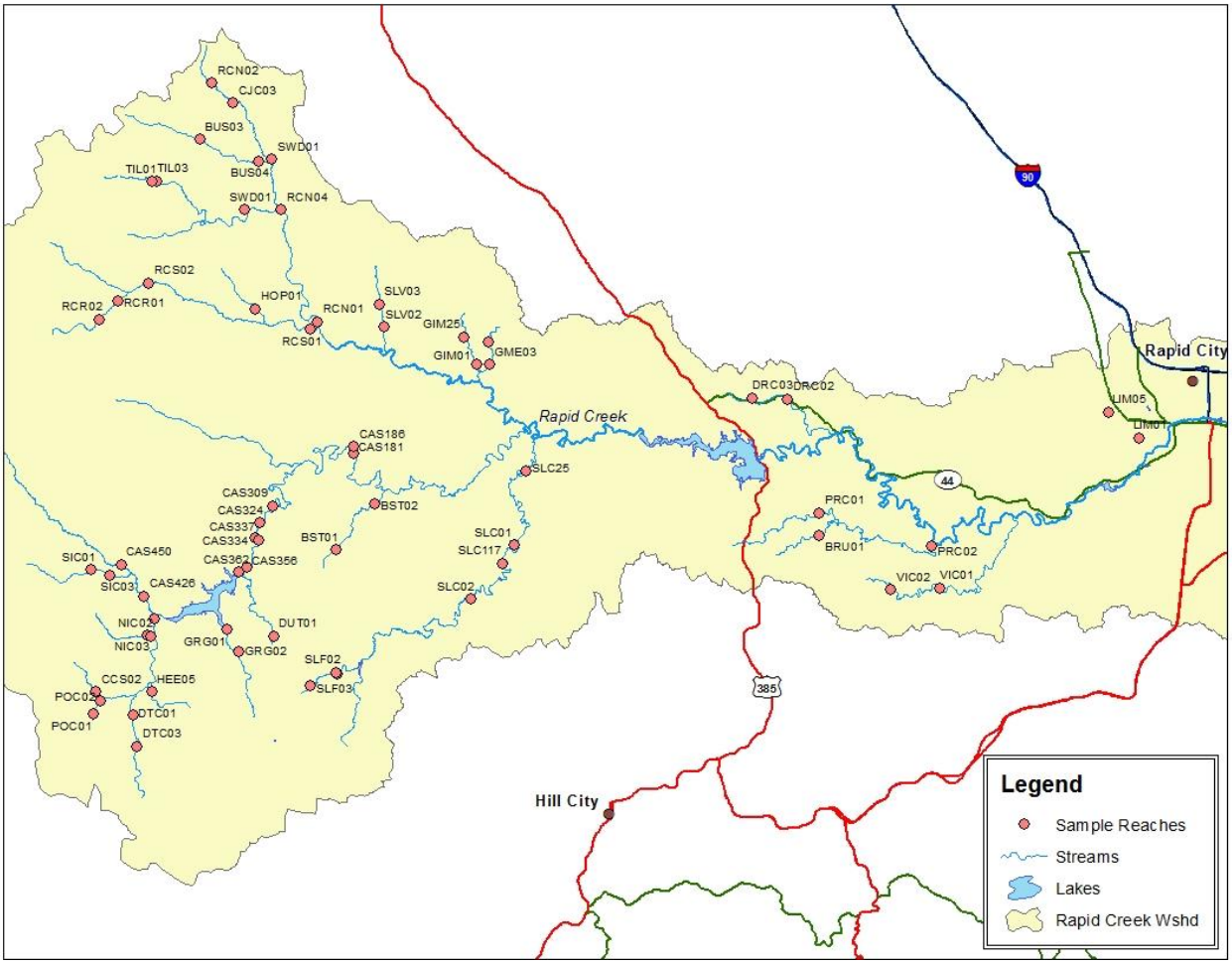

Figure 2. Location of sample reaches for the Rapid Creek Watershed within the Black Hills Fish Management Area, South Dakota, 2014.

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Results and Discussion

Nine species of fish were captured in the Rapid Creek Watershed during 2014 sampling (Tables 3, 4, 5). The most abundant and widespread species in the watershed was brook trout, although numbers of trout greater than 200 mm were higher for brown trout. Native fish species were present in low abundances, with a majority of them captured in Slate Creek, North Fork Rapid Creek and North Fork's tributaries (Table 5).

Table 3. Population estimates of brook trout in 100 meter sample reaches of tributary creeks of the Rapid Creek Watershed Black Hills Fish Management Area, South Dakota, 2014. Streams are in order from furthest downstream to upstream. Confidence interval (95%) is reported in parenthesis.

Creek Name/Site #	BKT <200 mm	BKT ≥200 mm	≥200 mm /acre	BKT class
Victoria\01	No fish			
Victoria\02	3 (0)	2 (0)	32	2
Prairie\01*	20			3
Brush\01	Low water/not sampled			
Deer\02	No fish			
Deer\03*	2			3
Slate\117	1 (0)	1(0)	12	3
Slate S.\02*	1			3
Slate S.\03*	1			3
Gimlet\01*	7			3
Gimlet\25	47 (3)			3
Gimlet East\03	2 (0)			3
Gimlet East\02*	16			3
Silver\02	8 (0)			3
Silver\03*	3			3
N. Fork Rapid\04	6 (3)	5 (0)	44	2
N. Fork Rapid\02	18 (1)	3 (1)	76	2
Swede Gulch\02	89 (3)	3 (1)	52	2
Tillson\03	82 (1)	1 (0)		3
Tillson\01	43 (2)			3
Buskala\03	49 (1)	1 (0)	42	2
Buskala\04	68 (12)			3
Cousin Jack\03*	116			3
Hop\01	No fish			
Rhodes Fork\01	5 (1)			3
Rhodes Fork\02	177 (12)	1 (0)	11	3
Bittersweet\02	dry			
Bittersweet\01	Low water/not sampled			
Castle \309	11 (1)	8 (6)	54	2
Castle \324	45 (13)	59 (143)	391	1
Castle\334	35 (4)	17 (4)	119	2
Castle\337	23 (1)	5 (2)	32	2
Castle\356	35 (3)	33 (16)	202	1
Castle\362	21 (1)	81 (6)	519	1
Gold Run\01	24 (1)	2 (1)	57	2
Gold Run\02	2 (0)	1 (0)	34	2
Castle\426	94 (10)	10 (2)	148	2
Castle\450	228 (17)	3 (0)	38	2
S. Fork Cas.\02	75 (3)			3
S. Fork Castle\02	71 (10)	10 (1)	104	2
Nichols\02*	62			
Nichols\03*	No fish			
Heely\05*	13			3
Ditch\01	385 (24)			

*single pass site, value is total fish captured

Table 3 (cont.). Population estimates, density, and stream class of brook trout in 100 meter sample reaches of tributary creeks within the upper portion of the Rapid Creek Watershed Black Hills Fish Management Area, South Dakota, 2014. Streams are in order from furthest downstream to upstream. Upper confidence interval (95%) is reported in parenthesis.

	BKT <200 mm	BKT ≥200 mm	≥200 mm /acre	BKT class
Ditch\03	130 (11)	6 (0)	66	2
Pole\01	25 (2)	1 (0)		3
Pole\02*	26			3
Silver of Castle\03*	10	3 yoy unidentified trout		3
Silver of Cas\01*	20			3

*single pass site, value is total fish captured

Table 4. Population estimates, density, and stream class of brown trout in 100 meter sample reaches of tributary creeks within the upper portion of the Rapid Creek Watershed Black Hills Fish Management Area, South Dakota, 2014. Streams are in order from furthest downstream to upstream. Upper confidence interval (95%) is reported in parenthesis.

	BNT <200 mm	BNT ≥200 mm	≥200 mm /acre	BNT class
Lime\01	105 (10)	25 (1)	332	1
Lime\05	14 (1)	5 (0)	100	2
Prairie\02	72 (5)	10 (1)	94	2
Gimlet\25		3 (1)	77	2
Gimlet East\03	1 (0)			3
Silver\02	1 (0)			3
N. Fork Rapid\01	21 (2)	12 (0)	122	2
N. Fork Rapid\04	7 (2)	9 (1)	79	2
Swede Gulch\02	6 (0)	1 (0)		3
Buskala\04	5 (19)			3
S. Fork Rapid\01	29 (0)	20(1)	226	1
S. Fork Rapid\02	218 (13)	29 (2)	245	1
Rhodes Fork\01	140 (6)	13 (1)		
Rhodes Fork\02	94 (7)	14 (0)	152	1
Castle \181	29 (2)	14 (1)		
Castle \186	36 (10)	8 (1)		
Castle \324	74 (8)	18 (1)	119	2
Castle\334	72 (64)	51 (37)	358	1
Castle\337	29 (1)	18 (1)	116	2
Castle\356	48 (11)	32 (9)	196	1
Castle\362	40 (16)	25 (6)	160	1

*single pass site, value is total fish captured

Table 5. Population estimates of rainbow trout and non-trout species in 100 meter sample reaches of tributary creeks within the Rapid Creek Watershed Black Hills Fish Management Area, South Dakota, 2014. Streams are in order from furthest downstream to upstream. Upper confidence interval (95%) is reported in parenthesis.

	RBT <200 mm	RBT ≥200 mm	LND	WHS	MTS	CRC	FHM	ROB
Lime\01	0	0	13	0	0			
Lime\05	1							
Victoria\02	0	0	0	0	0			
Slate\117			515 (1,553)	16	1	93		
Slate South\02*	1		37	3				
Slate South\03*			172				1	
N. Fork Rap.\01			39 (35)	11 (6)	3 (0)	1 (1)		
N. Fork Rap.\04		1	99 (13)	121 (8)	62 (31)			
N. Fork Rap.\02			1 (1)					
Sweede Gulch\02			250 (1,102)	5 (0)	5 (0)			
Buskala\04			120 (743)					
S. Fork Rap.\01				4 (0)				
Castle \186	2 (2)			3 (0)				
Castle \362				1 (0)				
Gold Run\01	13 (0)	15 (0)						36 (1)
Castle\426	25 (42)	11 (2)						
Castle \450	9 (5)	1 (0)						
S. Fork Cas.\02	3 (1)							
S. Fork Cas.\03	31 (3)	8 (0)						
Nichols\02	4							
Silver of Cas.\03*	2							

*single pass site, value is total fish captured

Lime Creek (LIM)

Lime Creek in Rapid City was surveyed at two sites on September 4th, 2014. Site 1 at Mary Hall Park yielded a population estimate of 130 brown trout, 25 of which were over 200 mm (Figure 3). Site 1 was previously sampled in 1993, 1995 and 2000 (Table 6).

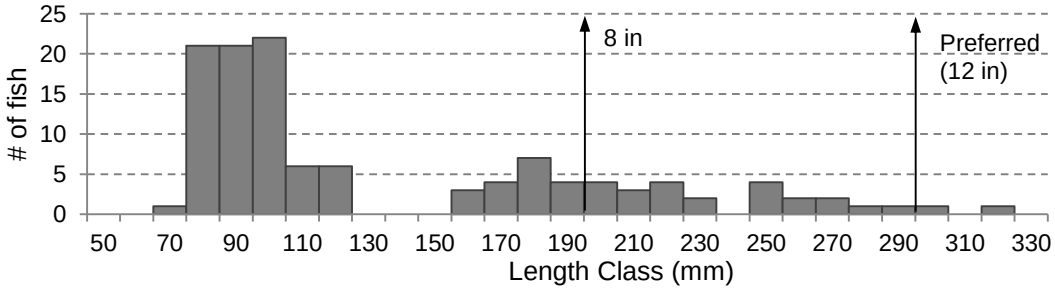

Figure 3. Length frequency histogram of brown trout captured during electrofishing survey of Lime Creek site 1 within the Black Hills Fish Management Area, South Dakota, 2014.

Table 6. Population estimate of fish per 100 meters for Lime Creek site 1 from surveys in 1993, 1995, 2000 and 2014 Black Hills Fish Management Area, South Dakota.

Sample Date	BKT ≥200 mm	BNT <200 mm	BNT ≥200 mm	BNT ≥200 mm/per acre	LND	WHS	CRC	LMB
May 1993		4	2	29	245	4		
June 1995	3	1	6	106	19	3	1	
July 2000		88	46	699	4	0		
Sept 2014		105	25	332	0	13		

Site 5, a new site on the SDGF&P Region 1 office property, yielded a population estimate of 19 brown trout with five ≥200 mm. This was 100 fish ≥200 mm/acre, meeting a class 2 brown trout fishery.

Victoria Creek (VIC)

The June 25th, 2014 survey of Victoria Creek site 1 yielded no fish. This was the same as during the 2008 survey. Victoria Creek was dry during the drought prior to 2008, which may explain the absence of fish. This site was also surveyed in June 1995 and 12 brook trout were estimated with one ≥200 mm.

Victoria Creek site 2 was sampled for the first time on June 14, 2014. The population estimate was five brook trout with two ≥200 mm, which was 32 brook trout ≥200 mm/acre, meeting a class 2 fishery.

Prairie Creek (PRC)

Prairie Creek was sampled on May 28th, 2014 at site 1. During that survey, 20 brook trout, all less than 200 mm, were captured. This was similar to the survey in May 2008. Fish numbers have decreased since this site was surveyed in June 1994 in which 211 brook trout under 200 mm and four over 200 mm were captured.

A new site, 2, was sampled on Prairie Creek about ¼ mile up from the confluence with Rapid Creek. Near the confluence there is a waterfall that is about seven feet tall. The landowner in this area indicated that the creek was dry for several years prior to 2008. The Aug 26th survey yielded a population estimate of 82 brown trout with eleven ≥200 mm (Figure 4). This is 94 adult brown trout per acre, classifying it as a class 2 brown trout fishery.

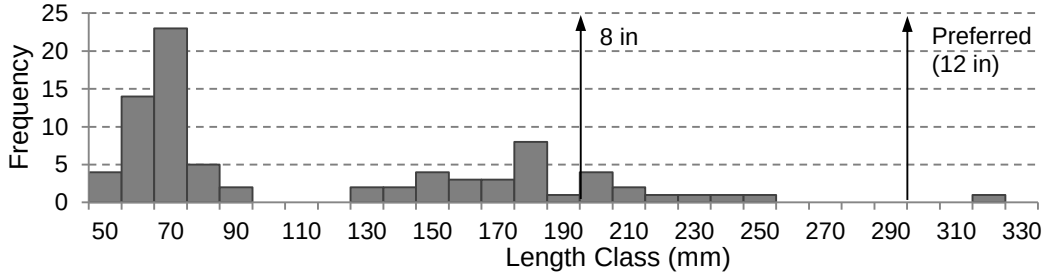

Figure 4. Length frequency histogram of brown trout captured during electrofishing survey of Prairie Creek site 2 within the Black Hills Fish Management Area, South Dakota, 2014.

Brush Creek (BRU)

Brush Creek site 1 was checked for water on May 28, 2014. It only had a small trickle of water and was not surveyed for fish. This site was dry in 2008.

Deer Creek (DRC)

Two new sites were sampled on Deer Creek in 2014. No fish were captured at site 2 and at site 3, two brook trout <200 mm were captured. Site 1 was un-able to be sampled due to downed willows, which is why site 3 was created on the other side of SD highway 44. No fish were captured at site 1 in 2008.

Slate Creek (SLC)

Slate Creek site 117 was sampled for the first time on May 28, 2014. Two brook trout were captured with one >200 mm. Creek chub, longnose dace, and white sucker were estimated at 93, 515 (CI+412), and 16 respectively. One mountain sucker was surveyed.

Slate Creek South Fork (SLF)

Two new sites were sampled on Slate Creek South Fork in 2014. Site 2, immediately up from site 1, sampled on July 17 yielded one of each rainbow trout and brook trout <200 mm, three white sucker, and 37 longnose dace. It is possible that the rainbow trout originated from Deerfield Park Reservoir, a private reservoir located about a mile upstream. An August 2008 survey of site 1 yielded 11 longnose dace.

Site 3 sampled on August 13 yielded one brook trout <200 mm and one fathead minnow. Longnose dace were the most numerous species with 172 sampled.

Gimlet Creek (GIM)

The survey of Gimlet Creek site 1 (Figure 1) on June 5, 2014 yielded seven brook trout <200 mm. The survey this site in June 2008 yielded two brook trout and one brown trout under 200 mm and two brown trout over 200 mm. Gimlet Creek had not been surveyed prior to 2008.
Site 25, 1 mile up Gimlet Creek Road, was sampled for the first time on June 5, 2014. Population estimates were 47 brook trout <200 mm and three brown trout ≥200 mm. This equates to 77 brown trout per acre meeting a class 2 brown trout fishery.

Gimlet Creek East Fork(GME)

Two new reaches were sampled on Gimlet Creek East Fork in 2014. Reach 2 surveyed on June 23 yielded 16 brook trout <200 mm. Reach 3, immediately up from reach 1 was surveyed on June 6 with a population estimate of two brook trout and one brown trout <200 mm.

Gimlet Creek East Fork site 1 was unable to be sampled in 2014 due to downed willows. It was previously surveyed in June 2008 with no fish captured and in May 1994 yielding three brown trout with one ≥200 mm.

Silver (Tributary of Rapid Creek) (SLV)

Site 2, approximately ¾ mile above the confluence with Rapid Creek, was sampled on June 9, 2014 with eight brook trout and one brown trout <200 mm. This site was sampled in June 2008 and five brook trout <200 mm were captured. In May 1994 the survey yielded 12 brook trout under and one over 200 mm.
A new site, site 3 approximately another ¾ mile upstream from site 2, was surveyed on June 23, 2014. This yielded three brook trout <200 mm.

North Fork Rapid Creek (RCN)

North Fork Rapid Creek was sampled at site 1, above the confluence with South Fork on June 20, 2014. The population estimate of this survey was 33 brown trout with 12 ≥200 mm (Figure 5), 1 creek chub, 39 longnose dace, 3 mountain sucker, and 12 white sucker. There were 122 brown trout ≥200 per acre maintaining it as a class 2 brown trout fishery. Previous surveys of this site have had similar results (Table 7). The hatchery brown trout identified in the 1993 survey probably came from stockings of the main stem of Rapid Creek below the confluence of South and North Forks, which was stocked with catchable brown trout annually until 2009.

Table 7. Population estimates of fish species surveyed during back-pack electrofishing surveys of North Fork Rapid Creek site 1 within the Black Hills Fish Management Area, South Dakota, 1993-2014.

Sample Date	BNT <200 mm	BNT ≥200 mm	HBNT ≥200	HRBT ≥200 mm	CRC	LND	MTS	WHS
Aug 1993	25	5	12			102	3	4
Sept 2006*	41	2		1		185	1	10
July 2010**	8	5				31	10	2
June 2014	21	12			1	39	3	12

*September surveys should not be compared to June and July surveys.
** 2010 was a single pass survey

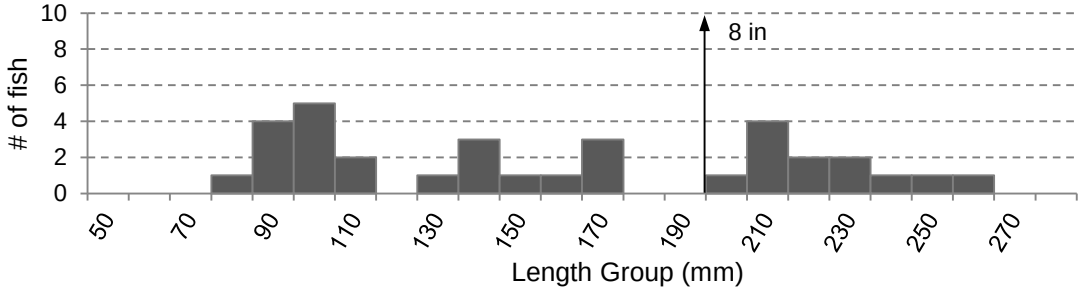

Figure 5. Length frequency histogram of brown trout captured during electrofishing survey of north Fork Rapid Creek site 1 within the Black Hills Fish Management Area, South Dakota, 2014.

Site 4, at the confluence of Swede Gulch, was surveyed on July 21, 2014. Population estimates were 11 brook trout with five ≥200 mm, 16 brown trout with 9 ≥200 mm, one rainbow trout ≥200 mm, 99 longnose dace, 62 mountain sucker, and 121 white sucker. A July 2010 single pass survey had similar results with 15 brook trout, three ≥200 mm, seven brown trout with three ≥200 mm, 27 mountain sucker, 88 longnose dace, and 28 white sucker.

North Fork Rapid Creek site 2, below Dumont Pond, was sampled June 18, 2014. Population estimates were 21 brook trout with three ≥200 mm, and one longnose dace. This site was sampled June 23, 2008 with a single pass yielding 16 brook trout, with one ≥200 mm, and one longnose dace. A June 1993 survey yielded a population estimate of 36 longnose dace.

Hop Creek (HOP)

Site 1 was surveyed on July 30, 2014, with no fish were captured. Hop Creek's pH during this survey was 3.4 which would negatively impact trout and native fish populations (Weiner et al 1986.; Pinder & Morgan 1995; Hulsman et al.1983). No fish have ever been surveyed in Hop Creek.

Rhoads Fork Rapid Creek (RCR)

Rhoads Fork site 1, ¼ mile above Black Fox Campground, was sampled on June 12, 2014. Trout abundances have been similar at site 1 since its first survey in 1994 (Table 8). During the 2014 survey, this site met the class 1 brown trout classification with one fish over 430 mm (Figure 6). This area was stocked with 250 to 640 catchable brown trout annually in the 1990s and up until 2003.

Table 8. Population estimates of fish species per 100 meters surveyed during back-pack electrofishing surveys of Rhodes Fork site 1 within the Black Hills Fish Management Area, South Dakota, 1994-2014.

Sample Date	BKT <200	BNT <200 mm	BNT ≥200 mm	HBNT ≥200	BNT ≥200/acre
July 1994	1	133	16	1	271
May 2003		130	18	15	447
Sept 2003		35	7	11	265
July 2008*	1	57	7		123
June 2014	5	140	13		184

*2008 was a single pass survey

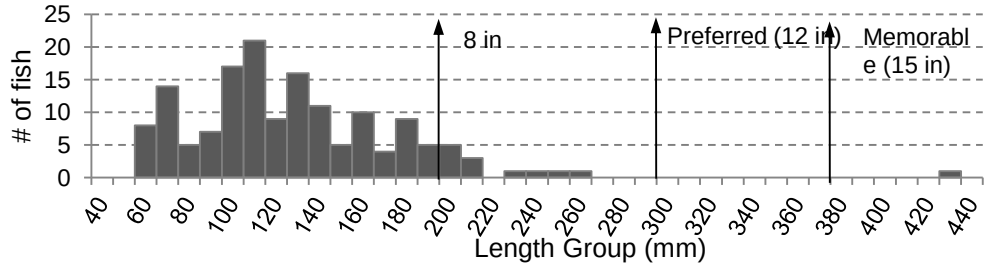

Figure 6. Length frequency histogram of brown trout captured during electrofishing survey of Rhodes Fork Rapid Creek site 1 within the Black Hills Fish Management Area, South Dakota, 2014.

A new site at Rhodes Fork site 2, was surveyed on June 12, 2014. This site was about 1 mile upstream of Black Fox Campground just below a USGS stream gaging station and between multiple beaver dam ponds. Population estimates were 178 brook trout with one ≥200 mm, and 107 brown trout with 14 ≥200 mm (Figure 7). This equates to 152 brown trout ≥200 mm/acre, meeting a class 1 brown trout fishery.

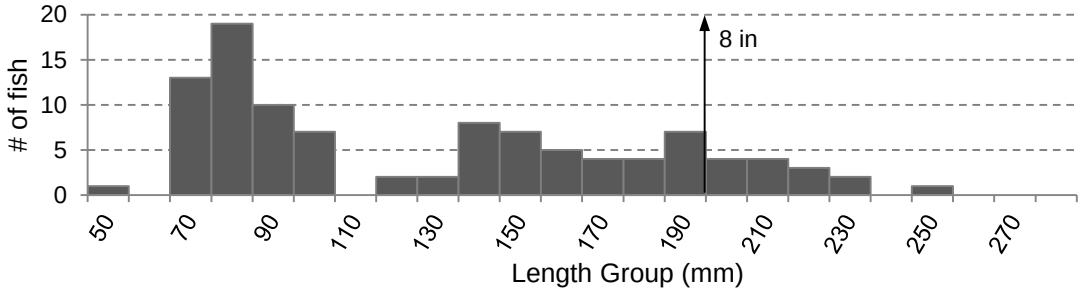

Figure 7. Length frequency histogram of brown trout captured during electrofishing survey of Rhodes Fork Rapid Creek site 2 within the Black Hills Fish Management Area, South Dakota, 2014.

Swede Gulch Creek (SWD)

Swede Gulch Creek was sampled on June 16, 2014 at site 2, about a mile from the confluence with Rapid Creek. Abundances of all species of fish seem to have improved since the 2008 survey and are comparable to what they were during the 2006 survey and possibly the 1994 survey since it had a high confidence interval (Table 9).

Table 9. Population estimates of fish species per 100 meters surveyed during back-pack electrofishing surveys of Swede Gulch Creek site 2 within the Black Hills Fish Management Area, South Dakota, 1994-2014.

Sample Date	BKT <200 mm	BKT ≥200 mm	BNT <200 mm	BNT ≥200 mm	BNT ≥200/acre	LND	MTS	WHS
Aug 1994	295*	15*	2	2	52	117	5	22
Aug 2006	150	2				93		10
June 2008[#]	5		2			14	1	
June 2014	89	3	6	1	17	250*	5	5

*high confidence interval
[#]2008 was a single pass survey

Tillson Creek (TIL)

On June 11, 2014, Tillson Creek site 1, near the headwaters, was surveyed. Forty-three brook trout ≤200 mm were captured in three passes. Previous surveys in June 2008 and June 1995 yielded 15 and 12 brook trout ≤200 mm, respectively. The 1995 survey also captured one brook trout >200 mm.

Site 3, about 260 meters up stream, was surveyed for the first time on June 30, 2014. The population estimate was 83 brook trout with one ≥200 mm.

Buskala Creek (BUS)

Site 4 was surveyed for the first time on June 10, 2014. The population estimate was 68 brook trout and five brown trout <200 mm . Twenty-four longnose dace were also captured.

Site 3 on Buskala Creek was surveyed on June 16, 2014. Fifty brook trout were captured with one ≥200 mm. A previous survey in July 2008 yielded 73 brook trout.

Cousin Jack Creek (CJC)

A new site, 3, was surveyed on July 30, 2014. This yielded 116 brook trout <200 mm. In 2008, site 1, further up steam, was looked at, but did not have enough water to sample.

Castle Creek (CAS)

Castle Creek survey reach sites are all numbered based on the distance in 100 meter reaches from the confluence of Rapid Creek. Castle Creek site 181 was sampled on July 2, 2014 with a population estimate of 29 brown trout under and 14 over 200 mm (Figure 8). This equates to 95 ≥200 mm per acre, meeting a class 2 brown trout fishery. This site was surveyed in June 2009 with a population estimate of 16 brown trout under and four over 200 mm. One mountain sucker, rainbow trout, and white sucker were also sampled in 2009.

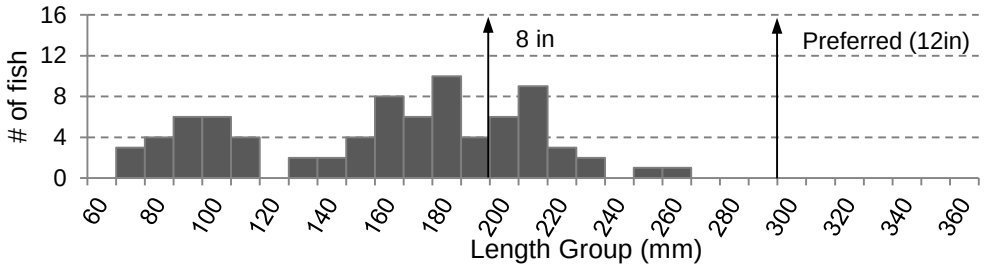

Figure 8. Length frequency histogram for brown trout surveyed at Castle Creek site 181 within the Black Hills Fish Management Area, South Dakota, 2014.

A survey of site 186 on July 3, 2014 had a population estimate of 36 brown trout under and eight over 200 mm, two rainbow trout <200 mm, and three white sucker (Figure 9). With a density of 61 brown trout ≥200 mm per acre, it is within the classification of a class 2 brown trout fishery. A survey of this reach in July 2009 yielded about the same population estimate with 36 brown trout less than 200 mm and three greater than 8 inches. This site is about two km downstream from Castle Peak Campground. Catchable rainbow trout are stocked throughout this section of Castle Creek from the confluence with Rapid Creek up past the campground until the road veers away from the creek.

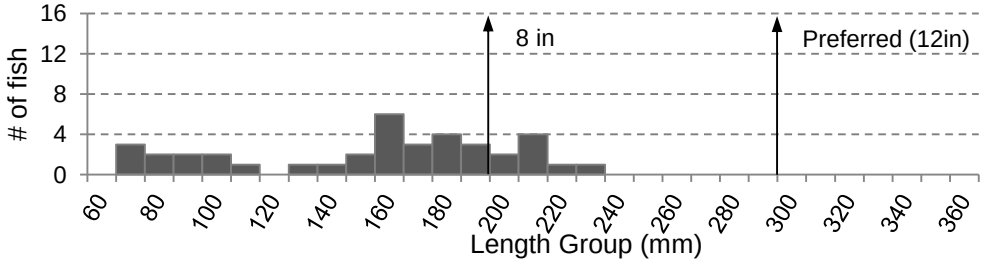

Figure 9. Length frequency histogram for brook trout surveyed at Castle Creek reach 186 within the Black Hills Fish Management Area, South Dakota, 2014.

Castle Creek site 309, below Flag Mountain Church Camp, was sampled on May 30, 2014. The population estimate was 19 brook trout with eight ≥200 mm, and 49 brown trout with 27 ≥200 mm (Figures 10 & 11). This is a density of 54 brook trout ≥200 mm per acre and 182 brown trout ≥200 mm

per acre meeting the class 2 brook trout and class 1 brown trout fishery classifications. Site 309 has been surveyed 9 times since 1992 (Table 10).

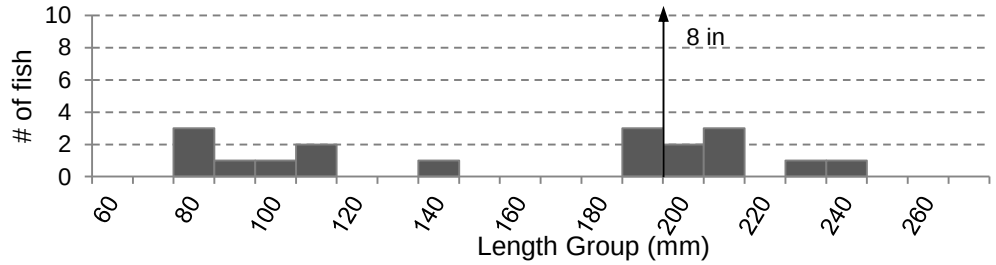

Figure 10. Length frequency histogram for brook trout surveyed at Castle Creek reach 309 within the Black Hills Fish Management Area, South Dakota, 2014.

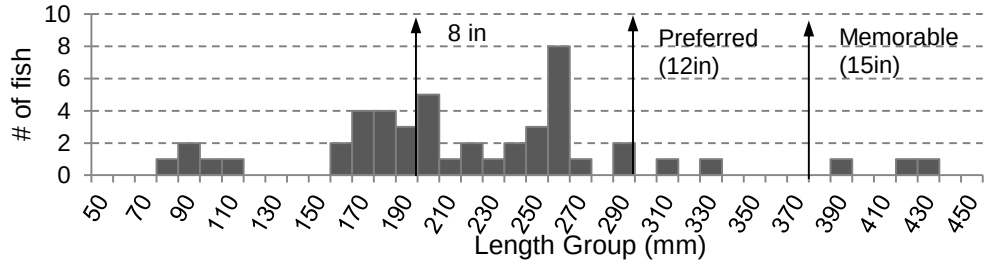

Figure 11. Length frequency histogram for brown trout surveyed at Castle Creek reach 309 within the Black Hills Fish Management Area, South Dakota, 2014.

Table 10. Population estimates of fish species per 100 meters surveyed during back-pack electrofishing surveys of Castle Creek reach 309 within the Black Hills Fish Management Area, South Dakota, 1992-2014.

Sample Date	BKT <200 mm	BKT ≥200 mm	BNT <200 mm	BNT ≥200 mm
Oct 1992	71	3	86	23
Oct 1993	80	5	58	26
Sept 1995	50	7	21	30
Sept 1996	360	8	18	17
Sept 1997	77	23	123	14
Sept 1998	54	8	91	40
Sept 1999	121	49	212	110
Sept 2000	120	49	239	73
May 2014	11	8	21	27

Site 324 was surveyed on May 23, 2014 with a population estimate of 88 brook trout with 59 ≥200 mm (Figure 12) and 92 brown trout with 18 ≥200 mm (Figure 13). This was a density of 391 brook trout ≥200 mm per acre and 119 brown trout ≥200 mm per acre meeting the class 1 brook trout and class 2 brown trout fishery classifications, respectively. However, it must be noted that depletion was not reached for brook trout and the confidence interval was high (143). This reach has been sampled several times previously (Table 11).

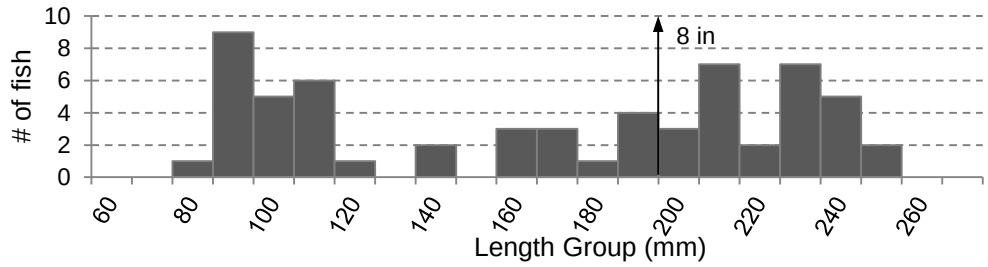

Figure 12. Length frequency histogram for brook trout surveyed at Castle Creek reach 324 within the Black Hills Fish Management Area, South Dakota, 2014.

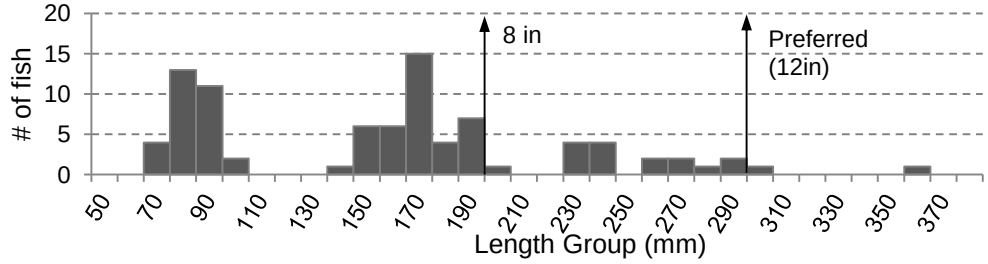

Figure 13. Length frequency histogram for brown trout surveyed at Castle Creek reach 324 within the Black Hills Fish Management Area, South Dakota, 2014.

Table 11. Population estimates of fish species per 100 meters surveyed during back-pack electrofishing surveys of Castle Creek reach 324 within the Black Hills Fish Management Area, South Dakota, 2002-2014.

Sample Date	BKT <200 mm	BKT >200 mm	BNT <200 mm	BNT >200 mm
Sept 2002	93	3	69	29
Sept 2003	32	4	54	32
Sept 2004	44	7	138	28
Sept 2007	57	2	31	15
Sept 2008	41	7	30	13
Aug 2012	608	24	158	23
May 2013	54	42	38	20
May 2014	45	59	74	18

Site 334 was sampled on May 27, 2014 with population estimates of 54 brook trout with 17 ≥200 mm and 131 brown trout with 51 ≥200 mm (Figures 14 & 15). This was densities of 119 brook trout per acre meeting a class 2 brook trout fishery and 358 brown trout per acre, meeting a class 1 brown trout fishery. This reach has been sampled several times previously (Table 12).

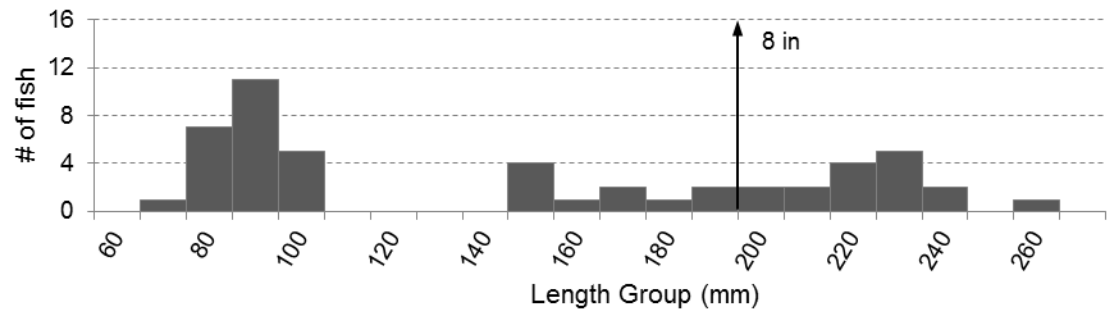

Figure 14. Length frequency histogram for brook trout surveyed at Castle Creek reach within the Black Hills Fish Management Area, South Dakota, 2014.

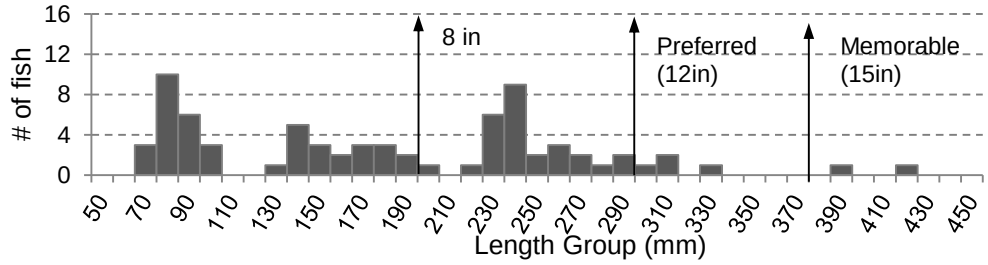

Figure 15. Length frequency histogram for brown trout surveyed at Castle Creek reach 334 within the Black Hills Fish Management Area, South Dakota, 2014.

Table 12. Population estimates of fish species per 100 meters surveyed during back-pack electrofishing surveys of Castle Creek reach 334 within the Black Hills Fish Management Area, South Dakota, 1992-2014.

Sample Date	BKT <200 mm	BKT >200 mm	BNT <200 mm	BNT >200 mm
Oct 1992	127	11	13	34
Oct 1993	87	21	38	29
Sept 1995	60	30	6	42
Sept 1996	30	25	4	32
Sept 1997	65	24	28	33
Sept 1998	95	38	41	40
Sept 1999	101	28	39	67
Sept 2000	164	35	43	60
Sept 2002	70	6	60	56
Sept 2004	3	4	197	40
Sept 2006	14	5	115	44
May 2014	35	17	72	51

Reach 337 was sampled on May 27, 2014 with population estimates of 28 brook trout with 5 ≥200 mm (Figure 16) and 47 brown trout with 18 ≥200 mm (Figure 17). Densities for brook trout and brown trout were 32 and 116 per acre, respectively, meeting class 2 brook and brown trout fisheries.

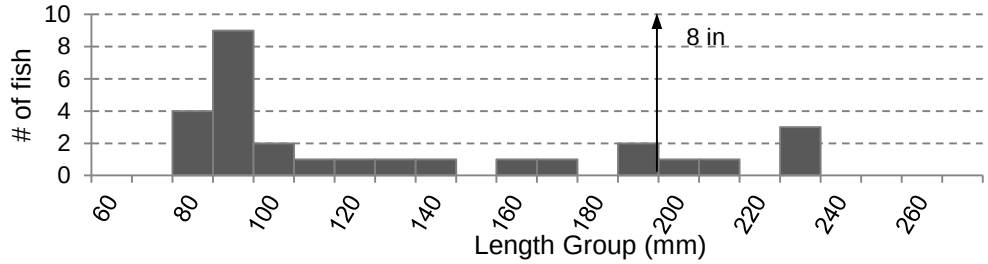

Figure 16. Length frequency histogram for brook trout surveyed at Castle Creek reach 337 within the Black Hills Fish Management Area, South Dakota, 2014.

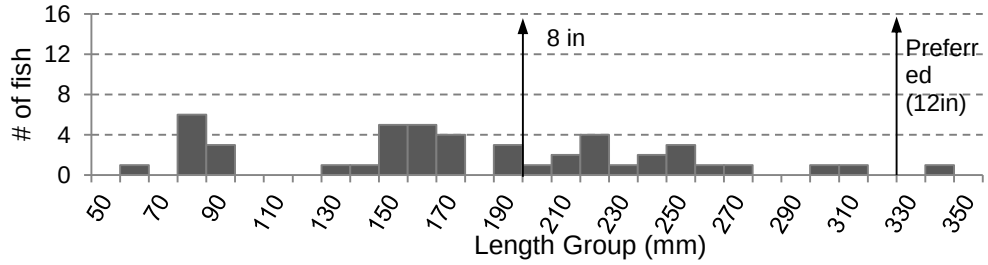

Figure 17. Length frequency histogram for brown trout surveyed at Castle Creek reach 337 within the Black Hills Fish Management Area, South Dakota, 2014.

On May 20, 2014 Castle Creek site 356 was sampled on with population estimates of 70 brook trout with 33 ≥200 mm (Figure 18) and 82 brown trout with 32 ≥200 mm (Figure 19). Densities for brook trout and brown trout were 202 and 196 per acre respectively, meeting a class 1 brook and brown trout fishery. This was the fourth time this site had been sampled since 1992 (Table 13).

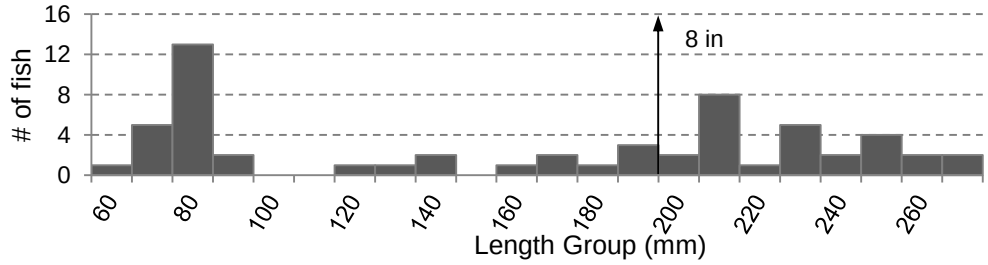

Figure 18. Length frequency histogram for brook trout surveyed at Castle Creek reach 356 within the Black Hills Fish Management Area, South Dakota, 2014.

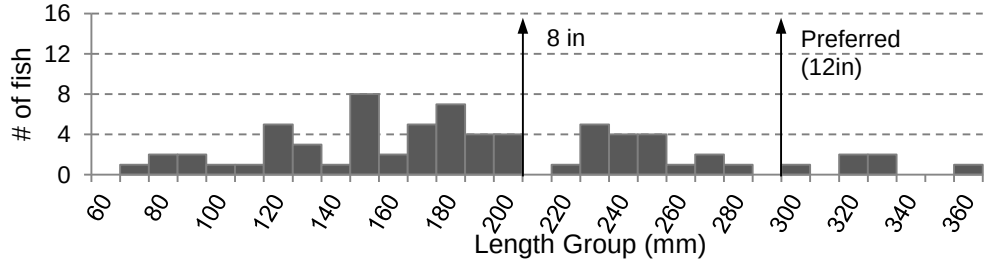

Figure 19. Length frequency histogram for brown trout surveyed at Castle Creek reach 356 within the Black Hills Fish Management Area, South Dakota, 2014.

Table 13. Population estimates of fish species per 100 meters surveyed during back-pack electrofishing surveys of Castle Creek reach 356 within the Black Hills Fish Management Area, South Dakota, 1992-2014.

Sample Date	BKT <200 mm	BKT >200 mm	BNT <200 mm	BNT >200 mm
Oct 1992	125	14	0	14
Oct 1993	105	20	7	10
Aug 2013	54	60	94	58
May 2014	35	33	48	32

Just below Deerfield reservoir, reach 362 was surveyed on May 19, 2014. Population estimates were 102 brook trout with 81 ≥200 mm (Figure 20), 67 brown trout with 25 ≥200 mm (Figure 21), and one white sucker. Brook trout and brown trout densities ≥200 mm were 519 and 160 respectively, meeting a

class 1 fishery for brook and brown trout. This was the fourth time this site had been sampled since 2009 (Table 14).

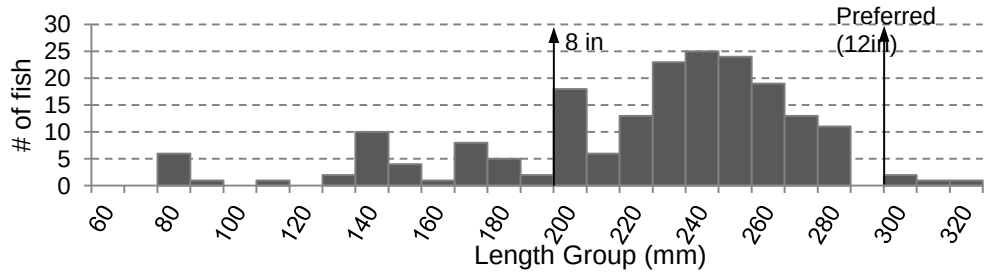

Figure 20. Length frequency histogram for brook trout surveyed at Castle Creek reach 362 within the Black Hills Fish Management Area, South Dakota, 2014.

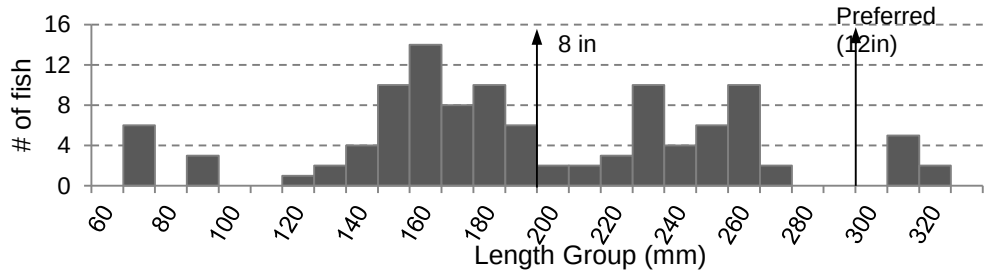

Figure 21. Length frequency histogram for brown trout surveyed at Castle Creek reach 362 within the Black Hills Fish Management Area, South Dakota, 2014.

Table 14. Population estimates of fish species per 100 meters surveyed during back-pack electrofishing surveys of Castle Creek reach 362 within the Black Hills Fish Management Area, South Dakota, 2009-2014.

Sample Date	BKT <200 mm	BKT >200 mm	BNT <200 mm	BNT >200 mm	WHS
June 2009	32	12	35	16	-
June 2012	381	236	6	30	6
May 2013	130	182	90	46	5
May 2014	21	81	40	25	1

Castle Creek above Deerfield Reservoir in the McIntosh Ren Restoration Area was surveyed at reach site 426 on June 19, 2014. Population estimates were 106 brook trout with 10 ≥200 mm (Figure 22) and 31 rainbow trout with 11 ≥200 mm (Figure 23). Densities for brook trout and rainbow trout ≥200 mm were 148 and 163 per acre, meeting a class 2 brook trout and class 1 rainbow trout fishery classification. This was the fourth time this site had been sampled since 1993 (Table 15).

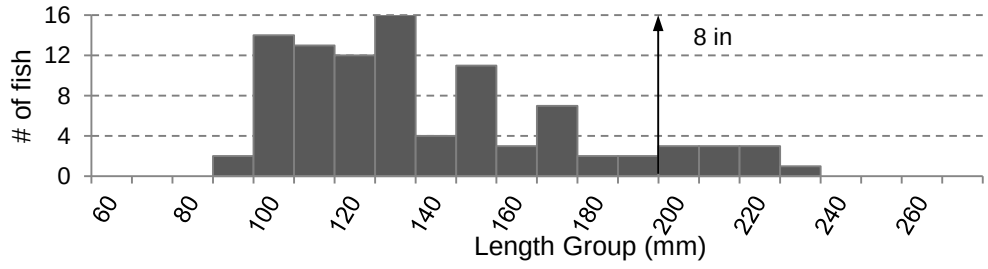

Figure 22. Length frequency histogram for brook trout surveyed at Castle Creek reach 426 within the Black Hills Fish Management Area, South Dakota, 2014.

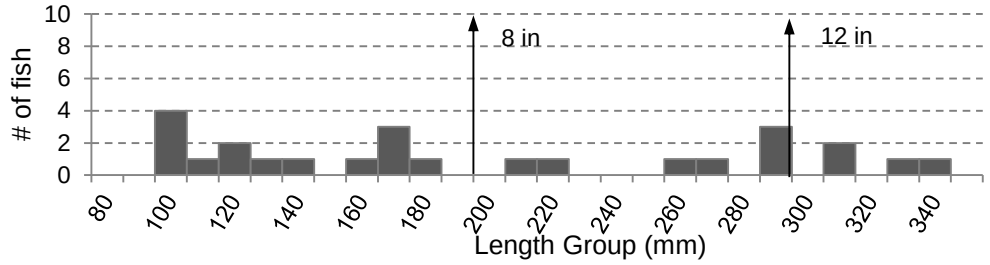

Figure 23. Length frequency histogram for rainbow trout surveyed at Castle Creek reach 426 within the Black Hills Fish Management Area, South Dakota, 2014.

Table 15. Population estimates of fish species per 100 meters surveyed during back-pack electrofishing surveys of Castle Creek reach 426 within the Black Hills Fish Management Area, South Dakota, 1993-2014.

Sample Date	BKT <200 mm	BKT >200 mm	RBT <200 mm	RBT >200 mm
June 1993	86	-	63	-
Aug 2009	98	5	10	1
July 2012	158	6	6	4
June 2014	94	10	25	11

Reach site 450 of Castle Creek was sampled on July 1, 2014. Population estimates were 230 brook trout with three ≥200 mm and nine rainbow trout with 1 ≥200 mm (Figure 24). This equates to densities of 38 and 13 trout ≥200 mm per acre respectively, meeting a class 2 brook and rainbow trout fishery.

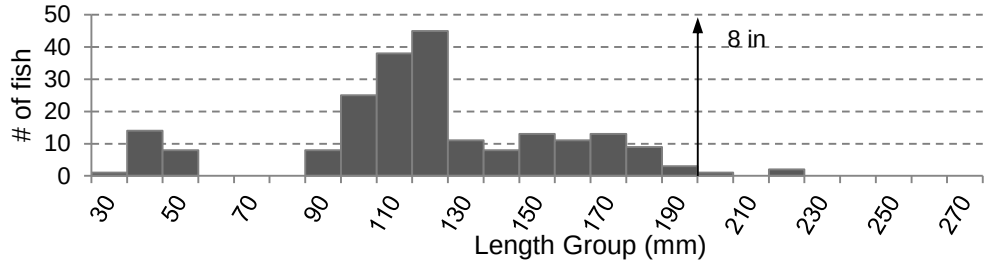

Figure 24. Length frequency histogram for brook trout surveyed at Castle Creek reach 450 within the Black Hills Fish Management Area, South Dakota, 2014.

Bittersweet Creek (BST)

Bittersweet Creek site 2 was inaccessible in 2014, due to closed roads, downed trees and private property; however, the stream bed about ½ mile down was dry when checked on June 23rd. Site 1, closer to the headwaters, had very little water when checked on Aug 18th. A survey of site 2 in July 2008 yielded no fish and the pH level was 3.4, which would negatively impact fish populations (Weiner et al. 1986; Pinder & Morgan 1995; Hulsman et al. 1983). No fish were captured in 1994 either.

Gold Run Gulch (GRG)

Gold Run Gulch site 1 near the inlet of Deerfield Reservoir was sampled on June 17, 2014. Populations estimates were 36 rock bass, 26 brook trout including two ≥200 mm, 28 rainbow trout including 15 ≥200 mm . Fourteen of these larger rainbow trout had an adipose clip (hatchery stocked fish). Apparently, reproduction is occurring up Gold Run Creek, with 13 young rainbow trout surveyed. In May 2008, this survey yielded one brook trout under 200 mm, two creek chubs, and one white sucker.

Site 2 was created and surveyed on June 26, 2014 about 1 km (0.7 mi) upstream from the Deerfield Store. Only brook trout were captured with two <200 mm and one ≥200 mm.

Silver Creek (Tributary of Castle Creek) (SIC)

Silver Creek site 3 was sampled for the first time on July 1, 2014 yielding ten brook trout <200 mm, two rainbow trout <200 mm and 3 unidentified young of the year trout.

Site 1 was sampled on June 18, 2014 with 20 brook trout <200 mm sampled in one pass. This site was previously sampled in May 2008 yielding 33 brook trout with one ≥200 mm in one pass and in June 1994 with 27 brook trout less than 200 mm estimated in three passes.

Castle Creek South Fork (CCS)

Castle Creek South Site 3, just above the confluence with Castle Creek, was surveyed on June 19, 2014. It had a population estimate of 80 brook trout with ten ≥200 mm (Figure 25) and 38 rainbow trout with eight ≥200 mm (Figure 26). This site was previously surveyed July 2012 with a population estimate of 190 brook trout with 14 ≥200 mm, 86 rainbow trout with six ≥200 mm, and 30 rock bass.

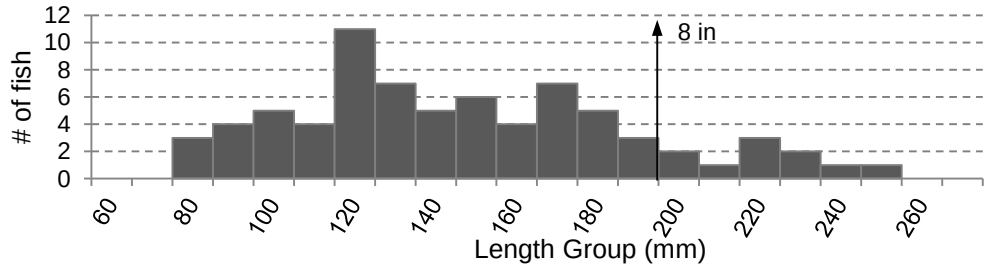

Figure 25. Length frequency histogram of brook trout captured during a back pack electrofishing survey of Castle Creek site 3 within the Black Hills Fish Management Area, South Dakota, 2014.

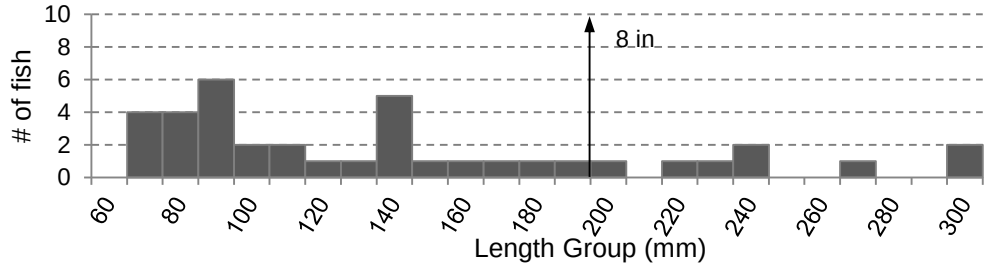

Figure 26. Length frequency histogram of rainbow trout captured during a back pack electrofishing survey of Castle Creek site 3 within the Black Hills Fish Management Area, South Dakota, 2014.

Castle Creek South site 2, above Ditch and Pole Creeks, was surveyed on June 26, 2014. Population estimates were 75 brook trout and three rainbow trout, all <200 mm. This site was surveyed in June 1994 and September 2006 with population estimates of 33, 32, and 12 brook trout < 200 mm sampled, respectively. It was also surveyed in July 2008 in a single pass with 12 brook trout captured.

Nichols Creek (NIC)

Nichols Creek site 2 was sampled for the first time on June 18, 2014. 62 brook trout and four rainbow trout all <200 mm were sampled. An interesting discovery about this creek was a waterfall at the top of the site that likely prevents fish movement. The 30 meters above the waterfall were also sampled with no fish detected. Another new site (site 3) was sampled about 160 meters up stream, with no fish detected.

Site 1, further upstream was not sampled in 2014 or in 2008 due to too little flow. It is located on private land and although the landowner gave permission to sample in 2008, he indicated that only a trickle was running at the time and that the creek is usually dry. This site was last surveyed in June 1993 and no fish were captured.

Heely Creek (HEE)

Site 5 of Heely Creek (Figure 2) was sampled for the first time on June 24, 2014 with 13 brook trout <200 mm detected in a single pass. This site was created as a result of further upstream access being impeded by logging activity and very large trees dropped across the trail. Site 1, about 625 meters upstream was sampled in May 2008 with no fish captured. A June 1994 survey of this site yielded eight brook trout with one ≥200 mm.

Ditch Creek (DTC)

Ditch Creek site 1 was surveyed on June 30, 2014. The population estimate was 385 brook trout <200 mm. In May 2008, 109 brook trout were sampled, with one ≥200 mm.

A new site (stie 3) at the Ditch Creek Campground was also surveyed on June 30, 2014 with a population estimate of 130 brook trout <200 mm and six ≥200 mm (Figure 27).

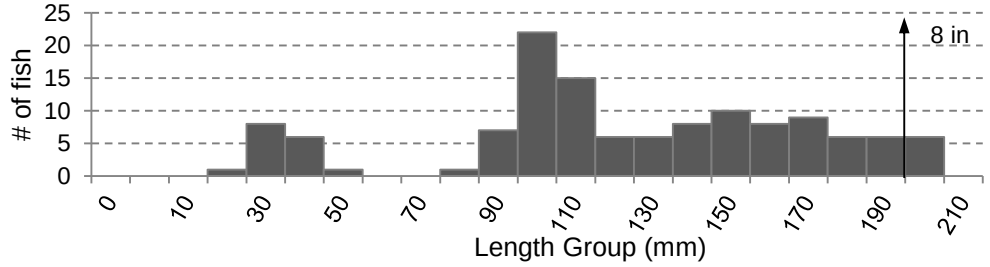

Figure 27. Length frequency histogram of brook trout captured during a back pack electrofishing survey of Ditch Creek site 3, in the Ditch Creek Campground within the Black Hills Fish Management Area, South Dakota, 2014.

Pole Creek (POC)

Pole Creek site 1 was surveyed on June 24, 2014 yielding a population estimate of 26 brook trout with one ≥200 mm. Previous surveys were in July 2008 with no fish captured and June 1994 with eight brook trout <200 mm and nine unidentifiable young-of-the-year trout captured.

Site 2, near the confluence with South Castle Creek, was surveyed for the first time on June 24, 2014. This yielded 26 brook trout <200 mm.

Recommendations

1. Manage Rapid Creek Watershed's tributaries as wild fish natural yield and native fishery
2. Survey Rapid Creek Watershed tributaries every five to seven years.
3. Perform an intense three-pass survey on Rapid Creek within 3 years or when water flows allow.

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Boxelder Creek Watershed

Counties: Lawrence, Meade, and Pennington

The Boxelder Creek watershed is located in the north central and eastern portions of the Black Hills and continues onto the prairie east of the Black Hills until it eventually reaches the Cheyenne River near Wasta, South Dakota (Figure 28). The Black Hills portion of the Boxelder Creek watershed is mainly pine and spruce forest managed by the United States Forest Service (USFS). However, there are many road crossings, intermixed private land, and impoundments within the watershed. Size and harvest regulations within the Boxelder Creek watershed are the statewide regulations for trout which is a five fish (any combination) daily limit with only one over 14 inches. Boxelder Creek experienced high flows in 2014, especially during the months of May and June when flows exceeded 200 cubic feet per second.

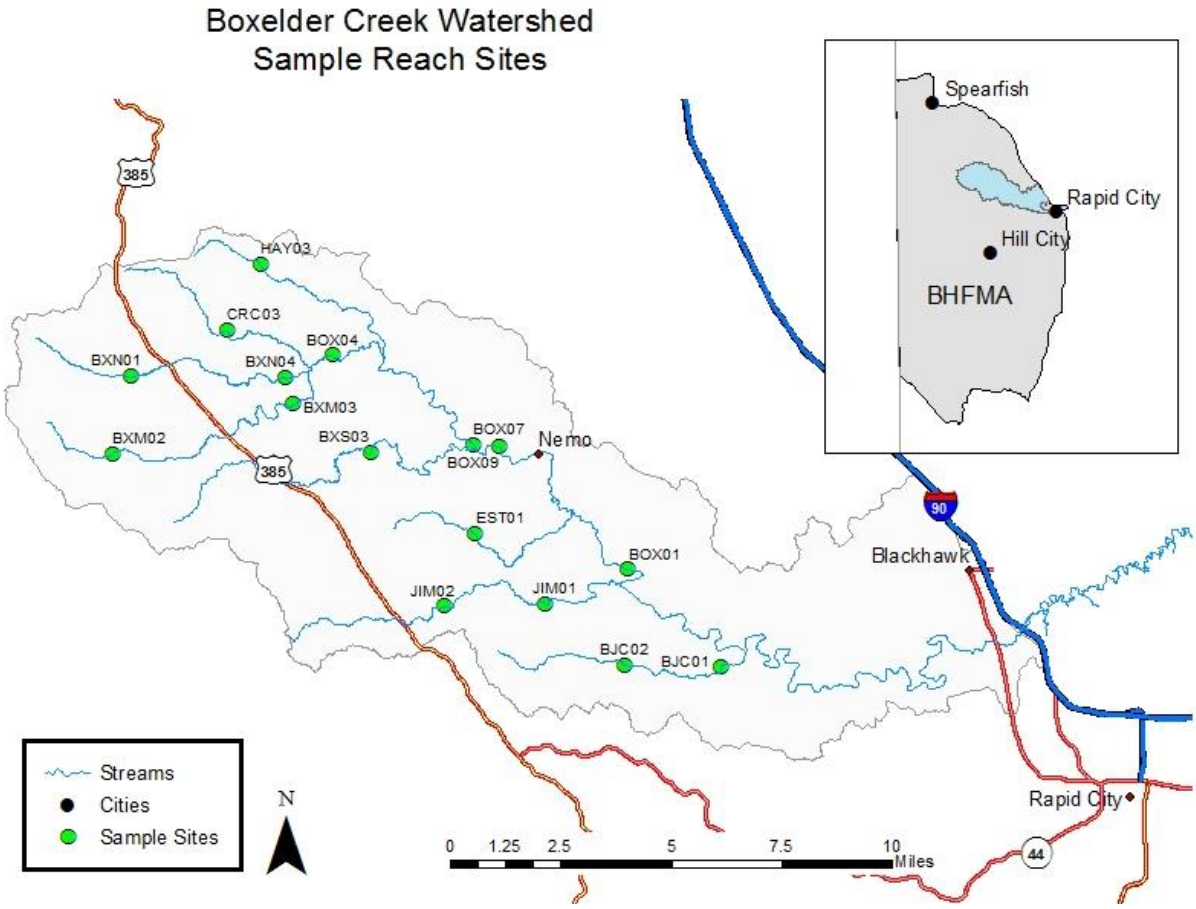

Figure 28. Boxelder Creek watershed survey locations in 2014.

METHODS

Efforts were made to sample at least two reaches within every stream that contained flowing water. Sampled creeks included Boxelder Creek, Bogus Jim Creek, Jim Creek, Estes Creek, Boxelder South Fork, Hay Creek, Corral Creek, Boxelder Middle Fork, Boxelder North Fork.

Sample Methods

Please see Introduction for all Black Hills Watersheds' Streams Report for methods and species abbreviations.

RESULTS AND DISCUSSION

In 2014, a total of 16 sites on nine different creeks were sampled within the Black Hills portion of the Boxelder Creek Watershed (Table 16). Ten total fish species were collected during the surveys. The most abundant species in the watershed was longnose dace, captured in all but four sites. Brook trout were the most widespread and were captured in all sites but Bogus Jim Creek, which had no fish. Brown trout were found only in Boxelder Creek itself and one site in Jim Creek (Table 17).

Table 16. Brook trout population estimates and estimated number of fish per acre within each site sampled in the Boxelder Creek watershed within the Black Hills Fish Management Area, South Dakota, 2014.

	BKT<200 mm		BKT≥200 mm		
Creek Name/ Site #	Pop. Est.	# / Acre	Pop. Est.	# / Acre	Stream Class
Boxelder/01	1 (1)	5	2	9	BKT3
Boxelder/07	31 (2)	170	6	33	BKT2
Boxelder/09	5 (1)	32	1	6	BKT3
Boxelder/04	41 (8)	479	7 (2)	82	BKT2
Bogus Jim/01	No fish detected				
Bogus Jim/02	No fish detected				
Jim/01	124 (51)	1493			
Jim/02	3 (1)	70	1	23	BKT3
Estes/01	135 (15)	2406	1	18	BKT3
Boxelder South/03	53 (6)	769	4	58	BKT2
Hay/03	4	114	1 (1)	29	BKT2
Corral/03	28 (2)	511	4 (1)	73	BKT2
Boxelder North/01	31 (3)	719	1	23	BKT3
Boxelder Middle/02	52 (1)	1125			BKT3
Boxelder North/04	68 (5)	1478	5	109	BKT2
Boxelder Middle/03	47 (4)	815	4	69	BKT2

Table 17. Brown trout population estimates and estimated number of fish per acre within each site sampled in the Boxelder Creek watershed within the Black Hills Fish Management Area, South Dakota, 2014..

	BNT<200 mm		BNT≥200 mm		
Creek Name/ Site #	Pop. Est.	# / Acre	Pop. Est.	# / Acre	Stream Class
Boxelder/01	9 (2)	42	5	23	BNT3
Boxelder/07	50 (3)	274	7	38	BNT2
Boxelder/09	26 (23)	165	5 (1)	32	BNT2
Boxelder/04	1 (4)	12			BNT3
Jim/02	1	23			BNT3

Table 18. Population estimates of non-salmonid fish species in each site sampled in the Boxelder Creek watershed within the Black Hills Fish Management Area, South Dakota, 2014.

Creek Name/ Site #	LND	WHS	MTS	STC	GSF	CRC	YEP	FHM
Boxelder/01	69 (38)	75 (6)	3 (1)	11 (21)				
Boxelder/07	1430 (2515)	7 (2)	68 (7)		1 (1)	1 (1)		
Boxelder/09	317 (50)	15 (2)	38 (5)					
Boxelder/04	266 (40)	3 (1)	11 (1)					
Jim/01	1 (4)							
Jim/02	2 (2)							
Boxelder South/03	279 (23)	1						
Boxelder North/01	16 (10)							
Boxelder North/04	87 (15)		4					
Hay/03	10 (9)	3 (1)						1 (4)
Boxelder Middle/02	4 (2)	2 (1)						
Boxelder Middle/03	153 (42)	8 (36)	2				2 (1)	

*single pass site, value is total fish captured

Boxelder Creek (BOX)

A total of four sites were sampled on main stem Boxelder Creek in 2014. Sites one and nine were sampled on July 31, site four was sampled on July 7, and site seven was sampled on August 1. A total of eight fish species were found at these four sites. Brown and brook trout were sampled *i*n all four sites. Other fish species included white suckers, longnose dace, mountain suckers, stone cats, green sunfish, and creek chubs (Table 18).

Based on the estimates of brook trout greater than 200 mm, in 2014 sites four and seven meet class two brook trout fisheries, and sites one and nine meet class three brook trout fisheries. Site one meets a class three brown trout fishery, and sites seven and nine meet class two brown trout fisheries as well. Mountain sucker, which are a fish species native to the Black Hills, and are a species of conservation concern were sampled at all four sites with the highest number being found at site seven.

Bogus Jim Creek (BJC)

Two sites were sampled on Bogus Jim Creek in 2014. Site one, which was sampled on June 5, 2014 revealed no fish, and was sampled with only one electrofishing pass. Previously, Bogus Jim Creek site one was last sampled in 2010 in which a small sample of brook trout less than 200 mm were collected. Prior to the 2010 sampling event the site was last sampled in 1993, and creek chubs, longnose dace and mountain suckers were collected.

Bogus Jim Creek site two was surveyed on July 9, 2014. This was a newly established survey site, and no fish were collected during the single pass survey in 2014.

Jim Creek (JIM)

Two sites were sampled on Jim Creek in 2014 as well. Site one was sampled June 10, 2014 and only brook trout less than 200 mm and longnose dace were collected. During previous surveys in 2008 and 2010 brook trout were the only species sampled, and in 2010 two brook trout greater than 200 mm were collected which were the only brook trout collected exceeding 200 mm in any of the last three surveys.

Jim Creek site two was surveyed on June 10, 2014. Brook trout, brown trout and longnose dace were collected with an estimated four, one, and two fish respectively in the site. This site meets a class three brook trout fishery. Previous surveys of this site in 1994, 2008, and 2010 revealed mountain and white suckers in addition to the fish species collected in the 2014 survey.

Estes Creek (EST)

Estes Creek site one was surveyed in 2014. This was the only site sampled on this creek. In 2014, there were an estimated 135 brook trout less than 200 mm and one brook trout greater than 200 mm at this

site. Estes Creek site one was last surveyed with a single pass in 2010. Brook trout were the only fish species collected at this site during the last two surveys. Site one meets a class three brook trout fishery in 2014.

South Box Elder Creek (BXS)

A single site was surveyed on South Boxelder Creek in 2014. Site three is a new site that had not been previously surveyed. On August 4, 2014 during three passes three fish species were collected at this site. These include brook trout, longnose dace, and white sucker. There was an estimated 53 brook trout less than 200 mm, four brook trout exceeding 200 mm, 279 longnose dace, and one white sucker. Site three met a class two brook trout fishery in 2014.

North Box Elder Creek (BXN)

Two sites were surveyed on North Boxelder Creek in 2014. Site one was sampled on June 11, 2014. There were an estimated 31 brook trout below 200 mm, one brook trout longer than 200 mm, and 16 longnose dace in site one. This site had previously been sampled in 1993 and 2010 (single pass). During the 1993 and the 2014 survey two species of fish (brook trout and longnose dace) were collected. During the 2010 single pass survey only brook trout less than 200 mm were collected. Site one met a class three brook trout fishery in 2014.

Site four was another site surveyed on North Boxelder Creek, and the survey was completed on July 9, 2014. This site had not previously been surveyed. During the 2014 survey three fish species were collected. An estimated 68 brook trout less than 200 mm, five brook trout exceeding 200 mm, 87 longnose dace, and four mountain suckers were in this site in 2014. This site would be classified as a class two brook trout fishery in 2014.

Hay Creek (HAY)

A fishery survey was conducted on Hay Creek site three on June 5, 2014 using three electrofishing passes. During the survey there were an estimated four brook trout below 200 mm, one brook trout above 200 mm, one fathead minnow, ten longnose dace, and three white suckers. This site would be a class two brook trout fishery based on the estimated number of fish over 200 mm per acre in 2014. During previous surveys in 2010 and 1994 all of the same fish species were collected with the exception of fathead minnows and white suckers. In 1994, one yellow perch was collected as well.

Corral Creek (CRC)

Site three was sampled on Corral Creek on July 23, 2014. This site had not previously been sampled. An estimated 28 brook trout less than 200 mm, four brook trout longer than 200 mm, 181 longnose dace, and one white sucker were in this site. During the 2014 survey there were an estimated 73 brook trout > 200 mm per acre meeting a class two brook trout fishery.

Middle Boxelder Creek (BXM)

Middle Boxelder Creek site two was surveyed on June 11, 2014 using three electrofishing passes. Three fish species were collected with an estimated 52 brook trout less than 200 mm, four longnose dace, and two white suckers found at this site. Previous surveys in 1993 and 2010 had the same fish species plus a fathead minnow was collected during the 1993 survey.

Site three was a new site in 2014. During the survey an estimated 47 brook trout < 200 mm, four brook trout > 200 mm, 153 longnose dace, two mountain suckers, eight white suckers, and two yellow perch were in this site. There was an estimated 69 brook trout > 200 mm at this site classifying it as a class two brook trout fishery.

Discussion and Management Considerations

All of the creeks surveyed in the Boxelder Creek Watershed contained brook trout except the sites surveyed in Bogus Jim Creek. The highest number of brook trout longer than eight inches was in North Boxelder Creek site four which met qualifications of a class two brook trout fishery in 2014.

Brown trout were only found in the sites surveyed on Boxelder Creek with the exception of Jim Creek site two where one brown trout less than eight inches was collected. The estimated number brown trout per acre was relatively low as none of the Boxelder Creek sites sampled had enough fish over eight inches to have a class one distinction.

There were other species of fish (besides brook and brown trout) in most of the sites sampled within the Boxelder Creek watershed. All but three of the sites contained longnose dace. Eight sites contained white suckers. Mountain suckers were collected in six sites with the highest estimated numbers in the Boxelder Creek sites. Stone cats, green sunfish, creek chubs, yellow perch and fathead minnows were also collected within the watershed.

Recommendations

1. Manage Boxelder Creek Watershed's tributaries as wild fish natural yield and native fishery.
2. Survey Boxelder Creek Watershed's tributaries every five to seven years.
3. Continue to monitor mountain sucker populations within Boxelder Creek.
4. Perform an intense three-pass survey on Boxelder Creek within five years.

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USGS Real-Time Water Data for South Dakota. January 12, 2015. US. Department of the Interior, U.S. Geological Survey. Reviewed Jan. 12, 2015. <http://waterdata.usgs.gov/sd/nwis/rt>.

Elk Creek Watershed

Counties: Meade and Lawrence

The Elk Creek watershed's headwaters are approximately four miles west of Brownsville on Hwy 385 and the creek drains into the Cheyenne River north of the city of Wasta. Most of the Elk Creek Watershed within the Black Hills Fish Management Area is located along a west to east orientation between Hwy 385 and I 90 north and west of Piedmont, SD (Figure 29). The Elk Creek watershed is in a pine/spruce forest and managed by the US Forest Service. As with the rest of the Black Hills, many forest service roads cut through the watershed with a few houses present. Elk Creek near forest service road 151 was last stocked in 1995 with catchable brown trout. Dalton Lake on Little Elk Creek is currently stocked with catchable rainbow trout. Elk Creek and its tributaries are managed under standard regulations with a daily limit of five trout (in any combination) with one allowed 14 inches or longer.

METHODS

Sample Location

Efforts were made to sample at least two reaches within every stream that contained flowing water. In 2014, six sites were sampled within three creeks in the Elk Creek watershed (Tables 19 & 20). A total of six fish species were collected during the surveys. The creeks sampled include Elk, Little Elk, and Meadow. An attempt was also made to sample Virkula Gulch Creek in 2014, but the creek was dry.

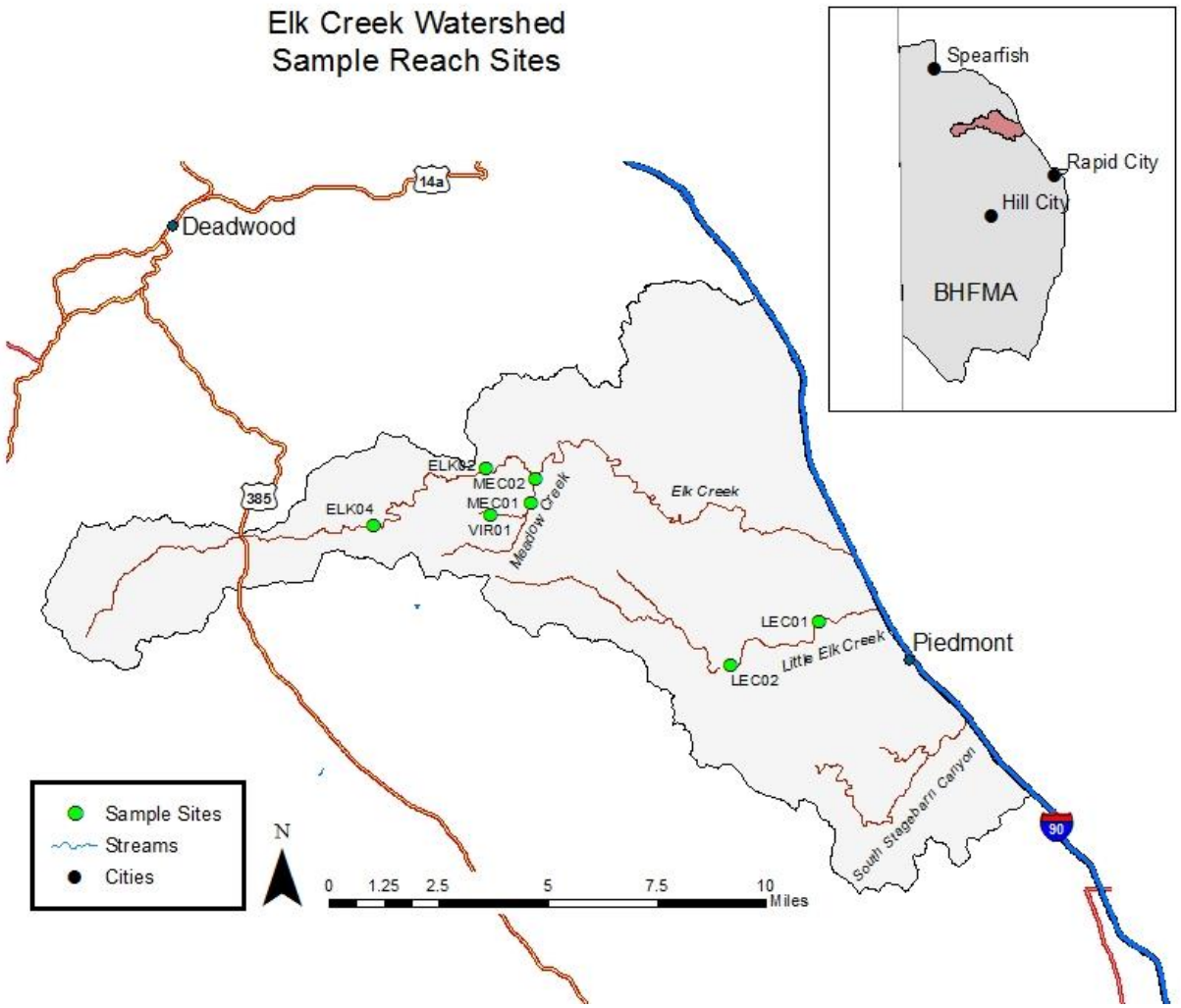

Figure 29. Stream survey sites in Elk Creek watershed within the Black Hills Fish Management Area, South Dakota, 2014.

Table 19. Brook trout population estimates and estimated number of fish per acre within each site sampled in the Elk Creek watershed within the Black Hills Fish Management Area, South Dakota, 2014.

	BKT<200 mm		BKT≥200 mm		
Creek Name/ Site #	Pop. Est.	# / Acre	Pop. Est.	# / Acre	Stream Class
Elk/02			7 (2)	47	BKT2
Elk/04			3	20	BKT3
Little Elk/01	60 (3)	517	5	43	BKT2
Little Elk/02	69 (7)	746	3 (1)	32	BKT2
Meadow/02	5	70	1	14	BKT3
Meadow/01	5	93	1	19	BKT3

Table 20. Population estimates of other fish species in each site sampled in in the Elk Creek watershed within the Black Hills Fish Management Area, South Dakota, 2014.

Creek Name/ Site #	LND	WHS	MTS	CRC	RBT≥200 mm
Elk/02	91 (9)	52 (26)	226 (10)	7	
Elk/04	183 (19)	1	40 (5)	6	
Little Elk/01					
Little Elk/02					1
Meadow/02	25 (355)		1 (1)		
Meadow/01	1				

Elk Creek (ELK)

Elk Creek site two was surveyed on July 14, 2014 using three electrofishing passes. Brook trout were collected with an estimated seven fish longer than 200 mm. Other fish species collected included longnose dace, white sucker, mountain suckers, and creek chubs. Site two was last surveyed in 2009 using a single pass. Fish collected included mountain sucker, longnose dace, and white sucker. In 2014, Elk Creek site two met a class two brook trout fishery based on the estimate of 47 brook trout longer than 200 mm per acre.

Site four was surveyed on July 18, 2014 with the same fish species detected as site two. There were an estimated three brook trout in the site and all exceeded 200 mm in length. Elk Creek site four was last surveyed in 2008 using a single pass. Brook trout, mountain sucker, longnose dace and white sucker were collected. During the 2014 survey Elk Creek site four met a class three brook trout fishery.

Little Elk Creek (LEC)

Two sites were surveyed on Little Elk Creek in 2014. Site one was sampled on August 12, 2014. Only brook trout were collected with an estimated 60 less than and five longer than 200 mm. A total of 19 brook trout were collected during one electrofishing pass in 2008. Little Elk Creek site one met the qualification of a class two brook trout fishery in 2014.

Little Elk Creek site two was surveyed July 30, 2014. This site had similar numbers of brook trout to site one with an estimated 73 brook trout with three exceeding 200 mm in length. A single rainbow trout longer than 200 mm was collected during the survey as well and it was likely from Dalton Lake which is on Little Elk Creek and stocked with rainbow trout. This site was last sampled in 2008 using a single pass. This surveyed yielded creek chubs, fathead minnows, and finescale dace in addition to the brook trout. This site met a class two brook trout fishery in 2014 as well.

Meadow Creek (MEC)

Meadow Creek site two was sampled on June 6, 2014. There were an estimated six brook trout, 25 longnose dace and one mountain sucker. This site was surveyed in 2010 as well and three brook trout and 17 longnose dace were collected in a single pass.

Meadow Creek site one was also surveyed on June 6, 2014 using two electrofishing passes. Very few fish were collected in this site including six brook trout and one longnose dace, all in the first pass. Meadow Creek site one was last surveyed in 2010 using a single pass. More fish were collected during this sampling than in 2014 with 24 brook trout, one mountain sucker, and 23 longnose dace collected.

Discussion and Management Recommendations

All of the sites surveyed within the Elk Creek watershed contained brook trout in 2014. The highest numbers were found within Little Elk Creek. The two sites surveyed in Little Elk Creek were exclusively brook trout with the exception of one rainbow trout. Elk Creek site two had the most brook trout larger than 200 mm, but no brook trout below that length. Most of the other fish species besides trout within the watershed were found in Elk Creek. In particular, Elk Creek site two had higher numbers of mountain sucker, which are a species of conservation concern in the Black Hills.

Recommendations

1. Manage Elk Creek Watershed's tributaries as wild fish natural yield and native fishery.

2. Survey Elk Creek Watershed's tributaries every five to seven years.

3. Continue to monitor mountain sucker populations within the Elk Creek Watershed.

Bear Butte Creek Watershed

Counties: Lawrence and Meade

Stream sites in the Bear Butte Creek Watershed within the Black Hills Fish Management Area were surveyed during 2014 to monitor fish populations (Figure 30). Eight reach site in six tributary creeks were surveyed between May and September 2014. The watershed is in a pine/spruce forest and managed by the US Forest Service. Historically, the Bear Butte Watershed played an important role in the gold mining activities. Several small gold mines are located within the watershed with the Gilt Edge Mine, a Superfund Site, located on the Strawberry Creek drainage (EPA Region 8). Bear Butte Creek was last stocked with catchable Rainbow Trout in 2006, but upper reaches within the BHFMA have not been stocked since 1989. Bear Butte Creek and its tributaries are currently managed under standard BHFMA regulations with a daily limit of five trout (in any combination) with one 14 inches or longer allowed.

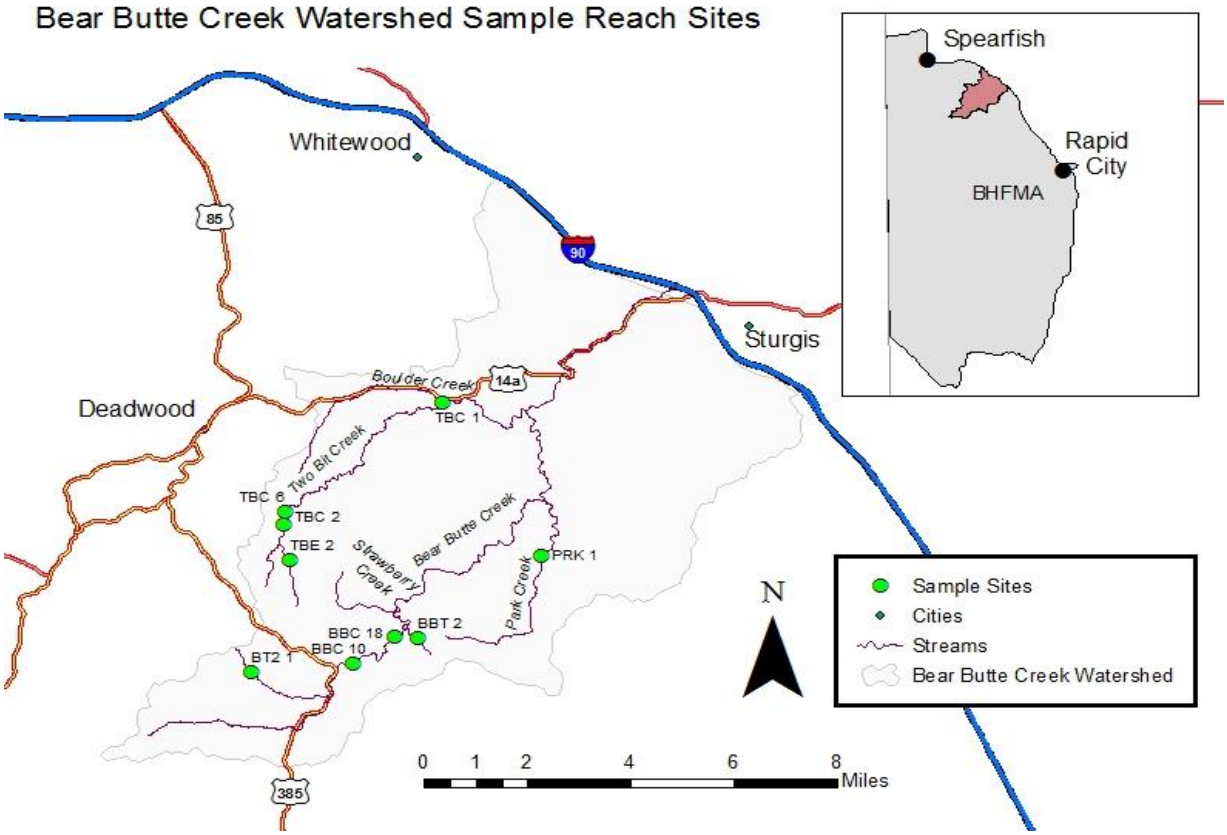

Figure 30. Map of the Bear Butte Creek Watershed within the Black Hills Fish Management Area, South Dakota, 2014.

Methods

Sample Location

Surveyed creeks included Bear Butte, Two Bit, Two Bit East, Park, and two unnamed tributaries. More sites in Bear Butte Creek and Strawberry Creek will be surveyed in 2015. Peedee Creek and Two Bit West Creek were not sampled due to private land access.

Sample Methods

Please see introduction for all Black Hills Watersheds' Streams Report for methods and species abbreviations.

Results and Discussion

Seven species of fish were captured in the Bear Butte Creek Watershed during 2014 sampling (Table 22). The most abundant species in the watershed was longnose dace, but they were captured in just three sites. Brook trout were present in all sites that had fish (Table 21).

Table 21. Population estimates of brook trout in 100 meter survey reach sites of creeks within the Bear Butte Creek Watershed within the Black Hills Fish Management Area, South Dakota, 2014. Streams are in order from furthest downstream to upstream. Confidence interval (95%) is reported in parenthesis.

Creek Name/ Site #	BKT <200 mm	BKT ≥200 mm	≥200 mm/ Acre	BKT Class
Bear Butte\18	12 (8)	2	26	BKT2
Bear Butte\10	10	3	29	BKT2
Two Bit\02*	50			BKT3
Two Bit\06*	96			BKT3
Two Bit East\02*	21			BKT3
Park\01*	No fish detected			
Bear Butte Trib.2\01*	8	2	76	BKT2
Bear Butte Trib.\02*	3			BKT3

*single pass site, value is total fish captured

Table 22. Population estimates of non-trout species in 100 meter survey reach sites of creeks in the Bear Butte Creek Watershed within the Black Hills Fish Management Area, South Dakota, 2014. Streams are in order from furthest downstream to upstream. Confidence interval (95%) is reported in parenthesis.

Creek Name/ Site #	LND	WHS	MTS	LMB	BSB	ROB	FHM
Bear Butte\18	517 (45)	2	9 (1)				1 (1)
Bear Butte\10	344 (41)	33 (5)	18 (1)	1	10		
Bear Butte Trib.2\01*	129	1				1	

*single pass site, value is total fish captured

Bear Butte Creek (BBC)

Bear Butte Creek Site 10 was sampled on July, 9 2014. Three passes were done with population estimates of 13 brook trout with three ≥200 mm, 280 longnose dace, 18 mountain suckers, 31 white suckers, ten brook stickleback, and 1 largemouth bass. This site was sampled in July 2010 with a single pass yielding 10 brook trout with two >200 mm, one mountain sucker and 176 longnose dace. A June 1995 survey yielded a population estimate of three brook trout with two >200 mm, 933 longnose dace, 139 mountain sucker, and 38 white sucker.

Bear Butte Site 18 (now referred to as 864) is a new site yielding a population estimate of 12 brook trout with two ≥200 mm, 430 longnose dace, nine mountain suckers, two white suckers, and one fathead minnow.

Two Bit Creek (TBC)

Two Bit Creek site 1 was dry when checked for water on August 5, 2014. Two Bit Creek site 6 was newly sampled on August 18, 2014. The survey yielded 96 brook trout in one pass with none over 200 mm.

Fifty brook trout were detected during a single pass of Two Bit Creek site 2 on July 31, 2014. None were over 200 mm. This site was also surveyed in August 2008 and July 1993. In 2008, 196 brook trout were surveyed with three ≥200 mm in a single pass and in 1993, the population estimate was 171 brook trout with 14 ≥200 mm.

Two Bit Creek-East Fork (TBE)

Two Bit Creek-East site 2 was first sampled on August 21, 2014. Twenty-one brook trout <200 mm were captured in a single pass. Site 1 was unable to be sampled due to private land access. During the 2008 survey at site 1, 19 brook trout were detected with four ≥200 mm.

Park Creek (PRK)

Park Creek site 1 was previously sampled in June 1995 and two fathead minnows were captured. Recently sampled on June 16, 2014, no fish were captured. An puddle of water in the drainage with no water flowing in or out was shocked in August and a few fathead minnows were detected, however it was dry later in September.

Bear Butte Creek Unnamed Tributary (BBT)

Site 2, above Silver Queen Lane off Galena Road, was surveyed on August 21, 2014 yielding three brook trout <200 mm. Site 1, a little bit downstream was surveyed in August 2008 with 33 brook trout surveyed.

Bear Butte Creek Unnamed Tributary 2 (BT2)

An unnamed tributary of Bear Butte Creek, locally referred to as Paradise Creek, was surveyed at site 1 for the first time. This yielded ten brook trout with two ≥200 mm, 129 longnose dace, one rock bass, and one white sucker. This site is below a small private dam, which has been detected to have rock bass.

Recommendations

1. Continue to manage the Bear Butte Creek watershed under standard trout regulations as a natural brook trout and native fishery and monitor on a 3-5 year basis.

2. Survey the main stem of Bear Butte Creek more intensely within the next 7 years.

3. Investigate areas of the Bear Butte Watershed that could serve as potential areas of native fish management.

Literature Cited

EPA Region 8. (November 10, 2008). Superfund Program: Gilt Edge Mine. Reviewed February 3, 2009. from US Environmental Protection Agency. Web site <http://www.epa.gov/region08/superfund/sd/giltedge/ index.html#1>.

Whitewood Creek Watershed

Counties: Lawrence

The Whitewood Creek watershed is located in the north central and eastern portions of the Black Hills and continues onto the prairie east of the Black Hills until it eventually reaches the Belle Fourche River near Vale, South Dakota. The Black Hills portion of the Boxelder Creek watershed is mainly pine and spruce forest managed by the USFS. However, there are many road crossings, intermixed private land, and impoundments within the watershed. Size and harvest regulations within the Whitewood Creek watershed are the statewide regulations for trout which is a five fish (any combination) daily limit with only one over 14". Hatchery rainbow trout are stocked in Whitewood Creek near Deadwood, SD.

In 2014, a total of 27 sites on nine different creeks were sampled within the Black Hills portion of the Whitewood Creek watershed (Figure 31). Nine total fish species were collected during the surveys including brook trout (Table 23), brown trout (Table 24) and non-salmonids (Table 25). The surveys were completed by South Dakota Game, Fish and Parks or by consultant firms for mining purposes.

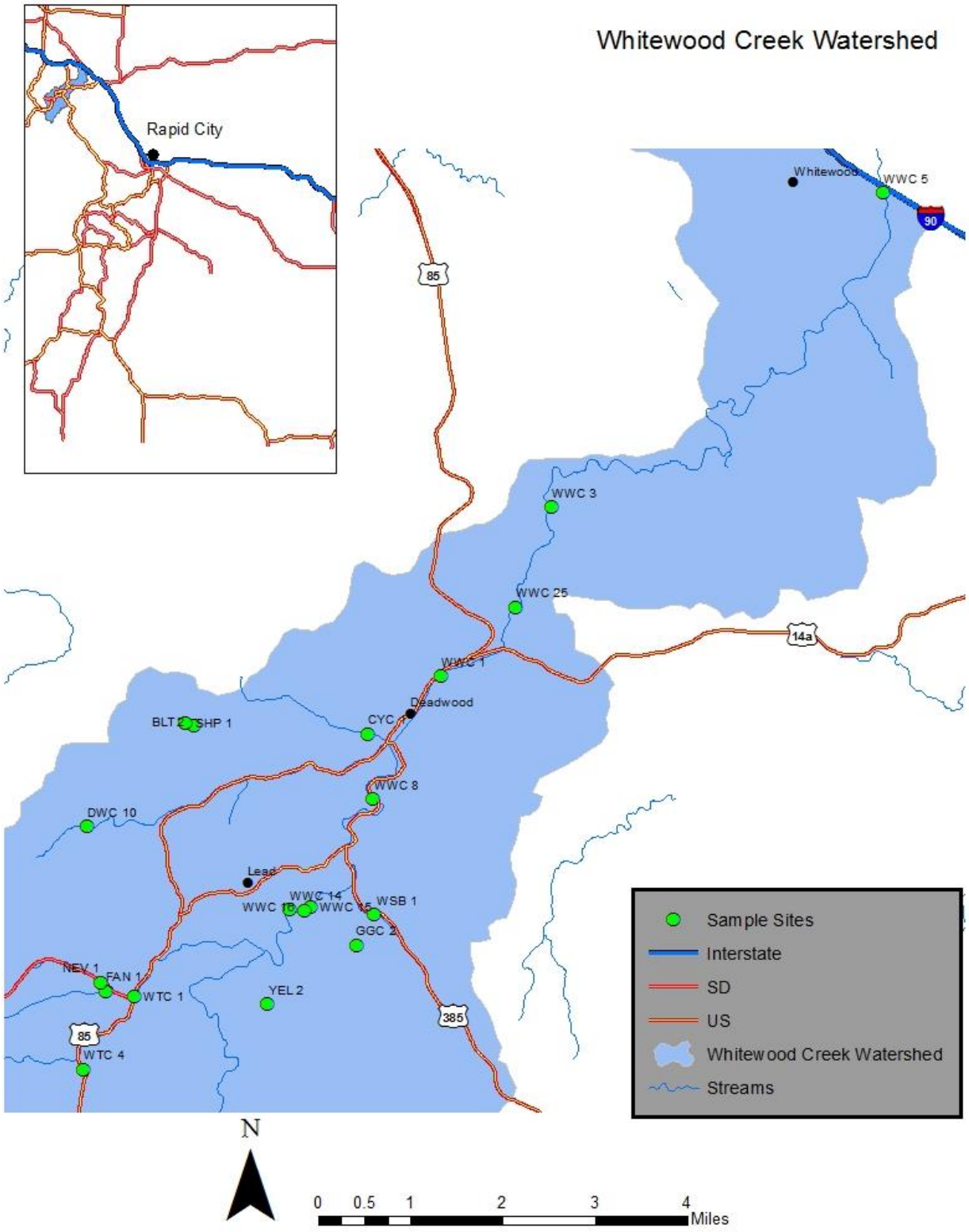

Figure 31. Stream survey locations in the Whitewood Creek watershed within the Black Hills Fish Management Area, 2014. Sites that were surveyed by consultant firms were not included on the map.

Table 23. Brook trout population estimates and estimated number of fish per acre within each site sampled in the Whitewood Creek watershed within the Black Hills Fish Management Area, 2014. Values in parenthesis are 95% confidence intervals.

	BKT<200 mm	BKT≥200 mm

Creek Name/ Site #	Pop. Est.	# / Acre	Pop. Est.	# / Acre	Stream Class
Blacktail/01**	93 (2)	2157	4	93	BKT2
Blacktail/02	163 (4)	3409	4	84	BKT2
Deadwood/02**	269 (12)	5523	9 (2)	185	BKT1
Deadwood/06**	170 (5)	3605			BKT3
Deadwood/08**	343 (8)	9800	8	229	BKT1
Deadwood/09**	441 (17)	7235	11	180	BKT1
Deadwood/10*	156	3434			BKT3
Deadwood/11**	279 (14)	4460	6 (1)	96	BKT2
Fantail/01*	2	87			
Fantail/03**	No fish				
Grizzly/02	64 (1)	1751			BKT3
Nevada/01*	11	395	1	36	BKT2
Sheeptail/01*	1	40	3	121	BKT2
Stewart/01**	310 (15)	6,608	8 (0)	171	BKT1
West Strawberry/01	142 (10)	2551	3 (2)	54	BKT2
Whitetail/03**	49 (2)	930	2	38	BKT2
Whitetail/04	27 (1)	547	5	101	BKT2
Whitewood/14	4 (1)	31			BKT3
Whitewood/15	7 (0)	43	20 (0)	122	BKT2
Whitewood/16	2 (2)	13	1 (1)	6	BKT3
Yellow/02*	23	539	1	23	BKT3

*Sites were completed with one electrofishing pass, and population estimates are the number of fish sampled.
** Sites were completed by a consultant firm for mining companies

Table 24. Brown trout population estimates and estimated number of fish per acre within each site sampled in the Whitewood Creek watershed within the Black Hills Fish Management Area, 2014. Values in parenthesis are 95% confidence intervals.

	BNT<200 mm		BNT≥200 mm		
Creek Name/ Site #	Pop. Est.	# / Acre	Pop. Est.	# / Acre	Stream Class
Grizzly/02	31 (3)	848			BNT3
West Strawberry/01	13 (1)	234	5	90	BNT2
Whitetail/01	100 (8)	1201	18	216	BNT1
Whitewood/01	15 (2)	91	33 (1)	199	BNT1
Whitewood/03	4 (2)	18	22 (1)	101	BNT2
Whitewood/05	1	6	1 (1)	6	BNT3
Whitewood/08	16 (1)	142	43 (1)	381	BNT1
Whitewood/14	74 (14)	577	36	281	BNT1
Whitewood/15	20 (1)	122	27 (31)	165	BNT1
Whitewood/16	250 (1037)	1591	25 (2)	159	BNT1

*Sites were completed with one electrofishing pass, and population estimates are the number of fish sampled.
** Sites were completed by a consultant firm for mining companies.

Table 25. Population estimates of fish species other than brook and brown trout in the Whitewood Creek watershed within the Black Hills Fish Management Area, 2014each site sampled in 2014. Values in parenthesis are 95% confidence intervals.

Creek Name/Site #	LND	WHS	MTS	FHM	ROB	CRC	RBT>200 mm
City/01*	19						
West Strawberry/01				1	1		
Whitewood/01	27 (5)		38 (4)				1
Whitewood/03	5062 (1774)		624 (580)			1 (4)	3 (1)
Whitewood/05	1314 (25)	1 (1)	340 (9)				
Whitewood/08	1 (1)		2 (2)				
Whitewood/15	1 (1)						
Whitewood/16	50 (481)						

*Sites were completed with one electrofishing pass, and population estimates are the number of fish sampled.
** Sites were completed by a consultant firm for mining companies.

City Creek (CYC)

City Creek reach site one was surveyed for the first time on September 2, 2014. The site was surveyed using one electrofishing pass and 19 longnose dace were the only fish collected.

Blacktail Gulch Creek (BLT)

Two reach sites were sampled on Blacktail Gulch Creek in 2014. During the surveys only brook trout were found. Site one was surveyed on August 25, 2014 by a consultant firm for a mining company. An estimated 93 brook trout <200 mm and four >200 mm were sampled. This site has been surveyed several times within the last ten years with the most recent survey occurring in 2012 when there an estimated 107 brook trout <200 mm and none >200 mm.

Site two was newly established and sampled on September 3, 2014. Population estimates were higher in this site with an estimated 163 brook trout <200 mm and four brook trout >200 mm.

Deadwood Creek (DWC)

Six sites were sampled on Deadwood Creek in 2014. Sites two, six, eight, nine, and 11 were surveyed by a consultant firm for a mining company. Site ten was surveyed by South Dakota Game, Fish and Parks. Brook trout were the only fish species found in Deadwood Creek in 2014 with the highest estimated numbers occurring in site nine. However, site ten was sampled with only a single pass and therefore the population could not be estimated. Based on number of fish per acre estimates for brook trout >200 mm Deadwood Creek sites two, eight, and nine would be considered a class one brook trout fisheries. Site 11 would be considered a class two brook trout fishery.

Fantail Creek (FAN)

Two sites were sampled on Fantail Creek in 2014. Site one was sampled on August 27, 2014. During a single pass two brook <200 mm were collected. The last time fish were found at this site was in 1998, and there were an estimated four brook trout <200 mm and two brook trout >200 mm in the site.

Site three was sampled by a consultant firm on August 19, 2014. This site has been surveyed several times in recent years and no fish have been captured in any of the sampling events.

Grizzly Gulch Creek (GGC)

Grizzly Gulch Creek site two was surveyed on August 25, 2014. During the sampling there were an estimated 64 brook trout and 31 brown trout <200 mm in the site. There were no fish collected >200 mm.

Site two was last surveyed in 2010 using as single pass. A total of 33 brook trout <200 mm, four brook trout >200 mm, and three brown trout <200 mm were collected.

Nevada Gulch Creek (NEV)

Nevada Gulch Creek Site one was sampled on August 25, 2014. A single pass was completed with a total of 12 brook trout captured with one >200 mm. No fish were found in previous samples in 2001, 2004, 2005, 2010, 2011, or 2012. The only other survey where fish were collected was in 1998, with one brook trout. Nevada Creek site could be considered a class two brook trout fishery at the time of the survey containing an estimated 36 brook trout per acre >200 mm.

Sheeptail Creek (SHP)

Sheeptail Creek was sampled on September 3, 2014 with one pass. A total of four brook trout were collected with one <200 mm and three >200 mm. This creek had not been previously surveyed. This site would be classified as a class two brook trout fishery but could be higher if three passes were completed for a population estimate.

Stewart Gulch Creek (STW)

Stewart Gulch Creek reach site one was surveyed on August 20, 2014 by a consultant for a mining company. There was an estimated total of 317 brook trout in the site with eight of those fish >200 mm. This site has been surveyed many times over the last decade by consulting firms, mostly in late August. Population estimates indicate the highest number of brook trout was in 2014 (Table 26). That being said, fish are likely engaged in spawning movements in Sept or even Aug and fall samples should not be compared to mid-summer ones.

Table 26. Population estimates of fish brook trout per 100 meters surveyed during back-pack electrofishing surveys of Stewart Gulch Creek reach site one in the Whitewood Creek watershed within the Black Hills Fish Management Area, 2014.

Sample mo/yr	BKT <200 mm	BKT ≥200 mm	# ≥200 mm per acre	Class
Aug 1994**	61 (4)	4 (3)	n/a	n/a
Sept 1997**	19 (2)	2 (0)	27	BKT2
Aug 1998**	40 (6)	17 (1)	356	BKT1
Aug 2001**	65 (5)	11 (0)	194	BKT1
Feb 2004**	0	0	-	-
Sept 2004**	56 (2)	6 (0)	123	BKT2
Aug 2005**	129 (6)	2 (1)	n/a	n/a
July 2008	0	0	-	-
Aug 2011**	110 (0)	7 (0)	138	BKT2
Aug 2012**+	131 (4)	8 (1)	162	BKT1
Aug 2014**	310 (15)	8 (0)	171	BKT1

+two brown trout were also surveyed
**surveyed by a consultant firm for a mining company

West Strawberry Creek (WSB)

West Strawberry Creek site one was sampled on August 7, 2014. Four fish species were collected. There were an estimated 146 brook trout in the site with three >200 mm and an estimated 18 brown trout in the site with five >200 mm. One rock bass and one fathead minnow were collected as well. The most recent survey prior to 2014 was in 2010 when a single electrofishing pass collected 89 brook trout and six brown trout. Site one would be classified as a class two brook trout and brown trout fishery with an estimated 54 brook trout and 90 brown trout per acre.

Whitetail Creek (WTC)

Three sites were sampled on Whitetail Creek in 2014. Site one was sampled on June 30 with an estimated 100 brown trout < 200 mm and 18 >200 mm in the site. This site was last surveyed in 1993 with a population estimate of 118 brown trout.
Site three was sampled on August 20, 2014 by an consultant firm for mining companies. There were an estimated 49 brown trout <200 mm and two >200 mm. This site has been surveyed several times in recent years with varying numbers of brown trout in the site during each sampling event.
Site four was sampled on August 27, 2014 with an estimated 32 brown trout with 27 <200 mm and five >200 mm. This site had not previously been sampled. Whitetail Creek sites three and four would both be considered class two brook trout fisheries based on estimates of 38 and 101 fish per acre >200 mm respectively.

Whitewood Creek (WWC)

Seven sites were surveyed on Whitewood Creek in 2014. Site one was sampled on July 28, 2014 with four fish species collected. There were an estimated 48 brown trout with 33 >200 mm, 27 longnose dace, 38 mountain suckers, and one rainbow trout >200 mm. This site meets the class one brown trout designation. It was last surveyed in 2013 when there were an estimated 98 brown trout with 55 >200 mm and 14 mountain suckers.

Site three was surveyed on July 29, 2014. Three electrofishing passes revealed five fish species. There were an estimated four brown trout < 200 mm, 22 brown trout >200 mm, one creek chub, 5,062 longnose dace, 624 mountain suckers, and three rainbow trout. This meets the brook trout and brown trout class two designations. This site was last sampled in August of 2009 using a single electrofishing pass. During that survey a total of 28 brown trout and 91 mountain suckers were collected.

Site five was sampled on July 24, 2014. Population estimates were two total brown trout, 1,314 longnose dace, 340 mountain suckers, and one white sucker. This site was sampled in 1993 with no fish captured.

Site eight was sampled on July 28, 2014 using three electrofishing passes. Similar to the other sites brown trout, longnose dace and mountain suckers were collected. There were an estimated 16 brown trout under 200 mm and 43 brown trout over 200 mm meeting a class one brown trout fishery. There were also an estimated two mountain suckers within the site. Site eight was last sampled in 2013 and there was an estimated 75 brown trout with 44 >200 mm. Similar to the 2014 survey, there were small number of longnose dace and mountain suckers during the 2013 survey as well.

Site 14 was surveyed on July 22, 2014 and both brook and brown trout were collected. There were an estimated four brook trout in the site and they were all less than 200 mm. There were an estimated 74 and 36 brown trout less than and greater than 200 mm respectively in site 14. The most recent survey prior to 2014 was in 2009 using a single electrofishing pass. Twelve brook trout and 92 brown trout were collected.

Site 15 was sampled on July 22, 2014 using three passes. There were an estimated 27 brook trout with 20 >200 mm and 47 brown trout with 27 >200 mm (Tables 1, 2). A single longnose dace was collected as well. This site was last surveyed using a single pass in 1997 with brown and brook trout as the only species collected. Site 15 could be classified as brook trout class two and brown trout class one.

Site 16 was sampled on July 24, 2014 with three fish species collected during three electrofishing passes. There was an estimated three brook trout, 250 brown trout <200 mm, 25 brown trout >200 mm, and 50 longnose dace (Tables 1, 2, 3). This site was last surveyed in 1997 using a single pass with a total of 10 brook trout, 21 brown trout, and three longnose dace collected. Site 16 could be classified as brown trout class one.

Yellow Creek (YEL)

Yellow Creek site two was sampled on August 25, 2014. Brook trout were the only fish species collected during a single pass with one out of 24 greater than 200 mm. This was the first time this site was surveyed. With an estimated 23 brook trout per acre over 200 mm Yellow Creek site two would be a class three brook trout fishery at the time of the survey.

Discussion and Management Recommendations

Most of the mainstem Whitewood Creek sites contained good numbers of brown trout with the majority of the site having a class one brown trout fishery at the time of the survey. Grizzly Gulch, Whitetail and West Strawberry Creeks also contained brown trout with Whitetail Creek site one containing the most brown trout.

Brook trout were found within most creeks (20 out of 27 survey sites) in the Whitewood Creek Watershed in 2014. Some of the highest numbers of brook trout found during the 2014 surveys were in Deadwood Creek.

Fish species other than brook and brown trout were only found in Whitewood, West Strawberry and City Creeks. The Whitewood Creek sites contained large numbers of longnose dace and mountain suckers. Fathead minnows and rock bass were collected at West Strawberry Creek, and longnose dace were in City Creek.

Recommendations

1. Continue to manage the Bear Butte Creek watershed under standard regulations as a natural and native fishery and monitor on a 5-7 year basis.

2. Continue to monitor mountain sucker populations in the Whitewood Creek Watershed

False Bottom Creek Watershed

Counties: Lawrence

The False Bottom Creek watershed is located in the northern Black Hills of South Dakota (Figure 32). A total of three sites on two creeks were sampled within the False Bottom Creek watershed in 2014 (Table 27). These creeks include False Bottom Creek and Burno Gulch Creek. Brook and brown trout were the only fish species collected in this watershed in 2014. Size and harvest regulations within the False Bottom Creek watershed are the statewide regulations for trout which is a five fish (any combination) daily limit with only one over 14”.

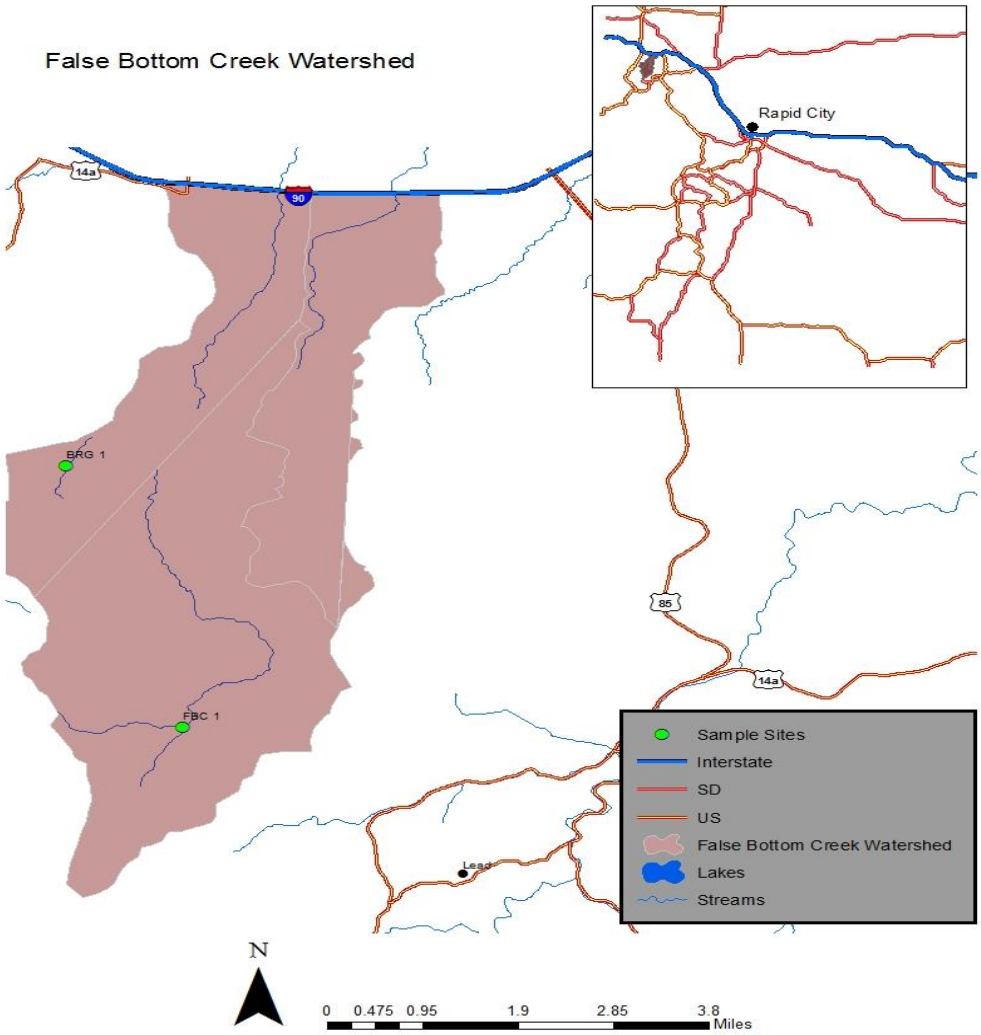

Figure 32. False Bottom Creek watershed survey sites in 2014. Sites completed by consultant firms were not included on the map, and are indicated by two asterisks in the tables.

Table 27. False Bottom Creek watershed brook trout population estimates and estimated number of fish per acre within each site sampled in 2014. Values in parenthesis are 95% confidence intervals.

	BKT<200 mm		BKT≥200 mm		
Creek Name/ Site #	Pop. Est.	# / Acre	Pop. Est.	# / Acre	Stream Class
False Bottom\01	76 (3)	1323			BKT3
False Bottom\04**	16 (1)	522			BKT3
Burno Gulch\01	101 (11)	1219	8	97	BKT2

** Site was completed by a consultant firm for mining companies.

False Bottom Creek (FBC)

Two sites were surveyed on False Bottom Creek in 2014. False Bottom Creek site one was surveyed on June 17, 2014. Brook and brown trout were collected at this site. There were an estimated 76 brook trout and three brown trout <200 mm and one brown trout > 200 mm. This site was last surveyed in 2010 using a single pass. A total of 93 brook trout and two brown trout were collected in 2010. Based on an estimated 17 brown trout exceeding 200 mm in 2014, site one would be a class three brown trout fishery.

Site four was sampled August 19, 2014 using three electrofishing passes. The site was surveyed by an consultant firm for mining companies. Brook trout were the only fish species collected with an estimated 16 fish all under 200 mm in site four. Site four was last surveyed in 2012 and there was an estimated 11 brook trout.

Burno Gulch Creek (BGC)

Burno Gulch site one was sampled on June 16, 2014 with an estimated 109 brook trout with eight of those fish > 200 mm. This site was last sampled in 2010 using a single electrofishing pass. A total of 196 brook trout were collected with four of those fish > 200 mm. This site qualified as a class two brook trout fishery at the time of the survey having an estimated 97 brook trout per acre > 200 mm.

Discussion and Management Considerations

During the three surveys in the False Bottom Creek watershed brook and brown trout were collected with the highest number of brook trout found in Burno Gulch Creek site one. This was also the only site of the three sampled that contained brook trout exceeding 200 mm. Brown trout were only found in False Bottom Creek site one of the three sites sampled within the watershed, and it there was very few brown trout collected in this site.

Recommendations

1. Continue to manage the False Bottom Creek Watershed under standard regulations as a natural trout and native fishery and monitor on a 5-7 year basis.

Spearfish Creek Watershed

Counties: Lawrence

The Spearfish Creek Watershed is located in the northern Black Hills of South Dakota (Figure 33). The Spearfish Creek headwaters begin above Cheyenne Crossing and continue through Spearfish Canyon and the City of Spearfish before eventually meeting the Redwater River. The Redwater River empties into the Belle Fourche River. Fish regulations for most of Spearfish Creek include the statewide regulations for trout which is five daily and one over 14” in any combination. However, the area from Homestake Hydro Plant No. 2 downstream to the face of the Maurice Intake Dam is catch and release only for rainbow trout and artificial lures only may be used. Yates Ponds are also catch and release only for any trout with the artificial lure regulation as well.

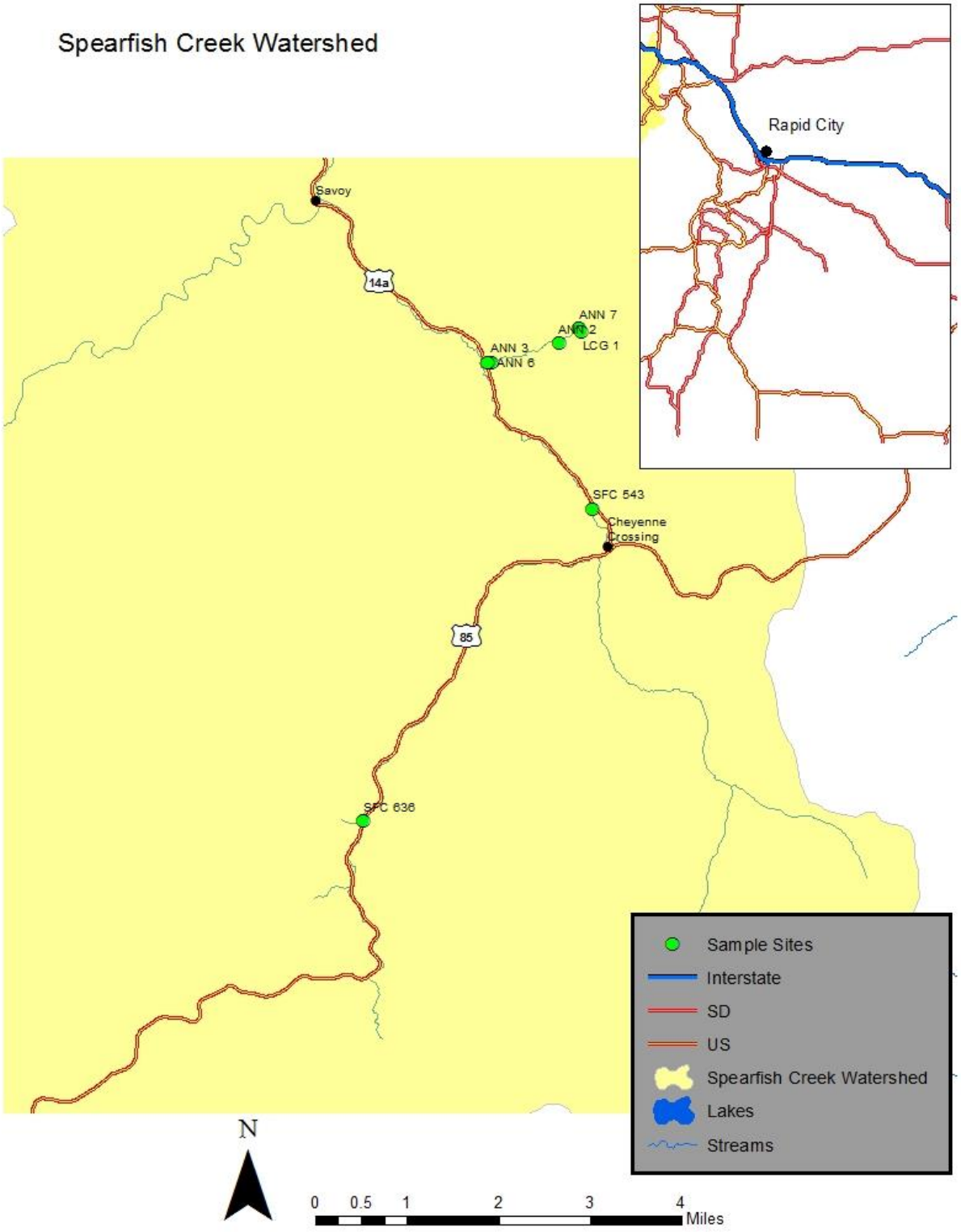

Figure 33. Survey locations sample by South Dakota Game, Fish and Parks staff within the Spearfish Creek watershed, Black Hills Fish Management Area, 2014.

Results and Discussion

In 2014, 18 sites on eight different creeks within the Spearfish Creek watershed were sampled (Table 28). Five fish species were collected within these sites. Some sites were surveyed by South Dakota Game, Fish and Parks personnel, and some sites were surveyed by consulting firms for monitoring due

to mining activities in the area. Typically, eight sites are sampled annually on Spearfish Creek to monitor any changes to stream conditions and fish populations with more intensive surveys occurring every three to five years. Due to high stream flows (especially in Spearfish Canyon and the City of Spearfish) in 2014 only one (site 636) of the eight sites were surveyed on Spearfish Creek.

Table 28. Brook trout population estimates and estimated number of fish per acre within each site sampled in the Spearfish Creek watershed, Black Hills Fish Management Area, 2014. Numbers in parentheses indicate 95% confidence intervals.

	BKT<200 mm		BKT≥200 mm		
Creek Name/ Site #	Pop. Est.	# / Acre	Pop. Est.	# / Acre	Stream Class
Spearfish/15 (old 543)					
Spearfish/636	33 (18)	166	8 (1)	40	BKT2
Rubicon/01**	79 (5)	1944	4	98	BKT2
Cleopatra/06**	471 (10)	7171	3 (1)	46	BKT2
Cleopatra/08**	535 (248)	12699	24 (59)	570	BKT1
Cleopatra/03**	167 (4)	4669	5 (1)	140	BKT2
Cleopatra/12**					
Labrador/01**	17 (4)	343	5	101	BKT2
Iron North/01					
Annie/06	25 (1)	308	1	12	BKT3
Annie/13	26 (2)	324	1	12	BKT3
Annie/03*					
Annie/07**					
Annie/11*					
Lost Camp/01*					
Lost Camp/03*					
Ross Valley/02**					

*single pass site, value is total fish captured
** sites were completed by an unknown consultant firm for mining purposes.

Table 29. Spearfish Creek watershed brown trout population estimates and estimated number of fish per acre within each site sampled in 2014. Numbers in parentheses indicate 95% confidence intervals.

	BNT<200 mm		BNT≥200 mm		
Creek Name/ Site #	Pop. Est.	# / Acre	Pop. Est.	# / Acre	Stream Class
Spearfish/543	188 (8)	868	84 (6)	388	BNT1
Spearfish/636	64 (6)	323	37 (2)	186	BNT1
Rubicon/01**					
Cleopatra/06**					
Cleopatra/08**					
Cleopatra/03**					
Cleopatra/12**					
Labrador/01**					
Iron North/01	41 (3)	491	31 (1)	371	BNT1
Annie/03*					
Annie/06	15 (2)	185			BNT3
Annie/07**					
Annie/11*					
Annie/13	17 (1)	212			BNT3
Lost Camp/01*					
Lost Camp/03*					
Ross Valley/02**					
Iron South/01					
Iron South/04					

*Indicates sites were completed with one electrofish pass, and therefore the values under the population estimate column are the number of fish collected.
** Indicates that the sites were completed by an unknown consultant firm for mining purposes.

Table 30. Spearfish Creek watershed population estimates of fish species other than brook and brown trout. Only sites within Iron Creek contained other fish species. Numbers in parentheses indicate 95% confidence intervals.

Creek Name/ Site #	LND	GSF	RBT (<200 mm)	RBT (≥200 mm)
Spearfish/543			10 (230)	
Iron North/01	1 (1)	1 (4)		5
Iron South/01	44 (17)			
Iron South/04	90 (640)			

Spearfish Creek (SFC)

Two sites were sampled on Spearfish Creek on June 25 and July 5, 2014 (Table 29). Spearfish Creek site 636 is one of eight sites that are surveyed annually on Spearfish Creek. Due to high instream flows most of the eight standard sites were not surveyed in Spearfish Creek in 2014. An estimated 41 brook trout with eight >200 mm were in this site 2014 (Table 1). Brown trout were collected as well with an estimated 64 fish < 200 mm and 37 fish > 200 mm. Site 636 meets a class one brown trout and class two brook fishery in 2014 based on fish per acre estimates during the 2014 survey.

Spearfish Creek site 543 had an estimated 188 and 84 brown trout under and over 200 mm respectively in the site. There were also an estimated ten rainbow trout all under 200 mm. With an estimated 388 brown trout per acre over 200 mm in the site it meets the classification as a class one brown trout fishery.

Rubicon Gulch (RBG)

Rubicon Gulch Creek site one was surveyed on August 29, 2014. This site had previously been sampled frequently by consulting firms for mining activities. Brook trout were the only fish species collected during the 2014 fish survey. In 2014 there was an estimated 98 brook trout per acre >200 mm in this site making it a class two brook trout fishery at the time of the survey. Brook trout were the only fish species collected in previous surveys as well with the exception of 2005 when a longnose dace was sampled.

Cleopatra Creek (SQU)

Cleopatra Creek sites 6, 8, 3 and 12 were surveyed in 2014 by a consultant firm. All of these sites had previously been surveyed numerous times mostly by various consultant firms.
Site six surveys revealed brook trout as the only fish species as well. During the August 27, 2014 survey there were an estimated 471 brook trout less than 200 mm and three brook trout greater than 200 mm.

Site eight has been surveyed frequently as well. Brook trout were the only fish species found in past and present surveys of this site. The August 28, 2014 survey revealed 535 brook trout less than 200 mm and 24 brook trout longer than 200 mm at this site.

Site three was surveyed on August 29, 2014. This site contained brook trout with an estimated 167 brook trout below 200 mm and five brook trout exceeding 200 mm in the site in 2014. Brook trout were the only fish species found in previous surveys as well.

Site 12 is found near the Cleopatra Creek headwaters right below mining activities. This site was sampled on August 19, 2014. No fish have been found at this site in past or present surveys. Cleopatra Creek sites six, eight and three would be classified as class two, one and two brook trout fisheries respectively based on fish per acre estimates.

Labrador Creek (LAB)

Labrador Creek site one was surveyed on August 28, 2014 by a consulting firm. This site is surveyed frequently by consulting firms. During the 2014 survey there were an estimated 17 brook trout less than 200 mm and five brook trout exceeding 200 mm in this site. With an estimated 101 brook trout per acre in 2014 this site would be classified as a class two brook trout fishery.

Iron Creek North (ICN)

Iron Creek North site one was surveyed on June 25, 2014. A total of four fish species were collected during the survey including brown trout, rainbow trout, green sunfish and longnose dace. Previous surveys in 1995, 2004, 2008, and 2010 had not found any green sunfish and longnose dace. The 2010 single pass sampling had found brook trout at this site as well. During the 2014 survey there were an estimated 41 brown trout less than 200 mm, 31 brown trout greater than 200 mm, five rainbow trout exceeding 200 mm, one green sunfish, and one longnose dace (Table 30). With an estimated 371 brown trout longer than 200 mm per acre at this site it would be considered a class one brown trout fishery.

Annie Creek (ANN)

Five sites were surveyed in 2014 on Annie Creek. Site three was surveyed on June 9, 2014 using one electrofishing pass. No fish were collected during this survey (Tables 1 & 2). Site six was surveyed on May 28, 2014. There was an estimated 12 brook trout per acre exceeding 200 mm in length in this site as well making it a class three brook trout fishery in 2014. Brown trout were also found at this site with an estimated 15 fish shorter than 200 mm and no brown trout longer than 200 mm. Mountain suckers were found at site six in 1995, and they have not been found in any of the surveys since.

Site seven was surveyed on August 21, 2014 by an unknown consulting firm. No fish were collected. This site had previously been surveyed in 2012, and no fish were collected.
Site 11 was sampled on May 28, 2014. No fish were found. This site had previously been surveyed in 2010 and no fish were collected during that survey as well.

Site 13, which was a newly established site, was surveyed on June 9, 2014. Brook trout were found at this site with an estimated 26 fish less than 200 mm and one longer than 200 mm. There were an estimated 17 brown trout below 200 mm and none exceeding 200 mm at this site as well.

Lost Camp Gulch (LCG)

Two sites (one and three) were surveyed on Lost Camp Gulch on June 9 and August 22, 2014. Previous surveys were conducted in 2010, 2011, and 2012. Some of the sampling was completed by consulting firms. There were no fish collected at these two sites in 2014 or during any of the previous sampling events.

Ross Valley (ROV)

Ross Valley site two was sampled on August 21, 2014. This site had been surveyed in 2006, 2010, 2011, and 2012. Like the previous surveys no fish were found during the 2014 sampling. This site was surveyed by a consultant firm as well.

Discussion and Management Recommendations

Ten of the 18 sites surveyed in the Spearfish Creek watershed contained brook trout in 2014. Population estimates indicate large numbers of brook trout in the Cleopatra Creek. With an estimated 540 brook trout over eight inches in Cleopatra Creek site eight it was the only site that met the qualifications for a class one brook trout fishery in 2014.

Brown trout were collected in five of the sites with the greatest number of fish in Spearfish Creek site 543. Both of the sites surveyed on Spearfish Creek in 2014 meet the qualifications for a class one brown trout fishery.

Rainbow trout were found at two of the sites surveyed in 2014. Iron Creek site one contained an estimated five rainbow trout exceeding 200 mm. Spearfish Creek site 15 (old 543) also contained a small number of rainbow trout but they were under 200 mm.

Only the Iron Creek sites contained fish species other than trout. Longnose dace and green sunfish were found at Iron Creek North site one.

Management recommendations are to continue to monitor trout populations within the Spearfish Creek watershed. Monitor the eight historical sites on Spearfish Creek annually with a more intensive survey every several years or as needed to evaluate if fish populations have been affected by drought or high precipitations events, or to answer other management questions. Survey other creeks in the watershed as needed to monitor fish populations and answer management questions.

Recommendations

1. Manage Spearfish Creek Watershed's tributaries as wild fish natural yield and native fisheries
2. Survey Spearfish Creek Watershed's tributaries every five to seven years.

3. Perform an intense three-pass survey on Spearfish Creek within 3 years or when water flows allow.

Stockade Beaver Creek Watershed

Counties: Pennington, SD; Weston, WY

Fish populations in the Stockade Beaver Creek Watershed within the BHFMA (Figure 34) were surveyed during 2014 to monitor fish populations. Four reaches in two creeks were surveyed in June and July. The Stockade Beaver Creek Watershed lies on the South Dakota Wyoming border west of Deerfield Lake and has a north to south orientation. The headwaters are located about two miles south of the county boundaries of Pennington and Lawrence. The watershed is in a pine/spruce forest on the South Dakota side and is managed by the US Forest Service. This is one of the most remote areas of the Black Hills with Moon, consisting of a few buildings, being the only town. Much of it is used for grazing and it is interspersed with ATV trails mostly used by local ranchers and grazing leases. Within South Dakota, Stockade Beaver Creek's tributaries are currently managed under standard regulations with a daily limit of five trout (in any combination) with one 14 inches or longer allowed.
There are few perennial flowing waters in this watershed. Beaver Creek, which starts about four miles west of the state border and eight miles south of the Lawrence county border, runs north through Beaver Creek Campground, and drains into Stockade Beaver Creek just across the state border. Thompson Canyon Creek is near the town of Moon and runs west into Stockade Beaver Creek in Wyoming.

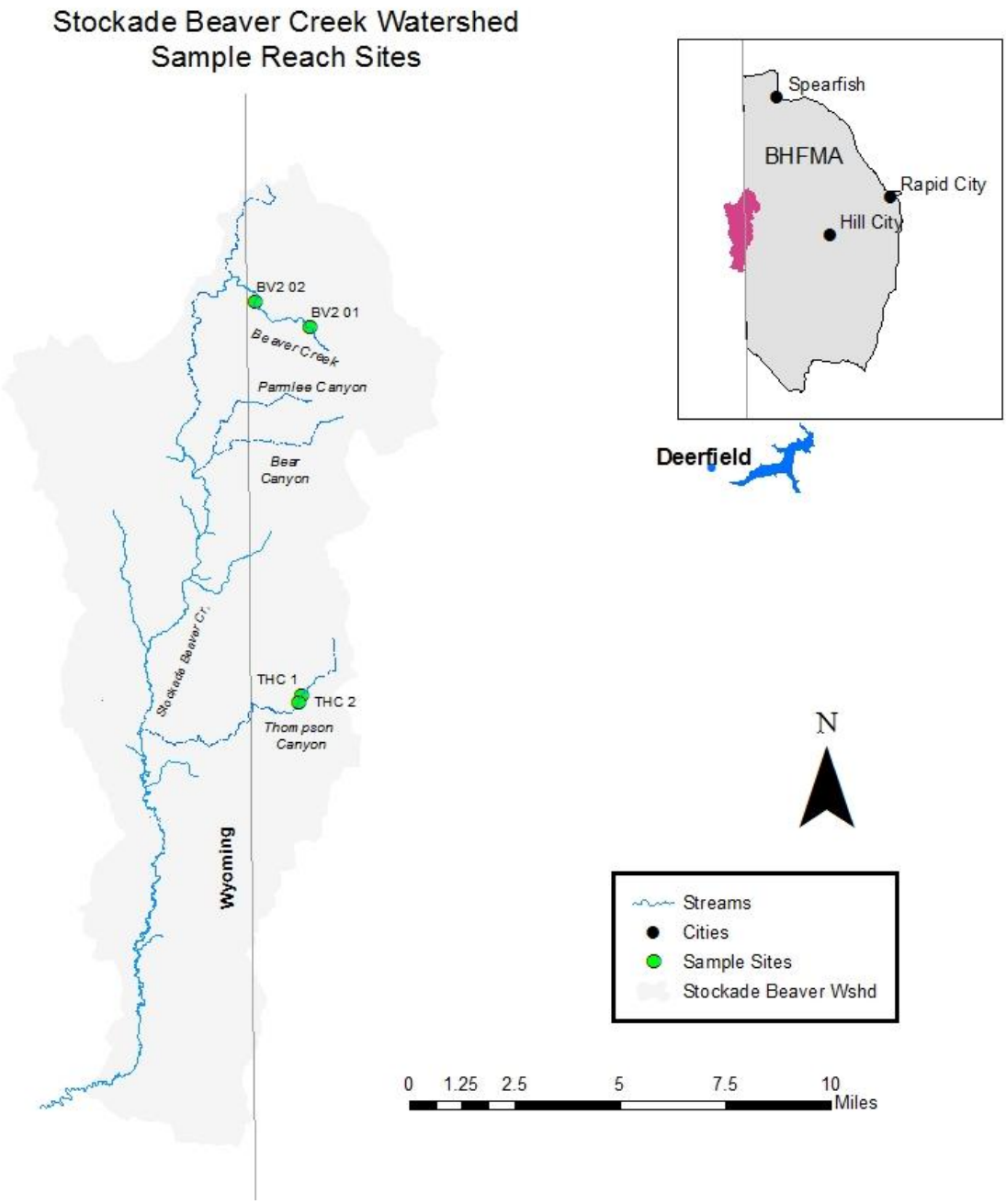

Figure 34. Sample sites within the Beaver Creek Watershed, Black Hills Fish Management Area, South Dakota, 2014.

Results and Discussion

Only brook trout were captured in the Beaver Creek Watershed during 2014 sampling (Table 1) and only in Beaver Creek (Table 31).

Table 31. Population estimates of brook trout in 100 meter survey reach sites of creeks within the Stockade Beaver Creek Watershed during 2014 surveys. Streams are in order from furthest downstream to upstream. Confidence interval (95%) is reported in parenthesis.

Creek Name/ Site #	BKT <200 mm	BKT >200 mm	# / Acre	Stream Class
Thompson Canyon\01	No fish			
Thompson Canyon\02	No fish			
Beaver\04	517 (35)	5 (2)	63	BKT2
Beaver\01	61 (8)	11 (1)	162	BKT1

Thompson Canyon (THC)

Thompson Canyon Sites 01 and 02, above and below a stock dam, were sampled on July, 2 2014. This was the first time they were sampled and no fish were discovered.

Beaver Creek (BV2)

Beaver Creek Site 4, at Beaver Creek Camp Ground near the Wyoming border, was sampled for the first time on July 8, 2014. A total of 523 brook trout were captured with five >200 mm. With 63 brook trout >200 mm per acre, this meets a class two brook trout fishery. There are plans to stock this campground area with catchable rainbow trout in 2015 in order to provide a fishery and hopefully reduce the high density of small brook trout.

Beaver Creek site 1, near the headwaters, was sampled twice in 2014. During the first survey on June 26, 2014 there was a population estimate of 72 brook trout with 11 ≥200 mm. This was 162 per acre meeting a class 1 brook trout fishery. On the second survey on July 7, 52 brook trout were estimated with eight ≥200 mm. This was 139 per acre, meeting a class 2 brook trout fishery.

Recommendations

1. Manage Stockade Beaver Creek Watershed's tributaries within South Dakota as wild fish natural yield and native fisheries

2. Survey Stockade Beaver Creek Watershed's tributaries every five to seven years.

3. Stock Beaver Creek within the campground with catchable rainbow trout in order to provide a fishery.

Creeks Sampled in other Watersheds

Spring Creek (SPR)

Site 1 was surveyed in August 4, 2014 with a population estimate of three longnose dace, two rainbow trout ≥200mm, 18 rock bass, and 53 white suckers. Creek chubs were also surveyed with 335 captured, but the confidence interval was too high to accurately estimate populations. In Aug 2009 two brown trout ≥200 mm were surveyed along with eight white sucker and 28 creek chub. In the 1990s, this site had mostly creek chub and brown trout, which were stocked at the time.

Site 6, near the headwaters, was surveyed on June 23, 2014 with a population estimate of 25 brook trout <200 mm and one ≥200 mm. Seven brook trout <200 mm were surveyd in a single pass in July 2009. The only significant difference in previous surveys was one mountain sucker surveyed in June 1993, but none in July 2006.

Battle Creek (BAT)

Site 963, above the confluence with Iron Creek South, was surveyed on June 13, 2014. Population estimates were three brook trout <200 mm and 43 white sucker. Also captured were 161 creek chub, 80 longnose dace, and 9 rock bass, but confidence intervals were too high to accurately estimate populations.

Iron Creek South (ICS)

Iron Creek South is part of the Battle Creek Watershed. It was surveyed on May 29, 2014 at sites 1 and 4. Site one had a population estimate of 66 brook trout <200 mm and 44 longnose dace. When sampled in May 2009, 54 brook trout <200 mm were surveyed in a single pass. No previous survey, (1992, 1993, 1994, 2009), has detected longnose dace at this site.

Site 4, 1.4 mile above highway 16A, had a population estimate of 21 brook trout with three >200mm. Nineteen longnose dace were also captured. When sampled in May 2009 there were 53 longnose dace, 13 brook trout under 200mm, and two brook trout over 200 mm detected.

Appendix I. GPS locations of stream sites sampled during the 2014 survey. GPS is reported in UTM Zone 13T.

Watershed	Stream	Site #	Y (northing)	X (easting)
Rapid Creek	Lime Creek	LIM01	4882056	638333
Rapid Creek	Lime Creek	LIM05	4883204	636936
Rapid Creek	Victoria Creek	VIC02	4875148	627084
Rapid Creek	Victoria Creek	VIC01	4875239	629312
Rapid Creek	Prairie Creek	PRC01	4878643	623840
Rapid Creek	Prairie Creek	PRC02	4877152	628910
Rapid Creek	Brush Creek	BRU01	4877623	623813
Rapid Creek	Deer Creek	DRC02	4883797	622367
Rapid Creek	Deer Creek	DRC03	4883836	620780
Rapid Creek	Slate Creek	SLC117	4876347	609485
Rapid Creek	S. Slate Creek	SLF02	4871392	601922
Rapid Creek	S. Slate Creek	SLF03	4870788	600761
Rapid Creek	Gimlet Creek	GIM01	4885397	608272
Rapid Creek	Gimlet Creek	GIM25	4886604	607728
Rapid Creek	Gimlet Creek East	EGC03	4885365	608869
Rapid Creek	Gimlet Creek East	EGC02	4886367	608841
Rapid Creek	Silver Creek	SLV03	4888091	603889
Rapid Creek	Silver Creek	SLV02	4887071	604114
Rapid Creek	N. Fork Rap. Creek	RCN01	4887318	601085
Rapid Creek	N. Fork Rap. Creek	RCV04	4894544	598982
Rapid Creek	N. Fork Rap. Creek	RCN02	4898116	596266
Rapid Creek	S. Fork Rapid Creek	RCS02	4889076	593424
Rapid Creek	S. Fork Rap. Creek	RCS01	4886971	600749
Rapid Creek	Hop Creek	HOP01	4887884	598267
Rapid Creek	Rhodes Fork Creek	RCR01	4888274	592016
Rapid Creek	Rhodes Fork Creek	RCR02	4887409	591195
Rapid Creek	Swede Gulch	SWD01	4894667	598981
Rapid Creek	Swede Gulch	SWD02	4892373	597761
Rapid Creek	Tillson Creek	TIL03	4893700	593559
Rapid Creek	Tillson Creek	TIL01	4893648	593809
Rapid Creek	Buskala Creek	BUS03	4895567	595726
Rapid Creek	Buskala Creek	BUS04	4894588	598420
Rapid Creek	Cousin Jack Creek	CJC03	4897212	597235
Rapid Creek	Castle Creek	CAS309	4878964	599000
Rapid Creek	Castle Creek	CAS181	4881331	602682
Rapid Creek	Castle Creek	CAS186	4881663	602743
Rapid Creek	Castle Creek	CAS324	4878182	598436
Rapid Creek	Castle Creek	CAS362	4875952	597523
Rapid Creek	Castle Creek	CAS450	4876290	592186
Rapid Creek	Castle Creek	CAS334	4877491	598242
Rapid Creek	Castle Creek	CAS337	4877419	598401
Rapid Creek	Castle Creek	CAS356	4876172	597859
Rapid Creek	Castle Creek	CAS426	4874846	593206
Rapid Creek	Bittersweet Creek	BST02	4879072	603661
Rapid Creek	Bittersweet Creek	BST01	4876960	601898
Rapid Creek	Dutchmen Creek	DUT01	4873064	599086
Rapid Creek	Gold Run Gulch	GRG02	4872342	597510

Watershed	Stream	Site #	Y (northing)	X (easting)
Rapid Creek	Gold Run Gulch	GRG01	4873360	596979
Rapid Creek	Silver of Castle Creek	SIC03	4875826	591676
Rapid Creek	Silver of Cas Creek	SIC01	4876056	590817
Rapid Creek	Silver of Cas. Creek	SIC03	4875827	591674
Rapid Creek	S. Fork Cas. Creek	CCS02	4870533	591032
Rapid Creek	S. Fork Cas. Creek	CCS03	4873839	593697
Rapid Creek	Nichols Creek	NIC02	4873042	593524
Rapid Creek	Nichols Creek	NIC03	4873126	593379
Rapid Creek	Heely Creek	HEE05	4870528	593561
Rapid Creek	Ditch Creek	DTC01	4869468	592704
Rapid Creek	Ditch Creek	DTC03	4868050	592903
Rapid Creek	Pole Creek	POC01	4869535	590892
Rapid Creek	Pole Creek	POC02	4870139	591215
Boxelder Creek	Boxelder Creek	BOX01	4890421	622695
Boxelder Creek	Boxelder Creek	BOX07	4894975	617047
Boxelder Creek	Boxelder Creek	BOX09	4894913	618011
Boxelder Creek	Boxelder Creek	BOX04	4898236	611881
Boxelder Creek	Bogus Jim Creek	BJC01	4886860	626074
Boxelder Creek	Bogus Jim Creek	BJC02	4886931	622565
Boxelder Creek	Jim Creek	JIM01	4889157	619670
Boxelder Creek	Jim Creek	JIM02	4889081	615982
Boxelder Creek	Estes Creek	EST01	4891713	617105
Boxelder Creek	Boxelder Creek South	BXS03	4894697	613294
Boxelder Creek	Boxelder North Creek	BXN01	4897489	604517
Boxelder Creek	Boxelder North Creek	BXN04	4897437	610158
Boxelder Creek	Hay Creek	HAY03	4901536	609282
Boxelder Creek	Corral Creek	CRC03	4899168	608051
Boxelder Creek	Boxelder Middle Creek	BXM02	4894637	603857
Boxelder Creek	Boxelder Middle Creek	BXM03	4896446	610453
Elk Creek	Elk Creek	ELK02	4905914	613069
Elk Creek	Elk Creek	ELK04	4903852	608962
Elk Creek	Little Elk Creek	LEC01	4900313	625322
Elk Creek	Little Elk Creek	LEC02	4898678	622067
Elk Creek	Meadow Creek	MEC02		
Elk Creek	Meadow Creek	MEC01	4904639	614716
Bear Butte Creek	Bear Butte Creek	BBC18	4907744	607502
Bear Butte Creek	Bear Butte Creek	BBC10	4906863	606189
Bear Butte Creek	Two Bit Creek	TBC02	4911563	604023
Bear Butte Creek	Two Bit Creek	TBC06	4911994	604036
Bear Butte Creek	Two Bit East Creek	TBE02	4910350	604215
Bear Butte Creek	Park Creek	PRK01	4910530	612061
Bear Butte Creek	Bear Butte Trib.	BBT02	4907721	608222
Bear Butte Creek	Bear Butte Trib.2	BT201	4906543	602997
Whitewood Creek	Whitewood Creek	WWC14	4911406	599431
Whitewood Creek	Whitewood Creek	WWC15	4911441	599792
Whitewood Creek	Whitewood Creek	WWC16	4911386	599692
Whitewood Creek	City Creek	CYC01	4914468	600802
Whitewood Creek	Blacktail Creek	BLT01	4913859	598746

Watershed	Stream	Site #	Y (northing)	X (easting)
Whitewood Creek	Blacktail Creek	BLT02	4914600	597760
Whitewood Creek	Deadwood Creek	DWC10	4912854	595903
Whitewood Creek	Fantail Creek	FAN01	4909985	596221
Whitewood Creek	Grizzly Creek	GGC02	4910794	600605
Whitewood Creek	Nevada Creek	NEV01	4910137	596133
Whitewood Creek	Sheeptail Creek	SHP01	4914646	597613
Whitewood Creek	Stewart Creek	STW01	4908755	595625
Whitewood Creek	West Strawberry Creek	WSB01	4911321	600903
Whitewood Creek	Whitetail Creek	WTC03	4908664	595809
Whitewood Creek	Whitetail Creek	WTC04	4908618	595844
Whitewood Creek	Yellow Creek	YEL02	4909749	599050
False Bottom Creek	False Bottom Creek	FBC01	4914784	594198
False Bottom Creek	False Bottom Creek	FBC04	4913521	593572
False Bottom Creek	Burno Gulch Creek	BRG01	4919978	592331
Spearfish Creek	Spearfish Creek	SFC543	4906238	590038
Spearfish Creek	Spearfish Creek	SFC636	4900758	586007
Spearfish Creek	Rubicon Gulch	RBG01	4917920	590658
Spearfish Creek	Labrador Creek	LAB01	4914238	590435
Spearfish Creek	Iron Creek North	ICN01	4913950	585907
Spearfish Creek	Annie Creek	ANN03	4908817	588264
Spearfish Creek	Annie Creek	ANN06	4908804	588200
Spearfish Creek	Annie Creek	ANN11	4909213	589456
Spearfish Creek	Annie Creek	ANN13	4908817	588265
Spearfish Creek	Lost Camp Gulch	LCG01	4909350	589874
Spearfish Creek	Lost Camp Gulch	LCG03	4909282	589943
Spearfish Creek	Ross Valley	R0V02	4909779	589766
Stockade Beaver	Thompson Canyon	THC01	4865762	577796
Stockade Beaver	Thompson Canyon	THC02	4865467	577677
Stockade Beaver	Beaver Creek	BV201	4879800	578095
Stockade Beaver	Beaver Creek	BV202	4880781	576022
Spring Creek	Spring Creek	SPR01	4871316	626027
Spring Creek	Spring Creek	SPR06	4862132	600652
Battle Creek	Battle Creek	BAT963	4859464	633011
Battle Creek	Iron South Creek	ICS01	4853979	623589
Battle Creek	Iron South Creek	ICS04	4855626	628422