Electrofishing Survey of Hoffman and Carter Creeks,

Madison County, Montana

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Introduction and Methods

On 20 February 2000, fish populations in Hoffman and Carter creeks near the proposed expansion of Barretts Minerals, Inc. talc mine were surveyed. The goal of the survey was to determine species composition of fish populations in the area, and specifically to examine the streams for presence of westslope cutthroat trout (*Oncorhynchus clarki lewisi*). Montana Department of Fish, Wildlife and Parks (MFWP) approved a temporary scientific collecting permit to perform the survey.

Fish were captured with a battery powered Smith-Root backpack shocker following methods outlined in the MFWP electrofishing methods policy. After capture, fish were identified to species and measured to the nearest millimeter (mm). Some fish were weighed to the nearest gram (g), however, the small size of the fish captured and windy conditions limited our ability to obtain accurate weights for all fish. All fish were returned alive to the sampled reach.

John Parks of Barretts Minerals Inc. showed us around the area and assisted with sampling. Sampling areas were selected based on suggestions from Dick Oswald of MFWP and Tom Ring of Montana Department of Environmental Quality. Three reaches of Hoffman Creek were sampled:

1. The "Homestead Reach" (45° 10' 28", 112° 24' 59") was 365 feet long, although thick willow clumps limited sampling to about 295 feet. Mean wetted stream width was 2.4 feet. Sampling began near the old homestead and continued upstream to where a spring entered the creek from the downstream right. Although Hoffman Creek continued for some distance upstream from this spring, snow and ice covered the stream and prevented further sampling. This reach had moderate gradient, minimal pool volume, and riparian condition appeared to be fair to good. Discharge in Hoffman Creek was about 1 cubic foot per second (cfs).

2. The "Middle Reach" (45° 10' 27", 112° 25' 30") was 73 feet long, and began at the head of a small on-channel reservoir and continued upstream until thick willow clumps prevented sampling. Mean wetted stream width was 3.1 feet, gradient was lower than the upper reach, and pool volume was minimal. Riparian condition was fair to good.

3. The "Lower Reach" (45° 10' 39", 112° 25' 31") was located below the reservoir in a fairly open, low gradient meadow area. The reach was 379 feet long, mean width was 2.0 feet, pool volume appeared to be higher than the upper two reaches, and riparian condition appeared to be fair to good.

Three areas on Carter Creek were sampled:

1. The "Upper Reach" (45° 09' 56", 112° 26' 11") began below a small tributary entering from the downstream left side, and continued upstream past this confluence in an area of old beaver dams. The reach was 705 feet long, but impenetrable willow thickets allowed sampling in only about 425 feet of stream channel. Carter Creek was larger than Hoffman Creek; discharge was about 2-3 cfs. Fine sediments were abundant in Carter Creek, pool volume was fair, and gradients were moderate.

2. The "Middle Reach" (45° 10' 20", 112° 26' 27") was 235 feet long, however willow thickets prevent sampling along the creek in most areas. Therefore, only about 50-60 feet were sampled.

3. The "Lower Reach" (45° 10' 20", 112° 26' 26") was located below the ranch house and above an on-channel reservoir in a canyon area. Most of the stream in this area was covered with snow and ice, or surrounded by impenetrable willow thickets. We could only sample about 40 feet of the 190 feet in this reach.

Results and Discussion

The only fish species captured was brook trout (*Salvelinus fontinalis*; Table 1). Brook trout in Hoffman Creek ranged 54 to 85 mm (2.1 to 3.3 in) and were smaller than in Carter Creek, where brook trout ranged 86 to 200 mm (3.4 to 7.9 in; Appendix Table 1).

Brook trout abundance was low and very similar in both creeks. Overall fish abundance was 198 and 206 fish/mile in Hoffman and Carter creeks, respectively. This was despite Carter Creek's larger size—it was about twice as big as Hoffman Creek. However, because fish were larger in Carter Creek, biomass in Carter Creek is probably higher.

Factors limiting fish populations in Hoffman and Carter creeks are unknown. Riparian conditions appeared to be adequate, but qualitative observations suggest that fine sediment may limit aquatic invertebrate production and spawning habitat. The low abundance of fish observed during this survey may have been cause by fish movement to more suitable overwintering habitat. For example, fish may have moved to areas with spring input or into the on-stream reservoirs.

No westslope cutthroat trout were captured; however, the efficacy of this survey was limited by winter conditions and only 36 fish in total were captured. Ice and snow covered portions of the stream and limited vehicular access to upper reaches of both streams. Because cutthroat trout are thought to be adversely affected by competition from introduced brook trout (Griffith 1988, Behnke 1992) the most likely area for westslope cutthroat trout populations to exist in these drainages is in areas above barriers to upstream dispersal of brook trout. We were unable to survey the headwater areas of these drainages where such refuges may exist. Moreover, while the presence of a species is easy to document by simply capturing a single individual of the species, absence of a species is difficult to prove definitively. Only when repeated or exhaustive sampling fails to document the occurrence of a species is the absence of that species established.

Table 1. Summary of fish captured and electrofishing effort in Hoffman and Carter creeks, 20 February 2000.

Reach (Seconds shocked)	Species	Number captured	Mean length (mm)	Mean length (inches)
Homestead (330 s)	brook trout	9	66	2.6
Middle (143 s)	brook trout	5	66	2.6
Lower (604 s)	brook trout	5	80	3.1
Upper (568)	brook trout	13	102	4
Middle (148)	brook trout	2	112	4.4
Lower (99)	brook trout	2	168	6.6

Conclusions

Hoffman and Carter creeks support modest populations of small brook trout. I was unable to document the presence of westslope cutthroat trout. The presence of westslope cutthroat trout cannot be precluded until a more exhaustive survey, particularly in the headwater reaches of both drainages is performed.

Literature Cited

Behnke, R. J. 1992. Native trout of western North America. American Fisheries Society Mongraph 6. Bethesda MD.

Griffith, J. S. 1988. Review of competition between cutthroat trout and other salmonids. American Fisheries Society Symposium 4:53-60.

Appendix Table 1. Length and weight of brook trout captured in Hoffman and Carter creeks, 20 February 2000.

Site	Section	Total length (mm)	Total length (inches)	Weight (g)
Hoffman	Homestead	57	2.2	
Hoffman	Homestead	58	2.3	3
Hoffman	Homestead	58	2.3	
Hoffman	Homestead	63	2.5	3
Hoffman	Homestead	66	2.6	
Hoffman	Homestead	70	2.8	4
Hoffman	Homestead	70	2.8	
Hoffman	Homestead	74	2.9	
Hoffman	Homestead	75	3.0	
Mean		65.7	2.6	3.3
Hoffman	Upper	54	2.1	2
Hoffman	Upper	64	2.5	2
Hoffman	Upper	69	2.7	3
Hoffman	Upper	70	2.8	3
Hoffman	Upper	75	3.0	6
Mean		66.4	2.6	3.2
Hoffman	Lower	76	3.0	4
Hoffman	Lower	77	3.0	6
Hoffman	Lower	80	3.1	6
Hoffman	Lower	80	3.1	5
Hoffman	Lower	85	3.3	5
Mean		79.6	3.1	5.2
Carter	Upper	87	3.4	
Carter	Upper	94	3.7	
Carter	Upper	96	3.8	
Carter	Upper	96	3.8	
Carter	Upper	101	4.0	
Carter	Upper	102	4.0	
Carter	Upper	102	4.0	
Carter	Upper	103	4.1	
Carter	Upper	106	4.2	
Carter	Upper	111	4.4	
Carter	Upper	115	4.5	
Carter	Upper	116	4.6	
Mean		102.4	4.0	
Carter	Middle	86	3.4	
Carter	Middle	137	5.4	
Mean		111.5	4.4	
Carter	Lower	137	5.4	26
Carter	Lower	200	7.9	53
Mean		168.5	6.6	39.5