APPENDIX H
STREAM-IRRIGATION NETWORK RELATIONSHIP IN THE UPPER CLARK FORK TMDL PLANNING AREA

Prepared For

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SECTION 1.0
INTRODUCTION

The Department of Environmental Quality contracted Confluence Consulting, Inc. to compile, evaluate, and assess the stream/irrigation network relationship in the Upper Clark Fork TMDL (Total Maximum Daily Load) Planning Area. This information is intended to assist TMDL decisions and the establishment of DEQ surface water standards.

SECTION 2.0
DATA SOURCES

The following data sources were utilized in this effort.

2.1 Water Resources Survey

The most complete information regarding the irrigation network within the Upper CFR is to be found in the Water Resource Surveys published by the State Engineer's office in the mid to late 1950s. These surveys were completed for each of the four counties within the area of investigation: Powell Co, 1959; Deerlodge Co, 1955; Granite Co, 1959; and Silver Bow Co, 1955. These surveys compiled data on water supply and water use, including mapping of irrigation ditches onto mylar overlays. Employees of the MT DNRC Water Rights Bureau's GIS Program scanned these mylars and digitized ditch alignments from the scan images. ArcView shapefiles of the digitized ditch alignments were the primary source of ditch alignment information used for this project.

2.2 Water Rights Points of Diversion

Montana Department of Natural Resources and Conservation Water Resource Division published *Montana Water Rights* GIS data in 2003 for the purpose of managing water resources. This data consists of estimated locations of all the active recorded points of diversion (PODs) in the water rights database. The estimated POD location coordinates were generated from 'centroid' points derived from public land survey (PLSS) legal descriptions recorded on the water right, at resolution no higher than quarter/quarter section. Thus, the accuracy of POD locations in this database depends on the accuracy of the water right descriptions and the accuracy of the 1:100,000 scale BLM maps from which the PLSS coordinates were taken. This GIS data is updated on a weekly basis and the version used for this project was obtained June 12th, 2008 from the Natural Resource Information System (NRIS) of the Montana State Library.

If MT DNRC enters into a water rights enforcement action, the POD for that water right is surveyed in the field to a much higher degree of accuracy than provided by the PLSS based 'centroid' locations. A small number of the PODs for this project area have such enforcement coordinates and these were used in preference to the 'centroid' locations, where available. The DNRC POD records were the sole source of point of diversion information for this project.

2.3 2005 Color NAIP Orthophotos, 12-Kilometer Tiles

The National Agriculture Inventory Program (NAIP) aerial photographs consist of 12x12-kilometer tile color orthorectified aerial photos, taken during the 2005 growing season. These natural-color images have a ground resolution of one meter and are registered to the Montana State Plane coordinate system, NAD83, units meters. The data was originally provided by the U.S. Farm Services Agency as Compressed County Mosaics (CCMs) in UTM coordinates. The State Library clipped and mosaiced the CCM data to form these tiles and converted them to State

Plane coordinates and MrSID file format. For this project, the NAIP photos were the used to correct POD locations, and as a source of supplemental ditch alignment information.

2.4 National Hydrography Dataset Stream Route Reaches

This dataset contains the stream reaches from the National Hydrography Dataset (NHD). A reach is a significant piece of surface water generally, but not always, between two confluences. The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that comprise the nations surface water drainage system. It is based initially on the content of the U.S. Geological Survey 1:100,000-scale Digital Line Graph (DLG) hydrography data, integrated with reach-related information from the U.S. Environmental Protection Agency Reach File Version 3.0 (RF3). The NHD also contains some irrigation ditch features. For this project the NHD data were used to delineate sub watersheds, to quantify stream lengths, and as a source of supplemental ditch alignment information.

2.5 Montana Subbasin Hydrologic Units

The Montana Subwatershed Hydrologic Units were created by the Montana Natural Resources Conservation Service State Office in 2007. This data set is a hydrologic unit boundary layer to the Subwatershed (12-digit, 6^{th} code) level for the State of Montana. This data set consists of geo-referenced digital data and associated attributes created in accordance with the "FGDC Proposal, Version 2.0-Federal Standards for Delineation of Hydrologic Unit Boundaries". Polygons are attributed with hydrologic unit codes for 4^{th} level sub-basins, 5^{th} level watersheds, 6^{th} level subwatersheds, name, size, downstream hydrologic unit, type of watershed, non-contributing areas and flow modification. For this project, Subwatershed Hydrologic Units were used to define and delineate the area of interest: the drainage area contributing to each 303(d) listed stream in the Upper Clark Fork Basin.

2.6 Cadastral - Montana Cadastral mapping – USGS topographic maps 1:24000

The Montana Cadastral Database is a polygon shapefile comprised of taxable parcels (fee land) and public land (exempt property). This database is maintained by the Montana Cadastral Mapping Project. This data base is updated approximately twice per year. The version of the database used for this project was obtained from the State Library on January 24, 2008. The parcel boundaries are based on the USDI Bureau of Land Management's (BLM) Geographic Coordinate Database (GCDB). The GCDB is a complex measurement management system that uses a least squares adjustment of existing survey data to come up with a digital representation of the Public Land Survey System (PLSS). These data were used to provide a gross characterization of land ownership/land use within the sub watersheds of 303(d) listed streams.

2.7 303 (d) listed streams in the Upper Clark Fork River Basin

Data describing the geographic extent and impairment status of the 303(d) listed stream segments in the upper Clark Fork River Basin TMDL Planning Area were obtained from the

Montana Department of Environmental Quality Clean Water Act Information Center 305(b)/303(d) Water Quality Assessment Database. In addition, an ArcGIS shapefile of the 303(d) listed stream segments' channel alignments was obtained from MT DEQ. These data were used in conjunction with the Subbasin Hydrologic Units to define the geographic extent of the project.

The project area includes the subwatershed basins which drain directly into the 19 303(d) listed streams present in the UCFTPA. The UCFTPA does not include the Little Blackfoot drainage basin, Silver Bow Creek, or the main stem of the Clark Fork River.

SECTION 3.0
METHODS

The following methodologies were employed in the creation of the deliverable datasets.

3.1 Subwatersheds

For each 303(d) listed stream segment, the area draining surface water to that stream segment was delineated using GIS methods. This delineation was accomplished by first aggregating all 6th code HUC sub watershed polygons containing or draining to the most downstream point of a 303(d) stream segment. Portions of the resulting aggregate subwatershed that drain downstream of the 303(d) listed segment were then excised manually, guided by the NHD stream network and USGS topography maps.

3.2 Water Right Points of Diversion

The DNRC water rights points of diversion (POD) database was converted to an ArcGIS point shapefile, using the 'centroid' based coordinates provided. These points were overlain with the 303(d) subwatersheds to select only those POD potentially impacting the 303(d) listed streams. This subset of the PODs was further winnowed by selecting only those points for which the accompanying water right is a surface water right, and for which the stated purpose of the water right is irrigation. This results in 368 unique POD centroid locations, associated with more than 1,000 surface water irrigation water rights.

The 368 POD within the project area were then edited to improve their positional accuracy vs the DNRC 'centroid' based locations. This was accomplished by one of two methods:

1. Where a field surveyed location was available from a DNRC water rights enforcement action, that POD was moved to the surveyed location.
2. Where a field surveyed location was not available, but where the location of the ditch headgate or other structure associated with the physical diversion of surface water was apparent on the 2005 NAIP aerial photos, the POD was moved to that location.

3.3 Irrigation Ditch Alignments

For each of the 368 POD, an attempt was made to provide the alignment of the associated irrigation ditch network. This was accomplished by one of two methods:

1. Where a ditch alignment was available from either the Water Resources Survey (preferred source) or the NHD (secondary source), that ditch alignment was accepted without alteration as the representative ditch alignment for the corresponding POD.
2. Where a ditch alignment was not available from either the Water Resources Survey or the NHD data, but where irrigation ditches were apparent on the 2005 NAIP aerial photos, the ditch alignment was digitized from the photos.

Thus constructed, these ditch alignments were then attributed with the ID of the corresponding POD. It should be noted that some POD did not have a ditch network that was either present in existing data sources or apparent on the NAIP photos. These POD were left in the data for reference. Similarly, the Water Resources Inventory contained some ditch alignments for which there does not appear to be a current water right/POD. These ditch alignments were removed from the data.

SECTION 4.0
RESULTS

ArcView shapefiles for the subwatersheds, POD and ditch alignments are presented as attachments to this report. **Figure 4-1** presents the 303(d) listed streams and their sub watershed areas, defining the geographic extent of the project.

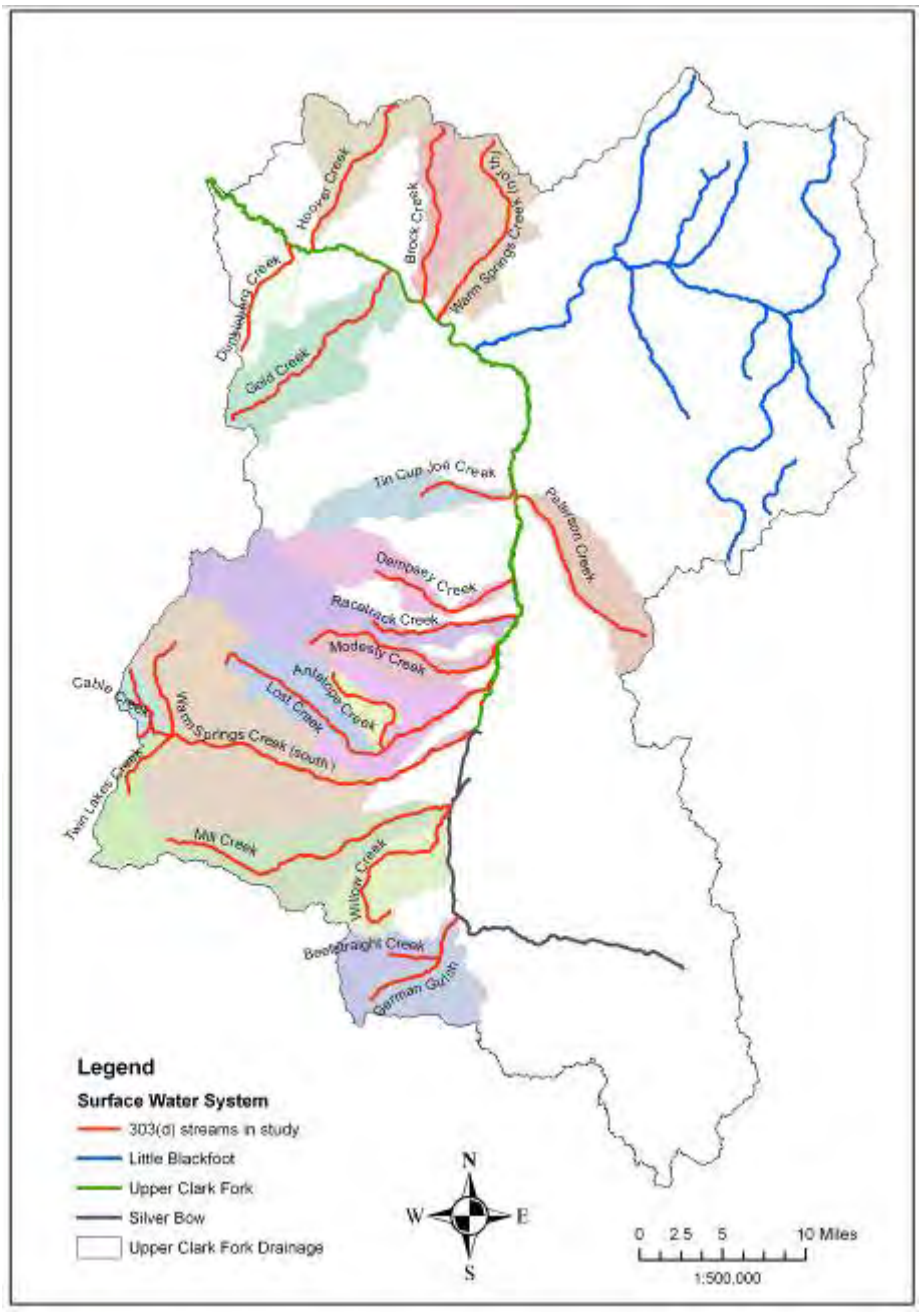

Figure 4-1 Project extent within Upper Clark Fork drainage

Results for individual 303(d) listed streams are presented below.

4.1 Antelope Creek

The Antelope Creek drainage encompasses nine square miles of area and 14 miles of stream channel (**Figure 4-2**). Approximately eight miles of 303(d) listed channel were identified from the 305(b) shapefile downloaded from the DEQ Clean Water Act Information website. This length differs from the length presented in the report (6.0 miles) generated for Antelope Creek (MT76G002_140) from the same website. The larger number and associated drainage basin from this shapefile has been used to prevent the exclusion of irrigation structures within the Antelope Creek drainage. The US Forest Service (USFS) manages approximately 1 square mile (11.2%) of the drainage as part of the Deerlodge National Forest. The State owns and manages a similar percentage (13.4%) with private ownership accounting for 6.81 square miles (75.3%) of the Antelope Creek basin. This basin contains 6 unique water rights associated with 10 point of diversion locations (**Table 4-1**). These diversions have a total potential maximum flow of 6.7 CFS, and are associated with an identified 8.6 miles of irrigation ditches **(Table 4-2**). The Wagner ditch has the potential to contribute flow from the Lost Creek drainage into the top of the Antelope Creek watershed. POD's 53 (Warm Springs *South*) and 66 (Lost Creek) also have the potential to deliver water from adjacent watersheds into the Antelope Creek basin.

Table 4-1. Unique Point of Diversion Locations and associated water rights within the Antelope Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
124	159976-1	76G 90378 00	2.50
140	215664-1	76G 127806 00	0.45
141	215664-1	76G 127806 00	0.45
142	215664-1	76G 127806 00	0.45
143	215664-1	76G 127806 00	0.45
144	215664-1	76G 127806 00	0.45
147	161318-1	76G 91160 00	0.25
150	162716-1	76G 91971 00	0.25
153	162715-1	76G 91970 00	0.88
157	162712-1	76G 91968 00	0.57

Table 4-2. Ditches identified in the Antelope Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
124	County	4,241
124	digitized	2,786
140	digitized	1,572
141	digitized	1,326
142	digitized	1,063
143	Kelly	2,743
144	Kelly	3,698
147	Lovell	1,490
150	Wagner	3,357
153	Wagner	7,430
53	Gardiner	14,728
66	digitized	840

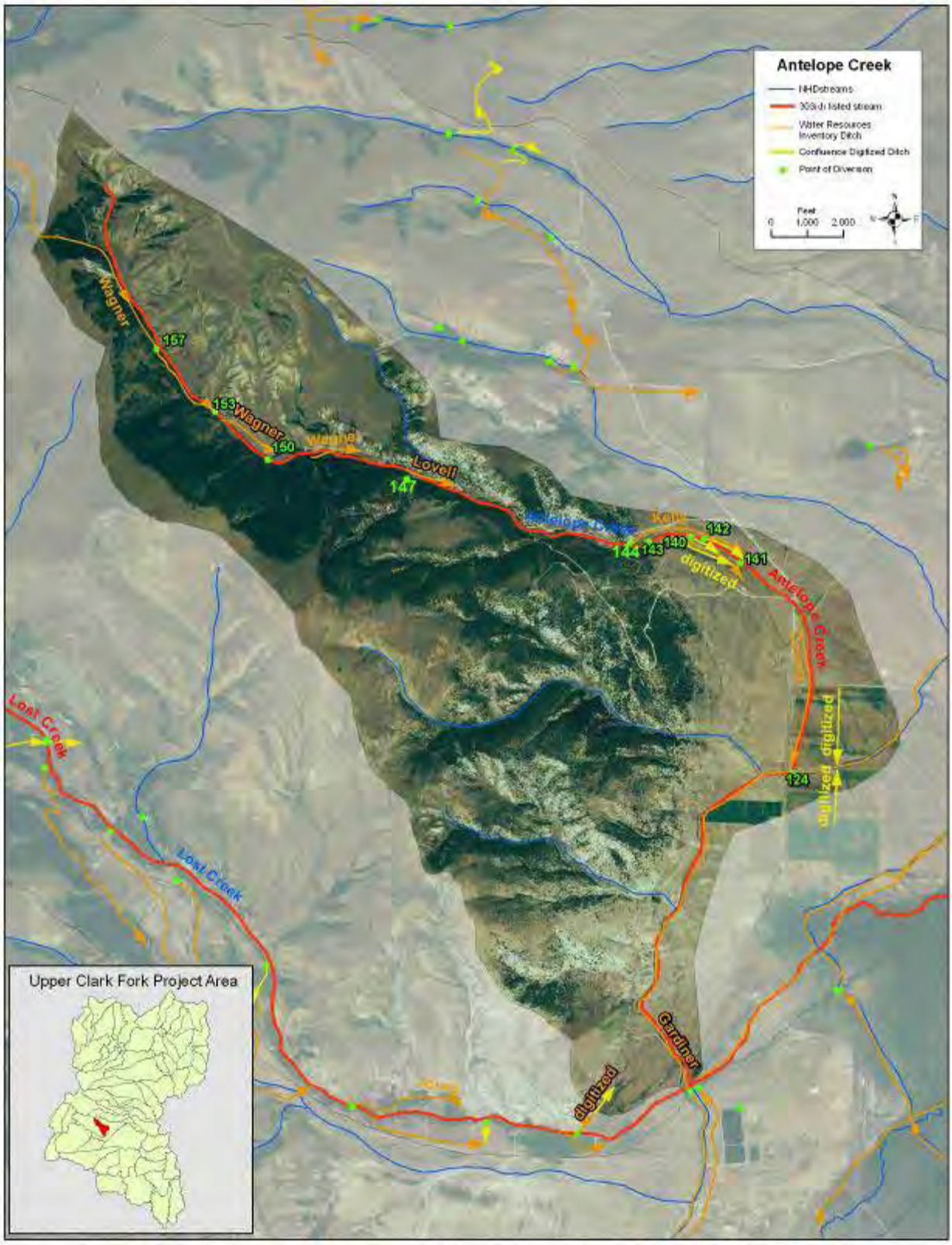

Figure 4-2. Antelope Creek watershed.

4.2 Beefstraight Creek

A tributary of German Gulch, Beefstraight Creek contains 17.5 square miles of drainage area and 22.5 miles of stream channels (**Figure 4-3**). The USFS manages 70% of this watershed and all the land adjacent to the entire 3.4-mile reach for this 303(d) listed stream that stretches from the confluence with Minnesota Gulch to the mouth (German Gulch). No irrigation points of diversion or ditches were identified in this basin.

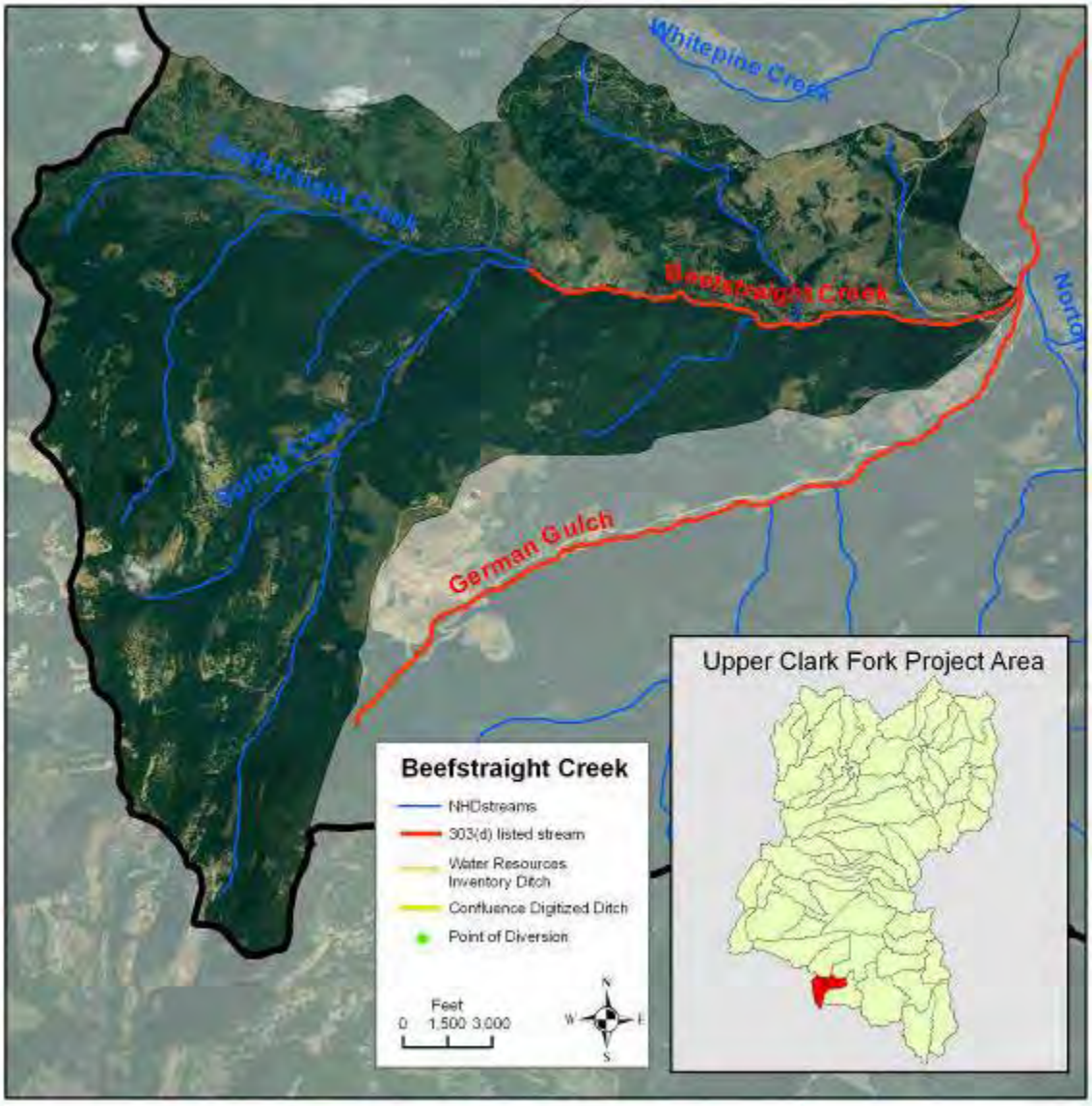

Figure 4-3. Beefstraight Creek watershed.

4.3 Brock Creek

The Brock Creek basin lies adjacent to the Warm Springs Creek *North* basin to the west and drains 24.8 square miles originating out of the Southern Garnet Sedimentary-Volcanic Mountains (**Figure 4-4**). The upper elevations of this watershed are heavily wooded. Vegetation trends to arid grassland with progression downstream to the main stem of the Clark Fork. The BLM manages roughly a quarter of this watershed, largely within the upper reaches of the drainage. Privately-owned lands account for nearly 70% of this watershed and dominate the areas adjacent to the 12-mile 303(d) listed reach (MT76G005_100). Surface water irrigation is limited to the lower reach of this basin, which contains 3 unique water rights (**Table 4-3**). The irrigation network in this basin consists of 5 point of diversion locations and 2 miles of irrigation ditches, with a max flow of 33.3 CFS (**Table 4-4**). Point of Diversion ID 361 and 363 are associated with the same Water Right; max flow for both of these diversions combined is 15 CFS.

Table 4-3. Unique Point of Diversion Locations and associated water rights within the Brock Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
359	288270-1	76G 211614 00	3.21
361	160828-1	76G 90878 00	15.00
363	160828-1	76G 90878 00	15.00
365	323444-1	76G 27629 00	0.07
365	160828-1	76G 90878 00	15.00

Table 4-4. Ditches identified in the Brock Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
359	knop ditch	3,519
365	digitized	7,023

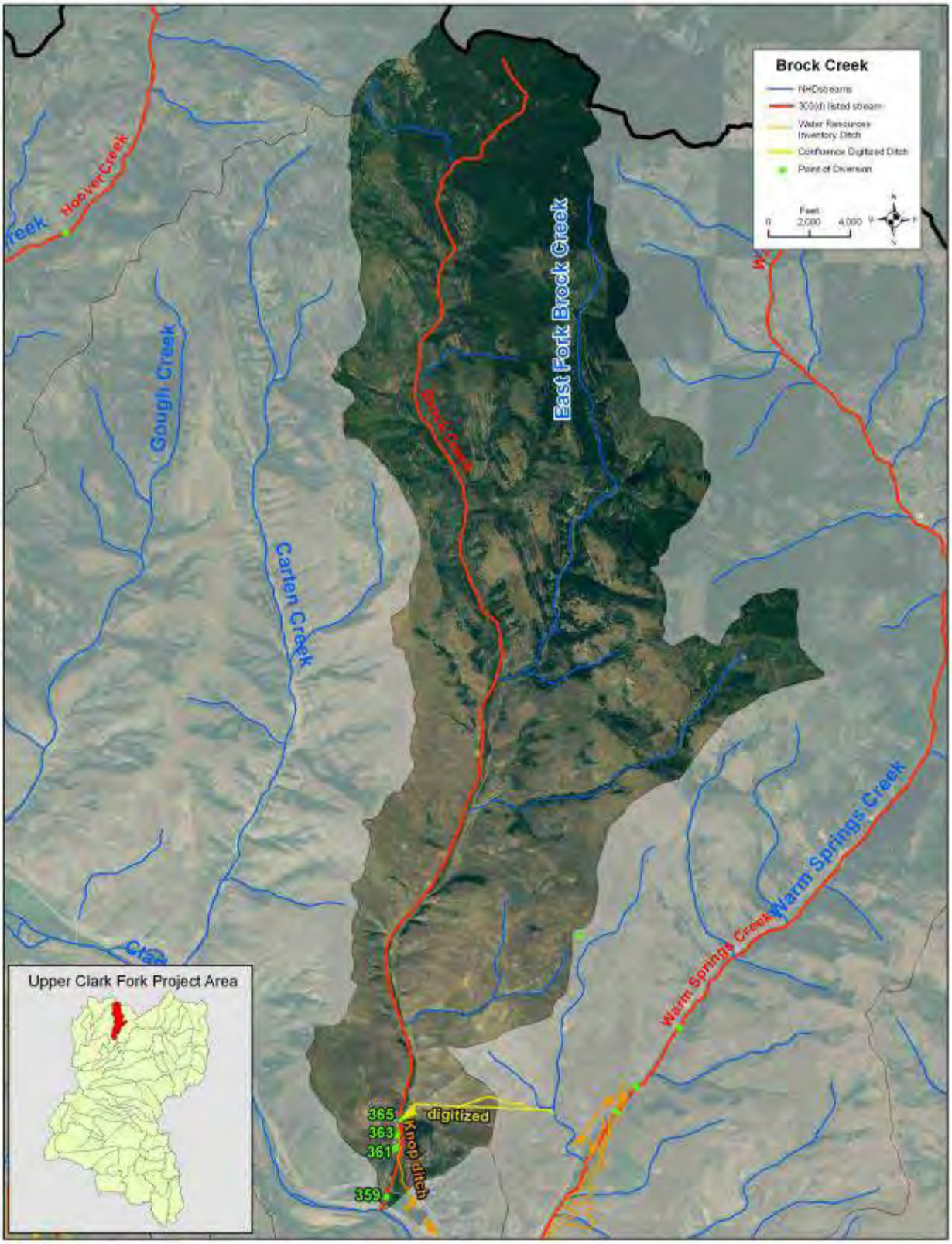

Figure 4-4. Brock Creek watershed.

4.4 Cable Creek

Cable Creek encompasses 7.4 square miles of drainage at the headwaters of Warm Spring Creek *South* basin and is the smallest watershed drainage in this project (**Figure 4-5**). This basin contains 9.2 miles of NHD stream channel, with 8.3 miles of those streams 303(d) listed (MT76G002_030). Three stream headwaters converge along the 303(d) listed Cable Creek reach. One of these tributaries extends to the very edge of the UCF basin and appears to be hydrologically connected to the adjacent Flint Creek/Silver Lake watershed by means of a pumping aqueduct. The USFS manages 6.2 square miles (85%) of the Cable Creek drainage. Private land accounts for the remaining 15%. This basin contains 4 unique water rights and two point of diversion locations **(Table 4-5)**, and an identified 1.6 miles of irrigation ditches with a max flow of 1.05 CFS (**Table 4-6**). The digitized ditch associated with POD ID 111 conveys flow out of this drainage and into the Warm Springs Creek South watershed.

Table 4-5. Unique Point of Diversion Locations and associated water rights within the Cable Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
111	228814-1	76G 142962 00	0.02
131	76369-1	76G 38503 00	0.05
131	161456-1	76G 91239 00	0.49
131	161454-1	76G 91238 00	0.49

Table 4-6. Ditches identified in the Cable Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
111	Digitized	4,758
131	Trace of	3,655

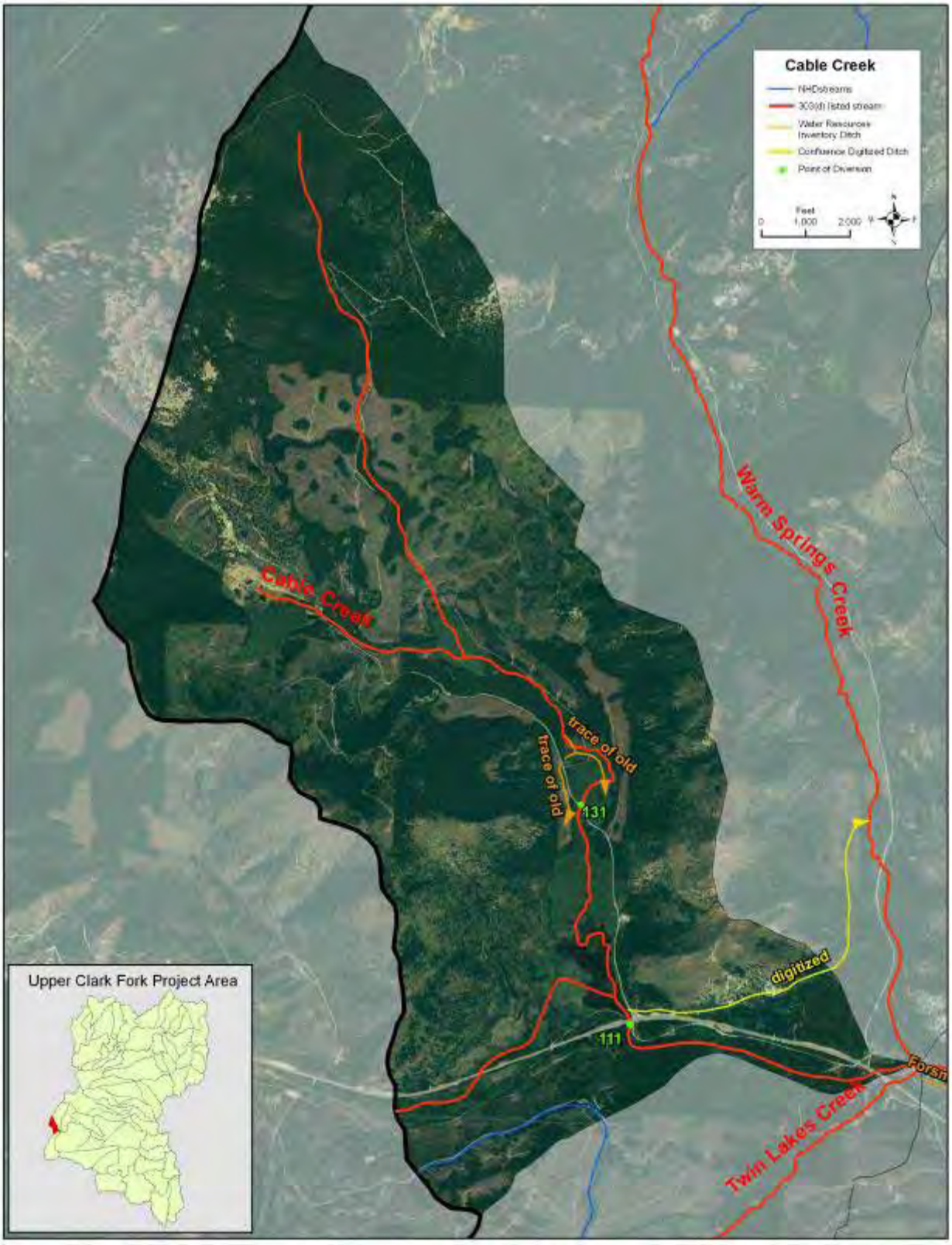

Figure 4-5. Cable Creek watershed.

4.5 Dempsey Creek

Dempsey Creek is an east flowing tributary of the Clark Fork River situated between the Tin Cup Joe and Racetrack Creek drainages **(Figure 4-6)**. The 28.4 square mile Dempsey Creek drainage contains 31.3 miles of mapped NHD watercourses. The 303 (d) listed reach of Dempsey Creek (MT76G002_100) extends 10 miles from the Deerlodge National Forest boundary to the mouth (Clark Fork). The drainage originates in the lake strewn Dempsey Basin in the Anaconda Mountains. The majority of the drainage within USFS land (61.8% of total drainage) appears heavily forested with a transition into irrigated arid grassland at the start of the 303(d) listed reach. This reach of 303(d) listed stream is mostly bordered by private land, accounting for 31.2% of the watershed basin. An approximate 1.6-mile reach of this stream is bordered on both sides by State land (Montana State Prison Ranch No. 2). Surface water irrigation is limited in the upper elevations of this basin, but extensive in the downstream reaches. A total of 36 point of diversion locations are associated with 61 unique water rights within the Dempsey basin (**Table 4-7**). A max flow of 136.3 CFS is allocated with these water rights through the 45 miles of identified ditches **(Table 4-8)**. The majority of the Dempsey Creek irrigation network is located within the lower half of the basin and has significant interaction (losses/gains) between the adjacent watersheds through the connection of 20+ ditches. POD's associated with these inter-watershed ditches include 180, 197, 212, 227, 275, and 301.

Table 4-7. Unique Point of Diversion Locations and associated water rights within the Dempsey Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
217	162977-1	76G 92121 00	1.25
218	162982-1	76G 92124 00	5.00
218	162911-1	76G 92083 00	5.00
218	162978-1	76G 92122 00	2.50
218	162980-2	76G 92123 00	2.54
219	162978-1	76G 92122 00	2.50
219	161696-1	76G 91377 00	1.29
219	162911-1	76G 92083 00	5.00
219	25643-2	76G 9642 00	1.88
219	162982-1	76G 92124 00	5.00
219	161220-1	76G 91103 00	1.31
219	161218-1	76G 91102 00	2.50
219	176696-1	76G 100079 00	2.83
219	161216-1	76G 91101 00	1.25
219	176695-1	76G 100078 00	2.58
219	25645-2	76G 9643 00	1.14
219	162977-1	76G 92121 00	1.25
219	25576-1	76G 9617 00	0.57
219	25578-1	76G 9618 00	0.94
219	25575-1	76G 9616 00	0.43
219	25647-2	76G 9644 00	0.86
219	292821-2	76G 9645 00	0.46
219	25652-2	76G 9646 00	0.67
219	25572-1	76G 9615 00	0.23
219	25569-1	76G 9614 00	0.33

Table 4-7 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
219	161702-1	76G 91380 00	0.36
219	162980-2	76G 92123 00	2.54
220	162977-1	76G 92121 00	1.25
221	305602-1	76G 126447 00	0.65
222	25576-1	76G 9617 00	0.57
222	25578-1	76G 9618 00	0.94
222	25575-1	76G 9616 00	0.43
222	25569-1	76G 9614 00	0.33
222	25572-1	76G 9615 00	0.23
223	162982-1	76G 92124 00	5.00
223	162911-1	76G 92083 00	5.00
223	162978-1	76G 92122 00	2.50
223	162980-2	76G 92123 00	2.54
224	162607-2	76G 91906 00	2.50
224	162610-3	76G 91908 00	2.50
224	162590-1	76G 91896 00	2.38
224	301520-1	76G 91898 00	1.13
224	162570-1	76G 91885 00	12.50
224	162591-1	76G 91897 00	2.50
224	162611-2	76G 91909 00	2.50
224	162599-2	76G 91902 00	17.50
224	162588-1	76G 91895 00	3.75
224	162615-2	76G 91911 00	2.50
224	162613-2	76G 91910 00	2.50
224	162586-1	76G 91894 00	1.25
224	162620-1	76G 91914 00	
225	305602-1	76G 126447 00	0.65
229	176698-1	76G 100080 00	1.25
232	64003-1	76G 31400 00	1.25
232	64000-1	76G 31399 00	2.75
233	161220-1	76G 91103 00	1.31
233	161218-1	76G 91102 00	2.50
233	161216-1	76G 91101 00	1.25
234	64003-1	76G 31400 00	1.25
235	161214-1	76G 91100 00	4.00
236	162977-1	76G 92121 00	1.25
237	176699-1	76G 100081 00	1.00
238	162573-1	76G 91886 00	2.50
238	162610-3	76G 91908 00	2.50
238	162607-2	76G 91906 00	2.50
238	162982-1	76G 92124 00	5.00
238	162570-1	76G 91885 00	12.50
238	162590-1	76G 91896 00	2.38
238	162977-1	76G 92121 00	1.25
238	301520-1	76G 91898 00	1.13
238	162911-1	76G 92083 00	5.00
238	162615-2	76G 91911 00	2.50
238	162588-1	76G 91895 00	3.75
238	162586-1	76G 91894 00	1.25
238	162591-1	76G 91897 00	2.50
238	162599-2	76G 91902 00	17.50

Table 4-7 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
238	162978-1	76G 92122 00	2.50
238	162611-2	76G 91909 00	2.50
238	162613-2	76G 91910 00	2.50
238	162980-2	76G 92123 00	2.54
238	162620-1	76G 91914 00	
239	162607-2	76G 91906 00	2.50
239	162610-3	76G 91908 00	2.50
239	162570-1	76G 91885 00	12.50
239	162590-1	76G 91896 00	2.38
239	301520-1	76G 91898 00	1.13
239	162586-1	76G 91894 00	1.25
239	162613-2	76G 91910 00	2.50
239	162588-1	76G 91895 00	3.75
239	162615-2	76G 91911 00	2.50
239	162591-1	76G 91897 00	2.50
239	162611-2	76G 91909 00	2.50
239	162599-2	76G 91902 00	17.50
239	162620-1	76G 91914 00	
240	228865-1	76G 143020 00	1.13
240	228866-1	76G 143021 00	2.38
240	228867-1	76G 143022 00	
242	162586-1	76G 91894 00	1.25
242	162615-2	76G 91911 00	2.50
242	162588-1	76G 91895 00	3.75
242	162591-1	76G 91897 00	2.50
242	162599-2	76G 91902 00	17.50
242	162611-2	76G 91909 00	2.50
242	162613-2	76G 91910 00	2.50
242	162610-3	76G 91908 00	2.50
242	162607-2	76G 91906 00	2.50
242	162573-1	76G 91886 00	2.50
242	162590-1	76G 91896 00	2.38
242	301520-1	76G 91898 00	1.13
242	162570-1	76G 91885 00	12.50
242	162620-1	76G 91914 00	
243	301457-1	76G 91366 00	1.00
243	161665-1	76G 91360 00	1.25
243	161664-1	76G 91359 00	5.00
243	161679-1	76G 91368 00	0.31
243	161675-1	76G 91365 00	2.50
243	161673-1	76G 91364 00	0.65
243	161678-1	76G 91367 00	0.69
244	162607-2	76G 91906 00	2.50
244	162610-3	76G 91908 00	2.50
244	162590-1	76G 91896 00	2.38
244	301520-1	76G 91898 00	1.13
244	162570-1	76G 91885 00	12.50
244	162586-1	76G 91894 00	1.25
244	162615-2	76G 91911 00	2.50
244	162588-1	76G 91895 00	3.75
244	162611-2	76G 91909 00	2.50

Table 4-7 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
244	162591-1	76G 91897 00	2.50
244	162599-2	76G 91902 00	17.50
244	162613-2	76G 91910 00	2.50
244	317413-1	76G 215549 00	0.42
244	162620-1	76G 91914 00	
245	214457-1	76G 126408 00	1.50
245	214458-1	76G 126410 00	2.00
245	305597-1	76G 126409 00	2.38
247	161682-2	76G 91369 00	1.19
248	162586-1	76G 91894 00	1.25
248	162613-2	76G 91910 00	2.50
248	162615-2	76G 91911 00	2.50
248	162588-1	76G 91895 00	3.75
248	162611-2	76G 91909 00	2.50
248	162591-1	76G 91897 00	2.50
248	162599-2	76G 91902 00	17.50
248	162607-2	76G 91906 00	2.50
248	162610-3	76G 91908 00	2.50
248	162590-1	76G 91896 00	2.38
248	301520-1	76G 91898 00	1.13
248	162570-1	76G 91885 00	12.50
248	162620-1	76G 91914 00	
249	161671-1	76G 91363 00	4.55
250	161693-2	76G 91376 00	2.16
250	161700-2	76G 91379 00	1.19
251	161668-1	76G 91361 00	2.50
254	162570-1	76G 91885 00	12.50
254	301520-1	76G 91898 00	1.13
254	162590-1	76G 91896 00	2.38
254	162610-3	76G 91908 00	2.50
254	162607-2	76G 91906 00	2.50
254	162573-1	76G 91886 00	2.50
254	162599-2	76G 91902 00	17.50
254	162591-1	76G 91897 00	2.50
254	162611-2	76G 91909 00	2.50
254	162588-1	76G 91895 00	3.75
254	162615-2	76G 91911 00	2.50
254	162586-1	76G 91894 00	1.25
254	162613-2	76G 91910 00	2.50
254	162620-1	76G 91914 00	
258	301457-1	76G 91366 00	1.00
258	161675-1	76G 91365 00	2.50
258	161678-1	76G 91367 00	0.69
258	161673-1	76G 91364 00	0.65
258	161679-1	76G 91368 00	0.31
262	161664-1	76G 91359 00	5.00
264	162615-2	76G 91911 00	2.50
266	162611-2	76G 91909 00	2.50
268	162613-2	76G 91910 00	2.50
270	162607-2	76G 91906 00	2.50

Table 4-8. Ditches identified in the Dempsey Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
180	morrison ditch	4,650
197	#10 ditch	65
212	johnson-eliason ditch	1,753
212	west side canal	1,930
217	prison ditch	1,940
218	digitized	4,125
218	prison ditch	5,334
219	#5 ditch	7,118
219	#9 ditch	854
219	digitized	4,368
219	quinlan ditch	912
220	digitized	933
221	digitized	5,970
222	#1 ditch	5,118
222	digitized	4,601
222	quinlan (vanisko) ditch	3,362
223	digitized	5,444
224	digitized	2,873
224	ryan ditch	2,913
225	quinlan (vanisko) ditch	3,486
227	digitized	3,472
229	digitized	9,124
232	#10 ditch	2,076
232	lowery-kramer ditch	6,673
233	#7 ditch	705
233	beck-lowery-kramer ditch	2,640
234	kramer ditch	1,992
235	#6 ditch	4,638
236	ryan waste ditch	5,063
237	#11 ditch	5,435
238	#3 ditch	9,481
239	ryan ditch	35,743
239	ryan waste ditch	8,731
240	#10 ditch	1,803
240	#13 ditch	1,981
242	digitized	12,781
242	ryan waste ditch	11,936
243	perkins ditch	2,578
244	perkins ditch	2,730

Table 4-8 (cont.)

POD ID	Ditch Name	Ditch Length (ft)
247	eliason lateral	2,099
247	perkins ditch	4,595
248	ryan ditch	1,610
249	#12 huot ditch	1,588
250	ryan ditch	2,863
254	perkins ditch	904
254	ryan ditch	5,265
258	perkins ditch	1,221
262	bungalow ditch	3,514
262	perkins ditch	13,053
275	digitized	677
301	west side canal	697
301	west side ditch	1,550

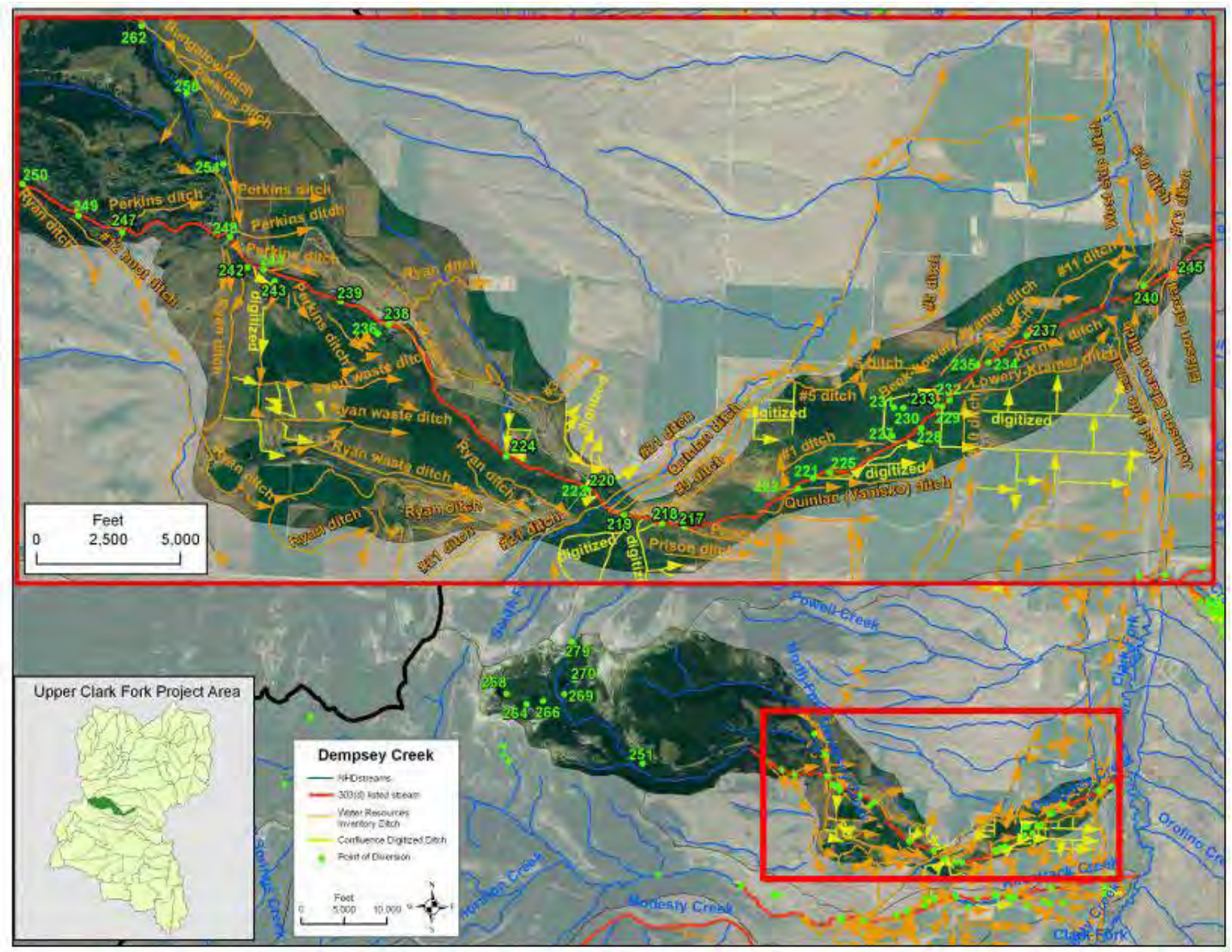

Figure 4-6. Dempsey Creek watershed.

4.6 Dunkleberg Creek

Dunkleberg Creek flows north through the Deerlodge National Forest and drains directly into the Clark Fork River **(Figure 4-7).** The Forest Service manages 5.3 square miles (34.0%) within the headwaters of this 15.5 square mile drainage. Privately owned lands account for 61.1% of this basin. A total of 27.9 miles of stream channel are identified from the NHD GIS stream layer. The 303(d) listed reaches of Dunkleberg Creek extends 8.3 miles from the headwaters to the mouth (MT76G005_071 and MT76G005_072). Landuse within the Dunkleberg basin includes irrigated agriculture and semiarid grazing land. This basin contains one unique water right associated with 5 point of diversion locations, and receives water from one point of diversion location in the Gold Creek drainage (POD ID 324) **(Table 4-9)**. Water right key 162729-1 has a total potential maximum flow of 3.0 CFS, and is associated with an identified 12.7 miles of irrigation ditches within the Dunkleberg basin (**Table 4-10**). An unnamed ditch originating in the Gold Creek watershed has the potential to deliver water into the headwaters of Dunkleberg. Four ditches in the lower elevations of this watershed have the potential to convey water into adjacent watersheds. POD ID's 324 and 353 are located outside the Dunkleberg basin and have the potential to transport water into this watershed via unnamed ditch.

Table 4-9. Unique Point of Diversion Locations and associated water rights within the Dunkleberg Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
353	162729-1	76G 91978 00	3.00
369	162729-1	76G 91978 00	3.00
372	162729-1	76G 91978 00	3.00
373	162729-1	76G 91978 00	3.00
374	162729-1	76G 91978 00	3.00

Table 4-10. Ditches identified in the Dunkleberg Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
324	unnamed ditch	2,810
353	unnamed ditch	32,703
369	digitized	4,249
369	unnamed ditch	4,741
372	hendrickson ditch	3,061
372	wallace ditch	13,583
373	unnamed ditch	2,093
373	wallace ditch	1,532
374	wallace ditch	2,268

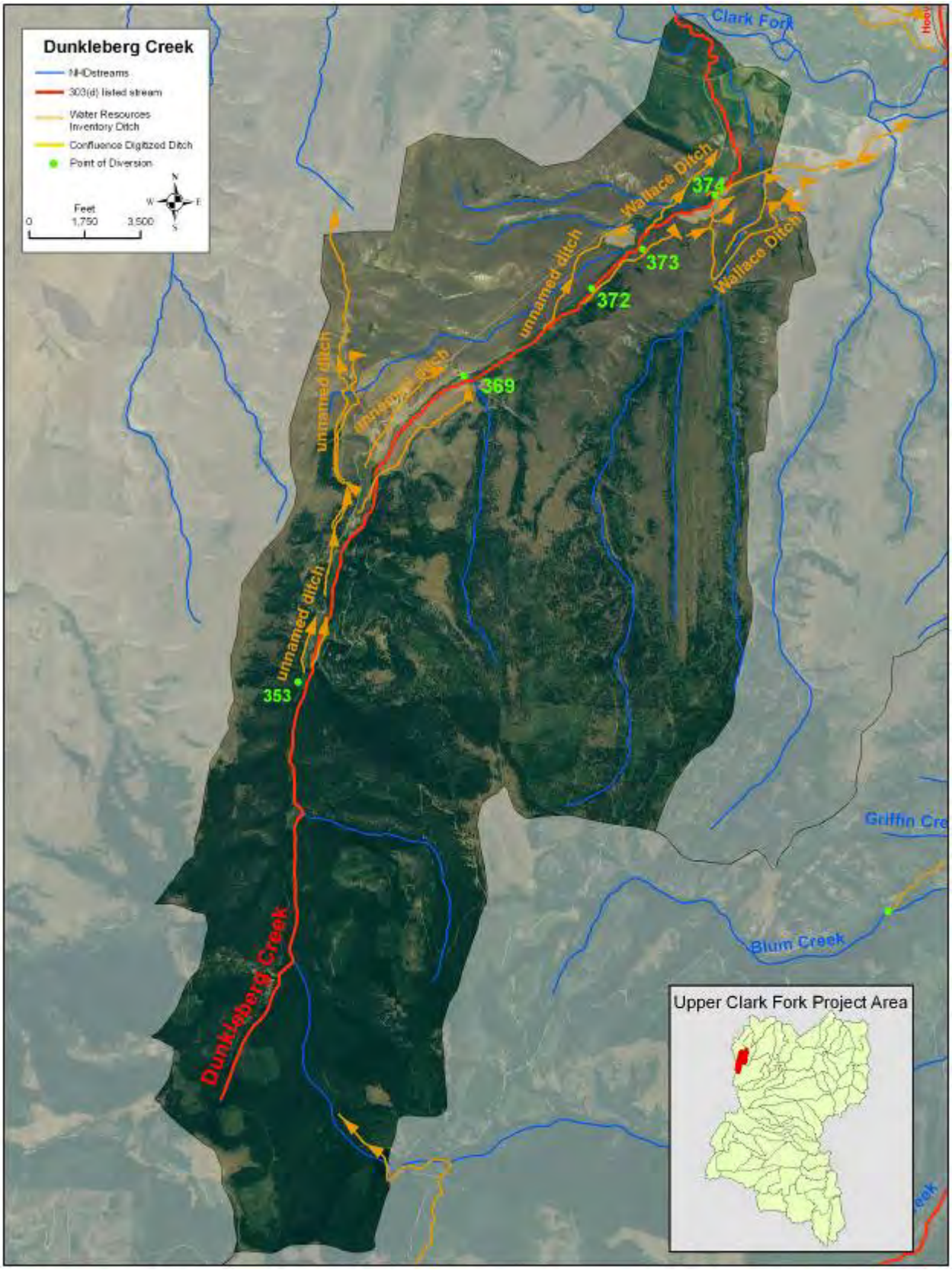

Figure 4-7 Dunkleberg Creek Watershed

4.7 German Gulch

German Gulch originates in the Eastern Pioneer Mountains along the Continental Divide and flows east-northeast into Silver Bow Creek. The entire 8.4 mile reach of this stream, from the headwaters to the mouth, has been 303(d) listed (MT76G003_030). This 23.5 square mile basin includes 35.4 miles of NHD mapped streams. The USFS manages the majority (80%) of this basin. Impacts from mining activity in the headwaters of this drainage are apparent from the aerial imagery. This basin contains 3 point of diversion locations and 7 unique water rights (**Table 4-11**). Max flow diverted from German Gulch allocated by these water rights is 122.35 CFS. No irrigation ditches were identified in this survey.

Table 4-11. Unique Point of Diversion Locations and associated water rights within the German Gulch watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
1	215417-1	76G 127524 00	0.76
2	217613-1	76G 130058 00	0.92
3	31836-1	76G 12883 00	15.00
3	301514-1	76G 91851 00	12.50
3	31834-1	76G 12882 00	37.50
3	162516-1	76G 91853 00	43.17
3	162514-1	76G 91852 00	12.50

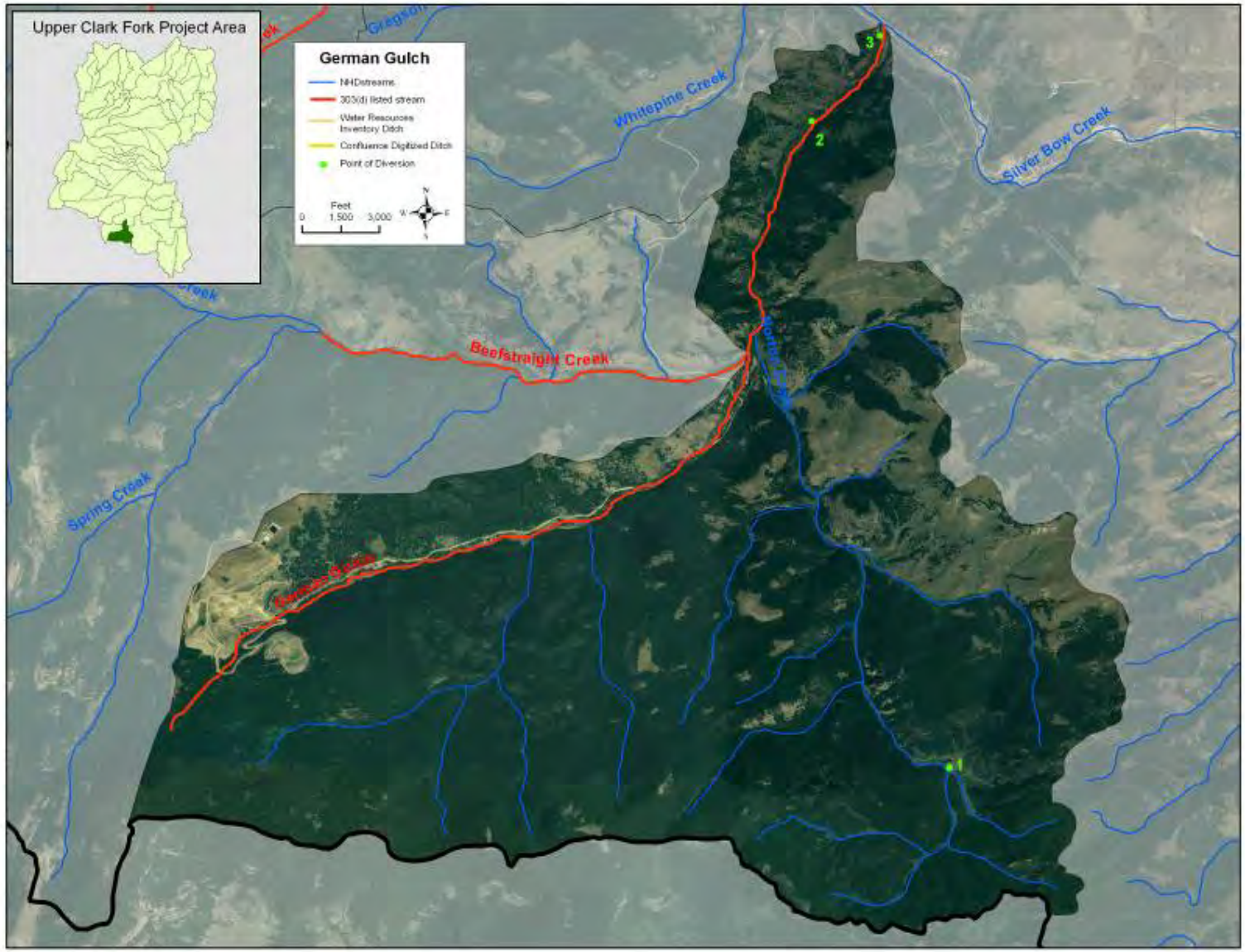

Figure 4-8. German Gulch watershed

4.8 Gold Creek

The 50.7 square mile Gold Creek drainage contains 60.0 miles of NHD mapped stream channels **(Figure 4-9)**. Similar to the adjacent Dunkleberg drainage, the upper Gold Creek watershed is primarily owned and managed by the USFS (55.2%) with the lower watershed predominantly in private ownership (42.7%). Two 303(d) listed reaches include the entire 15.2 miles of Gold Creek from the headwaters to the mouth (MT76G005_091 and MT76G005_092). This basin contains 49 unique water rights associated with 35 point of diversion locations and an identified 47 miles of irrigation ditches (**Table 4-12** & **4-13)**. A total 200.5 CFS is allocated for irrigation from this drainage. The irrigation network in this area has the potential to deliver water from this basin into the adjacent Dunkelberg Creek. Conversely, POD ID 326 has the potential to transport water into the Gold Creek basin via Carrouthers ditch.

Table 4-12. Unique Point of Diversion Locations and associated water rights within the Gold Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
323	160113-1	76G 90457 00	
324	160297-1	76G 90563 00	5.0
325	160554-1	76G 90712 00	0.87
327	160555-1	76G 90713 00	0.15
328	160162-1	76G 90485 00	5.00
329	288293-1	76G 211642 00	25.00
329	160963-1	76G 90956 00	3.75
330	301412-1	76G 90953 00	1.88
331	288293-1	76G 211642 00	25.00
332	161738-1	76G 91402 00	1.88
332	161763-1	76G 91416 00	1.88
333	288293-1	76G 211642 00	25.00
333	301356-1	76G 90464 00	1.88
333	160208-1	76G 90511 00	7.50
333	160961-1	76G 90955 00	3.00
334	290655-1	76G 215012 00	11.55
334	161022-1	76G 90990 00	1.50
334	162654-1	76G 91934 00	1.50
335	288293-1	76G 211642 00	25.00
335	160960-1	76G 90954 00	2.25
336	288293-1	76G 211642 00	25.00
336	160967-1	76G 90958 00	0.38
337	160197-1	76G 90505 00	2.50
338	288293-1	76G 211642 00	25.00
338	160965-1	76G 90957 00	2.50
339	288293-1	76G 211642 00	25.00

Table 4-12 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
339	160939-1	76G 90942 00	0.38
340	160142-1	76G 90474 00	10.00
341	301463-1	76G 91417 00	0.95
342	160138-1	76G 90472 00	1.50
343	160125-1	76G 90463 00	1.75
344	160209-1	76G 90512 00	2.08
345	215452-1	76G 127564 00	2.50
345	215454-1	76G 127566 00	1.50
345	290655-1	76G 215012 00	11.55
346	291269-1	76G 215732 00	8.25
346	160135-1	76G 90469 00	1.25
346	160177-1	76G 90494 00	2.08
346	301525-1	76G 91937 00	1.50
346	162663-1	76G 91939 00	6.25
347	317469-1	76G 215956 00	5.25
348	161026-1	76G 90992 00	2.50
349	215528-1	76G 127651 00	0.57
351	160132-1	76G 90468 00	3.60
355	317467-1	76G 215943 00	7.50
355	13174-1	76G 4823 00	7.50
357	290560-1	76G 214901 00	8.25
357	301469-1	76G 91465 00	7.50
358	160122-1	76G 90462 00	1.25
360	317467-1	76G 215943 00	7.50
360	13178-1	76G 4824 00	2.50
362	13180-1	76G 4825 00	
366	291269-1	76G 215732 00	8.25
366	162657-1	76G 91935 00	1.38
366	162663-1	76G 91939 00	6.25
366	162664-1	76G 91940 00	5.00
367	107977-1	76G 57062 00	2.09
370	107977-1	76G 57062 00	2.09
370	20602-1	76G 7539 00	0.66

Table 4-13. Ditches identified in the Gold Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
324	unnamed ditch	8,887
325	digitized	3,730
326	carrouthers ditch	8,090
327	mannix & wilson high ditch	7,769
328	digitized	2,714
329	roberts-mager ditch	5,906
330	lingenfelter ditch	6,143
331	digitized	2,075
332	elerick ditch	3,475
332	lingenfelter ditch	1,793
333	lingenfelter ditch	741
334	company ditch	4,734
335	lingenfelter ditch	2,699
336	lingenfelter ditch	2,684
337	digitized	27,824
338	lingenfelter blum cr ditch	3,498
338	lingenfelter ditch	2,451
339	digitized	28,831
340	digitized	9,657
341	mannix & wilson high ditch	7,508
342	jackson ditch	3,424
343	jackson ditch	4,679
344	fagin ditch	5,562
344	mcgurrin ditch	12,452
345	toner ditch	11,087
346	stark ditch	1,550
347	steiner ditch	3,063
348	digitized	8,112
351	digitized	3,501
351	milroy ditch	3,607
351	perriman ditch	1,698
355	cannon-brand ditch	7,900
357	digitized	4,867
358	steiner ditch	3,223
360	brand #2 ditch	4,895
360	digitized	13,230
362	brand #3 ditch	1,691
366	east side anthony ditch	3,804
367	digitized	6,930
370	keenan ditch	384

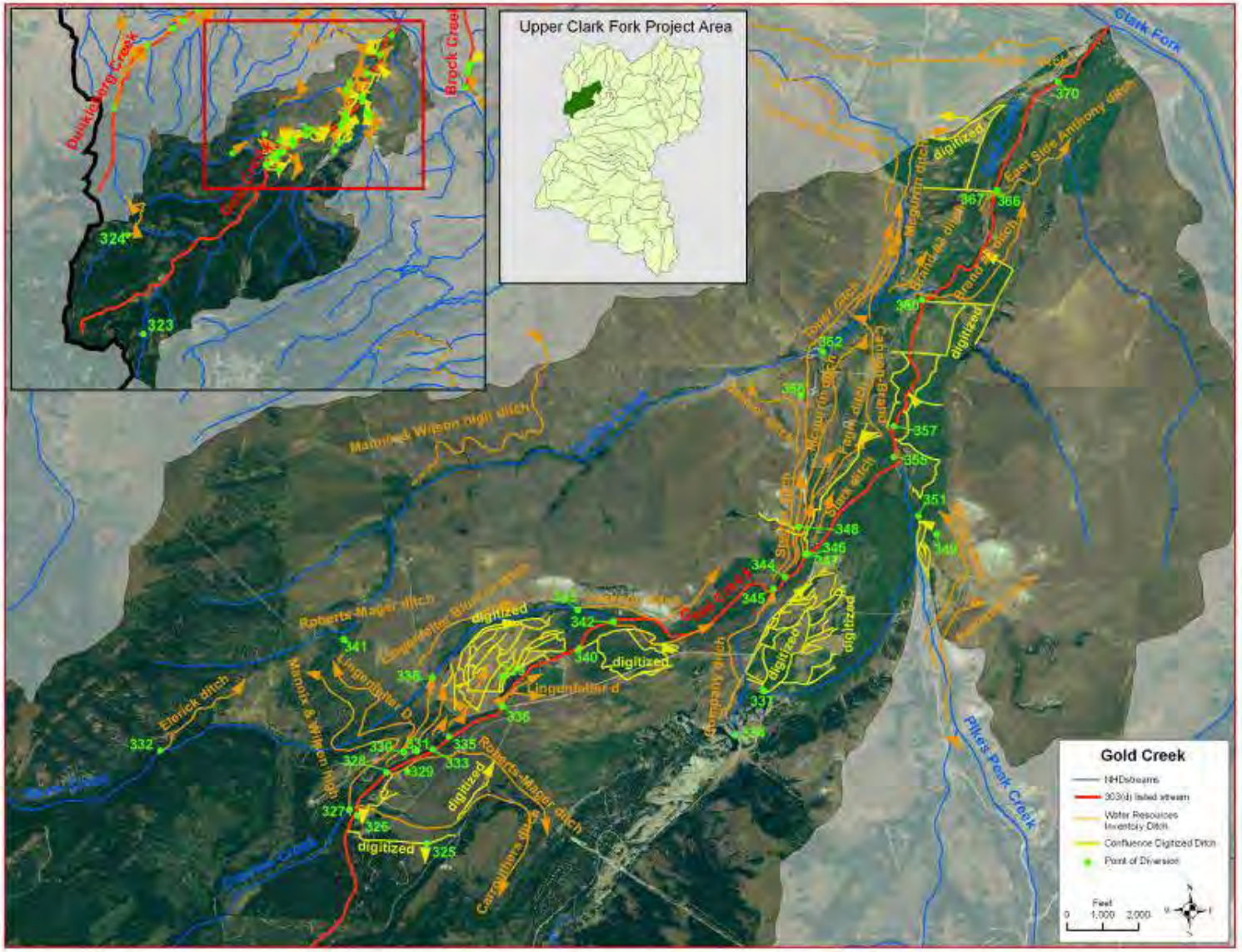

Figure 4-9. Gold Creek watershed

4.9 Hoover Creek

The Hoover Creek basin encompasses 30.9 square mile and contains 36.4 miles of NHD stream channels **(Figure 4-10)**. Main tributaries to Hoover Creek include Swamp and Kelly Creek. The Swamp Creek drainage converges with the Hoover Creek watershed at Miller Lake. The 303(d) listed stream segments of Hoover Creek (MT76G005_81 and MT76G005_82) reach from the mouth (Clark Fork River) and extends above Miller Lake to the head of Hoover Creek. Private ownership accounts for 85% of this drainage; BLM manages approximately 4.9% of the watershed within the Limestone Canyon/Lost Creek drainage, a considerable tributary to Hoover Creek above Miller Lake. The state owns 9.5% of the watershed, primarily within the Swamp Creek drainage above Miller Lake, with small parcels dispersed throughout the watershed. Surface water irrigation is limited to the lower elevation areas of this basin, which contain 7 unique water rights and 9 point of diversion locations for a potential max flow of 18.3 CFS **(Table 4-14)**. The Hoover Creek watershed contains an identified 4.5 miles of irrigation ditches (**Table 4-15**).

Table 4-14. Unique Point of Diversion Locations and associated water rights within the Hoover Creek watershed

POD ID	WRKEY	WRNUMBER	Max Flow (cfs)
376	161346-1	76G 91176 00	2.50
376	161350-1	76G 91178 00	2.58
376	161360-1	76G 91184 00	1.00
376	161344-1	76G 91175 00	7.50
376	161356-1	76G 91182 00	1.00
376	301438-1	76G 91180 00	1.25
377	301438-1	76G 91180 00	1.25
377	161344-1	76G 91175 00	7.50
377	161356-1	76G 91182 00	1.00
377	161360-1	76G 91184 00	1.00
377	161350-1	76G 91178 00	2.58
377	161346-1	76G 91176 00	2.50
378	301438-1	76G 91180 00	1.25
378	161356-1	76G 91182 00	1.00
378	161344-1	76G 91175 00	7.50
378	161360-1	76G 91184 00	1.00
378	161350-1	76G 91178 00	2.58
378	161346-1	76G 91176 00	2.50
379	161346-1	76G 91176 00	2.50
379	161350-1	76G 91178 00	2.58
379	161360-1	76G 91184 00	1.00
379	161344-1	76G 91175 00	7.50

Table 4-14 (cont.)

POD ID	WRKEY	WRNUMBER	Max Flow (cfs)
379	161356-1	76G 91182 00	1.00
379	301438-1	76G 91180 00	1.25
380	301438-1	76G 91180 00	1.25
380	161356-1	76G 91182 00	1.00
380	161344-1	76G 91175 00	7.50
380	161360-1	76G 91184 00	1.00
380	161350-1	76G 91178 00	2.58
380	161346-1	76G 91176 00	2.50
381	161350-1	76G 91178 00	2.58
381	161346-1	76G 91176 00	2.50
381	161360-1	76G 91184 00	1.00
381	161356-1	76G 91182 00	1.00
381	161344-1	76G 91175 00	7.50
381	301438-1	76G 91180 00	1.25
387	190436-1	76G 108011 00	2.50
390	161360-1	76G 91184 00	1.00
390	161346-1	76G 91176 00	2.50
390	161350-1	76G 91178 00	2.58
390	301438-1	76G 91180 00	1.25
390	161344-1	76G 91175 00	7.50
390	161356-1	76G 91182 00	1.00
394	161360-1	76G 91184 00	1.00
394	161350-1	76G 91178 00	2.58
394	161346-1	76G 91176 00	2.50
394	301438-1	76G 91180 00	1.25
394	161344-1	76G 91175 00	7.50

Table 4-15. Ditches identified in the Hoover Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
377	pickup ditch	1,339
378	digitized	4,482
379	digitized	2,593
380	digitized	2,223
381	gordon ditch	3,287
387	gordon ditch	4,353
387	hollenback ditch	5,378

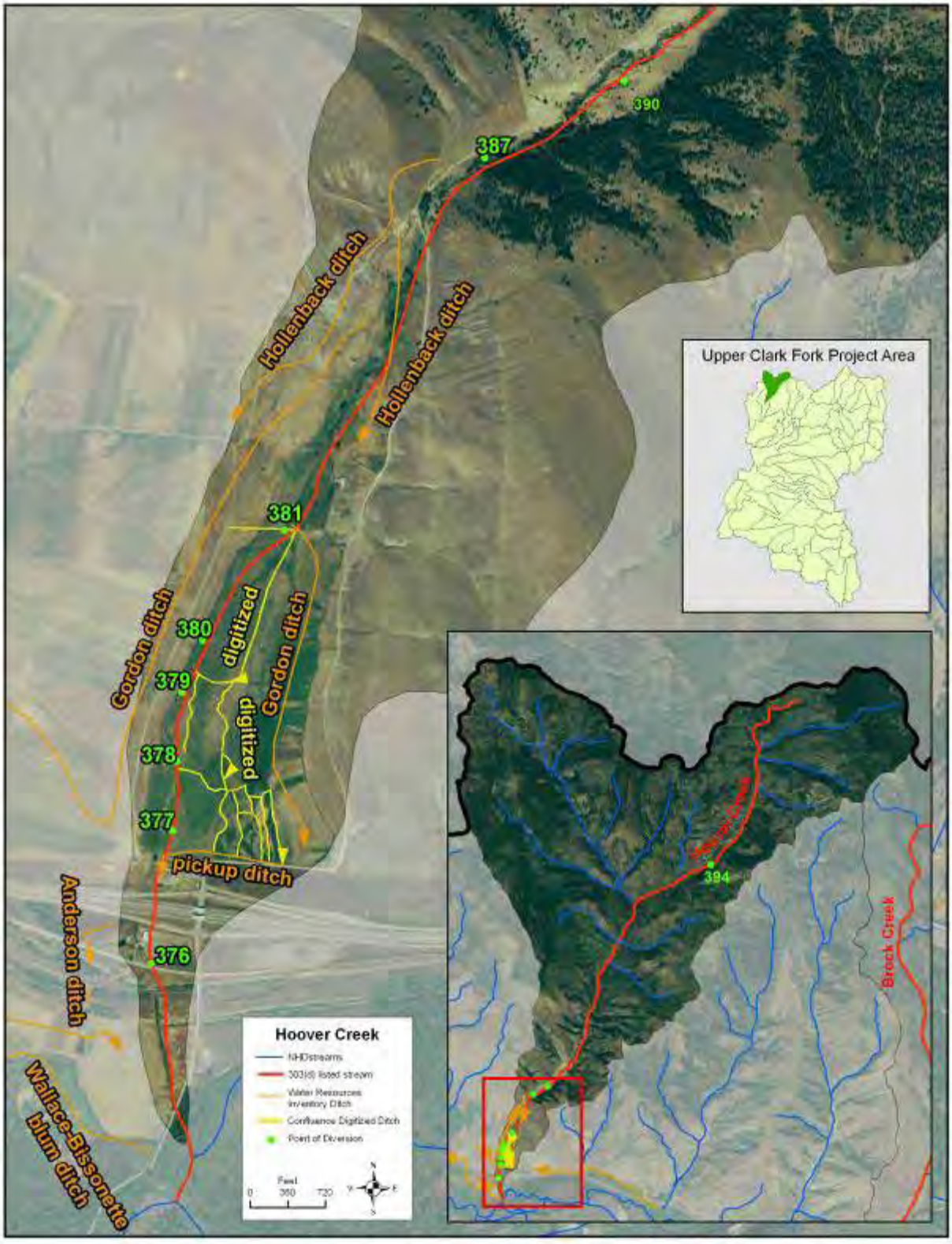

Figure 4-100. Hoover Creek watershed

4.10 Lost Creek

Lost Creek originates along the eastern slopes of the Anaconda Mountains in the Deerlodge National Forest **(Figure 4-11** & **Figure 4-12)**. The USFS manages 14.2% of this 60.3 square mile drainage basin. The State owns 5.4% of the basin, including the land along approximately 2 miles of the 303(d) listed channel along Lost Creek State Park. Private lands account for 75.6% of this watershed. This basin contains 88.64 miles of NHD stream channels, with 21.9 miles (24.7%) of Lost Creek 303(d) listed (MT76G002_071 and MT76G002_072) from the headwaters to the mouth (Clark Fork River). Surface water irrigation is extensive throughout this basin, which contains 75 unique water rights, 28 point of diversion locations, delivering a potential max flow of 188.8 CFS **Table 4-16**). A total of 49 miles of irrigation ditches were identified within this basin (**Table 4-17**). The Wagner ditch originates in the Upper Lost Creek watershed and has the potential to deliver water into the adjacent Antelope Creek basin. This water would be returned into the Lower Lost Creek drainage as Antelope Creek discharges into this basin. The Gardiner ditch carries water from the Warm Springs Creek *South* drainage, through the Lost Creek Basin, and potentially into the Modesty Creek watershed. If still active, a feature identified in the Water Resource Survey data source has the potential to carry water from Modesty Creek into the Lower Lost Creek drainage. The Elmer Jones ditch, Takerina, Henault, Nelson Havron, DesLauris, and other digitized ditches in the lower reaches of the Lost Creek watershed cross surface hydrology boundaries and extend into adjacent basins. POD ID's located outside of the Lost Creek drainage and associated with the fore mentioned inter-watershed ditches include 52, 53, 54, 66, 68, 69, 98, 108, 115, 123, 124, 126, 127, 135, 136, 153, and 173.

Table 4-16. Unique Point of Diversion Locations and associated water rights within the Lost Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
70	330368-1	76G 74211 00	4.50
71	31918-1	76G 12930 00	1.00
74	214639-1	76G 126617 00	0.40
74	215489-1	76G 127606 00	0.56
74	214640-1	76G 126618 00	0.58
74	214638-1	76G 126616 00	0.86
74	295416-1	76G 32347 00	2.90
74	305753-1	76G 127609 00	7.51
74	214647-2	76G 126626 00	1.56
74	215487-1	76G 127604 00	1.25
74	305752-1	76G 127602 00	3.81
74	65649-1	76G 32351 00	3.24
74	65671-1	76G 32363 00	2.50
74	215490-1	76G 127607 00	1.23
74	215491-1	76G 127608 00	2.88
74	215488-1	76G 127605 00	1.27
74	65673-1	76G 32364 00	2.90
93	65644-1	76G 32348 00	3.93
97	305752-1	76G 127602 00	3.81
97	214571-1	76G 126539 00	3.68
97	214578-1	76G 126547 00	1.69
97	214647-2	76G 126626 00	1.56
97	214580-1	76G 126549 00	3.75
97	215487-1	76G 127604 00	1.25
97	305753-1	76G 127609 00	7.51
97	215490-1	76G 127607 00	1.23
97	215491-1	76G 127608 00	2.88
97	215488-1	76G 127605 00	1.27
97	214639-1	76G 126617 00	0.40
97	215489-1	76G 127606 00	0.56
97	214640-1	76G 126618 00	0.58
97	214638-1	76G 126616 00	0.86
100	65782-1	76G 32427 00	1.00

Table 4-16 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
101	65656-1	76G 32354 00	0.50
101	72266-1	76G 36151 00	5.25
101	214496-1	76G 126453 00	6.25
101	65663-1	76G 32358 00	1.25
103	214582-1	76G 126552 00	0.56
103	214609-1	76G 126582 00	0.13
103	214577-1	76G 126546 00	0.38
113	305752-1	76G 127602 00	3.81
113	305603-1	76G 126454 00	9.47
113	305753-1	76G 127609 00	7.51
113	215487-1	76G 127604 00	1.25
113	214647-2	76G 126626 00	1.56
113	215488-1	76G 127605 00	1.27
113	215490-1	76G 127607 00	1.23
113	215491-1	76G 127608 00	2.88
113	215489-1	76G 127606 00	0.56
113	214639-1	76G 126617 00	0.40
113	214638-1	76G 126616 00	0.86
113	214640-1	76G 126618 00	0.58
114	214596-1	76G 126568 00	1.75
114	214576-1	76G 126545 00	2.59
114	214593-1	76G 126565 00	1.20
114	65784-1	76G 32428 00	1.00
116	65660-1	76G 32357 00	1.89
125	65674-2	76G 32365 00	3.75
125	65646-1	76G 32349 00	4.40
125	65637-1	76G 32344 00	1.65
133	161423-1	76G 91220 00	1.86
133	301440-1	76G 91202 00	1.43
133	161396-1	76G 91204 00	2.50
137	190491-1	76G 108042 00	10.50
139	160103-1	76G 90451 00	3.89
139	160104-1	76G 90452 00	20.83
139	160130-1	76G 90467 00	3.85
145	190492-1	76G 108043 00	5.00
146	301440-1	76G 91202 00	1.43
146	161423-1	76G 91220 00	1.86
146	161396-1	76G 91204 00	2.50
151	220631-1	76G 133525 00	0.95
151	220631-1	76G 133525 00	0.95
154	204940-1	76G 116496 00	3.85
155	161016-1	76G 90986 00	3.85
156	162884-1	76G 92067 00	0.50
158	162885-1	76G 92068 00	2.00
159	162882-1	76G 92066 00	2.00
160	301538-1	76G 92065 00	1.25
161	162897-1	76G 92075 00	4.74
163	162901-1	76G 92077 00	4.74
169	162877-1	76G 92063 00	1.25
170	190502-1	76G 108048 00	1.25
170	162878-1	76G 92064 00	1.25

Table 4-17. Ditches identified in the Lost Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
52	Elmer Jones	2,050
53	Gardiner	33,498
54	drain	1,744
66	Farwell	2,591
66	digitized	106
68	digitized	551
69	Jones	7,030
70	Elmer Jones	7,723
74	Elmer Jones	18,529
93	drain	4,018
97	Gardiner	24,140
98	Takerina	745
98	Takerina	1,641
98	digitized	1,167
100	digitized	477
101	Fifer-Cummock	10,016
101	digitized	3,917
108	Henault	4,717
113	Fifer-Cummock	3,595
115	Henault	3,885
115	Henault	6,590
116	Fifer-Cummock	18,359
123	Nelson Harvon	6,931
124	digitized	916
125	Moss	25,048
126	digitized	973
127	digitized	1,788
133	digitized	6,829
135	DesLauris	3,691
136	DesLauris	2,279
137	Fred Jacobson	10,215
139	Beck	7,915
145	Fred Jacobson ?	1,134
146	digitized	1,146
146	drain	1,714
151	trace of old	2,698
153	Wagner	8,775
154	Beckstead	682
155	digitized	2,074
156	Fairweather	6,328
163	Fairweather	8,056
169	digitized	2,138
170	digitized	1,168
173	trace of old	975

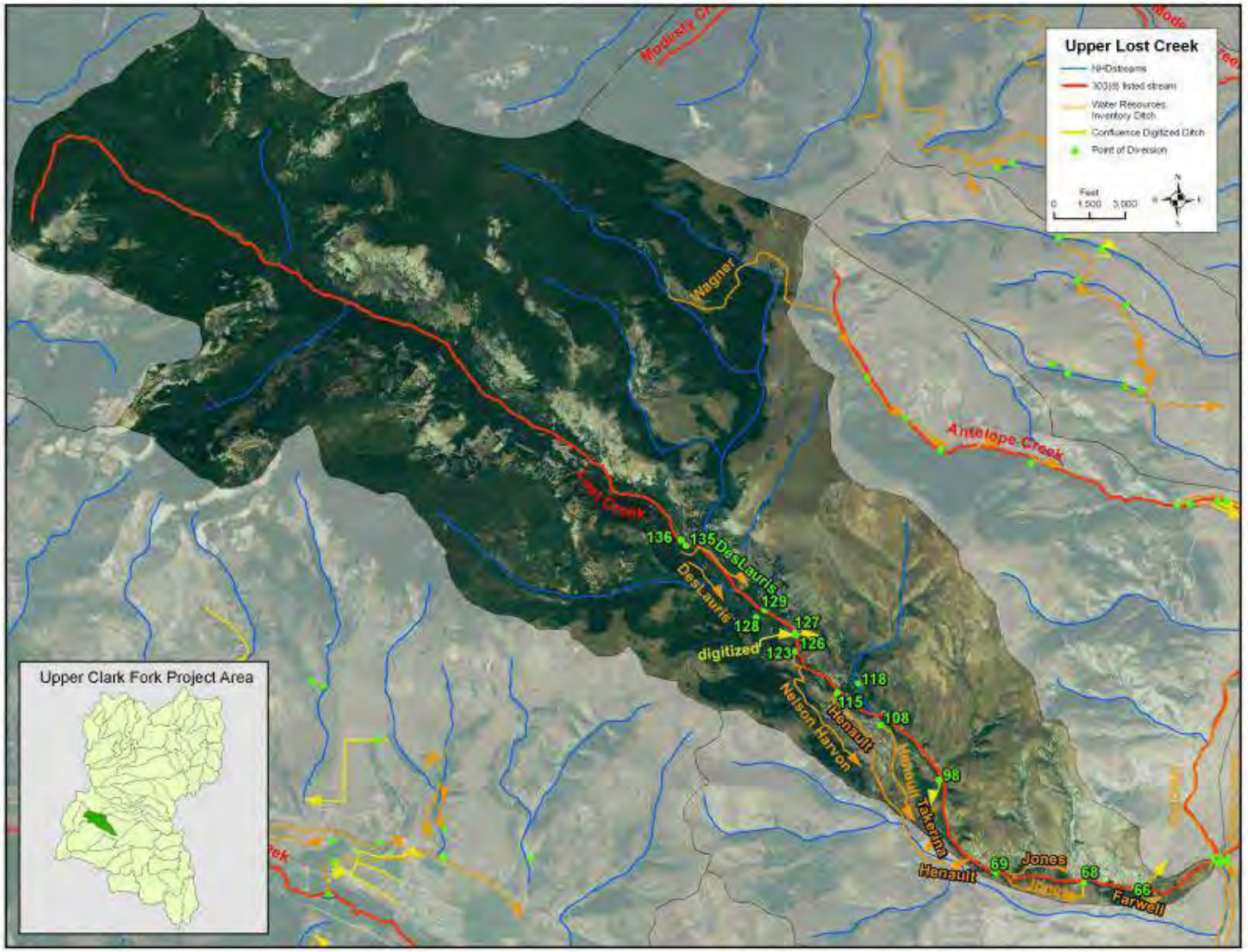

Figure 4-11. Upper Lost Creek watershed

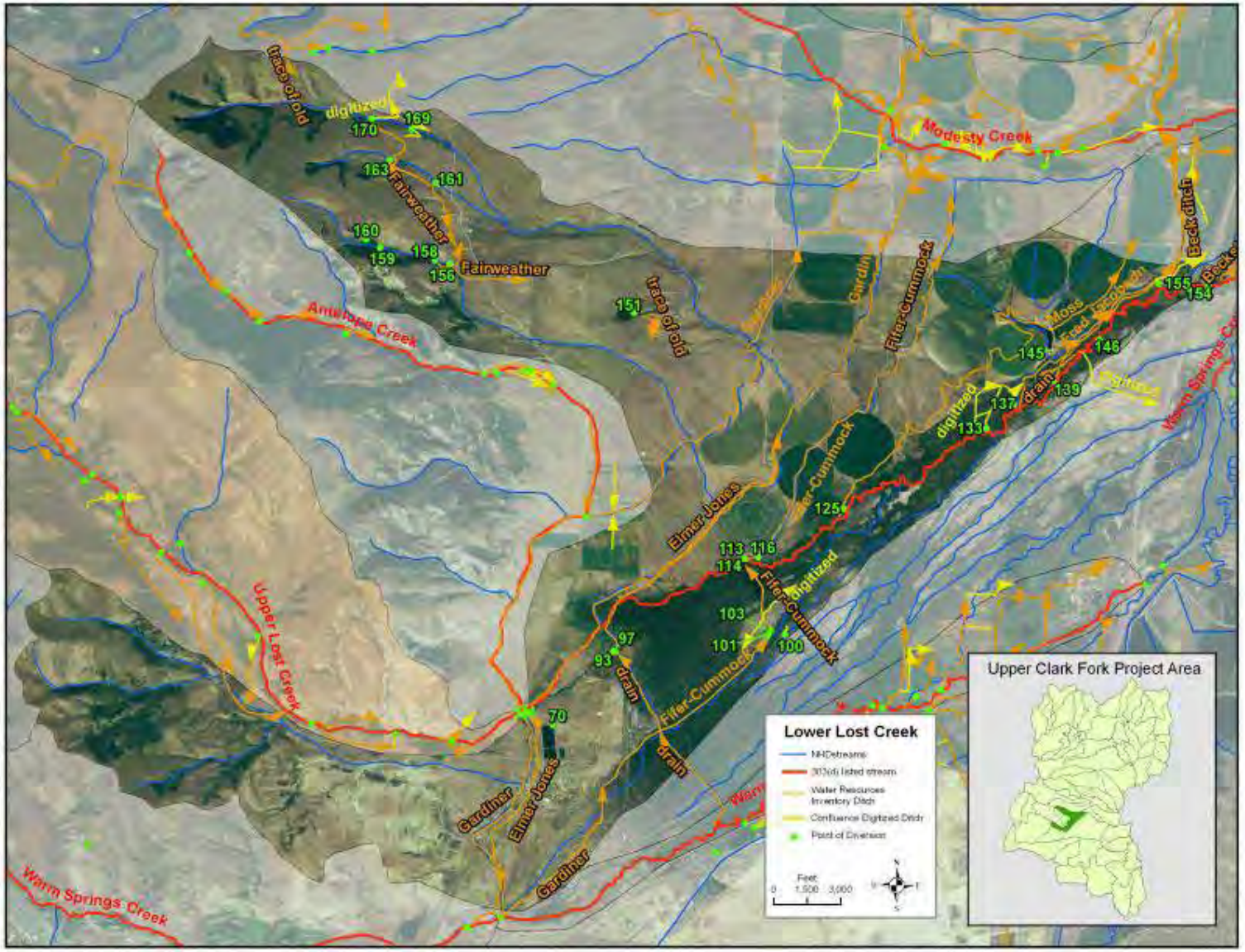

Figure 4-12. Lower Lost Creek watershed

4.11 Mill Creek

Mill Creek flows east from the Continental Divide into Silver Bow Creek **(Figure 4-13)**. The majority of this 49.2 square mile basin is privately owned (75.1%), with private ownership accounting for the majority of land adjacent to the 303(d) listed stream reaches (MT76G002_051 and MT76G002_052) that extend from the headwaters to the mouth. USFS property accounts for very little of this drainage (<1%); State-owned land include 20.5% of the Mill Creek drainage and includes property managed in the Mount Haggin State Wildlife Management Area. Approximately 56.9 miles of NHD stream channels are present in this basin with significant tributaries including Clear Creek and Silver Creek. The downstream reaches of this basin contain 59 unique water rights and 19 point of diversion locations (**Table 4-18**). The basin contains an identified 34.2 miles of irrigation ditches **Table 4-19)** with a potential max flow of 365.2 CFS drawn from this system. Significant ditches within the Mill Creek irrigation network include the A.C.M. ditch, Yellow ditch, and Willow Creek ditch. Each of these ditches cross watershed boundaries and carry water into or out of the adjacent Willow Creek and Warm Springs *South* basins. POD ID's associated with cross watershed diversions include 9, 18, 73, and 82.

Table 4-18. Unique Point of Diversion Locations and associated water rights within the Mill Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
15	161539-1	76G 91287 00	12.50
15	215502-1	76G 127621 00	0.38
15	215523-1	76G 127645 00	25.00
15	215504-1	76G 127624 00	1.71
15	215511-1	76G 127632 00	1.00
15	215519-1	76G 127641 00	6.06
15	215499-1	76G 127618 00	23.01
15	215501-1	76G 127620 00	8.60
15	215522-1	76G 127644 00	5.00
17	65705-1	76G 32382 00	5.00
17	65698-1	76G 32378 00	3.40
17	65700-1	76G 32379 00	5.00
17	65696-1	76G 32377 00	3.40
17	65692-1	76G 32375 00	12.50
21	65690-1	76G 32374 00	25.00
21	215498-1	76G 127617 00	12.39
21	215510-1	76G 127631 00	22.89
21	305756-1	76G 127630 00	4.00
21	215509-1	76G 127629 00	7.01
21	215521-1	76G 127643 00	5.00
21	215514-1	76G 127635 00	12.50
21	65711-1	76G 32386 00	0.33
21	305754-1	76G 127616 00	7.09
21	295421-1	76G 32390 00	1.93
21	305757-1	76G 127640 00	20.16

Table 4-18 (cont.)

Table 4-18 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
21	215518-1	76G 127639 00	5.00
21	215503-1	76G 127622 00	7.88
21	215513-1	76G 127634 00	2.73
21	295420-1	76G 32383 00	12.50
21	65686-1	76G 32372 00	10.00
21	65693-1	76G 32376 00	2.00
21	65719-1	76G 32391 00	4.75
21	65708-1	76G 32384 00	5.57
21	65712-1	76G 32387 00	7.58
21	65714-1	76G 32388 00	3.41
21	215524-1	76G 127646 00	5.00
21	65703-1	76G 32381 00	3.26
21	215497-1	76G 127615 00	2.73
21	215516-1	76G 127637 00	1.33
26	57942-1	76G 27918 00	3.70
27	65710-1	76G 32385 00	7.28
28	228861-1	76G 143015 00	0.20
29	18493-1	76G 6769 00	0.25
30	96229-1	76G 49961 00	0.05
31	295419-1	76G 32373 00	11.10
32	65681-1	76G 32369 00	25.00
32	215520-1	76G 127642 00	7.50
33	160052-1	76G 90422 00	0.02
34	160604-1	76G 90750 00	0.13
35	162908-1	76G 92081 00	0.23
35	162903-1	76G 92078 00	0.03
36	163295-1	76G 92307 00	1.30
38	95447-1	76G 49510 00	0.05
39	161539-1	76G 91287 00	12.50
39	163015-1	76G 92144 00	
40	204965-1	76G 116510 00	1.00
41	161539-1	76G 91287 00	12.50
43	86580-1	76G 44389 00	1.25
43	211786-1	76G 123327 00	1.25
43	161539-1	76G 91287 00	12.50
43	161657-1	76G 91355 00	0.11
43	220724-1	76G 133631 00	0.19

Table 4-19. Ditches identified in the Mill Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
9	Yellow	3,996
15	Opportunity	7,378
17	Allen	4,615
18	digitized	2,198
21	A.C.M.	6,994
26	A.C.M. 16	5,264
27	unnamed	5,117
28	A.C.M.	5,438
28	Ingalls	10,707
29	A.C.M.	6,855
30	digitized	1,920
31	A.C.M. 16	8,572
31	digitized	2,208
32	A.C.M. 16	1,206
33	Patterson	7,895
34	#3	9,222
34	#4	5,643
34	#5	6,317
35	#6	6,781
36	Ingalls	4,154
38	#8	9,956
39	Yellow	5,030
40	#9	6,958
41	unnamed	5,509
43	#10	3,403
73	Willow Creek	1,775
82	digitized	2,224

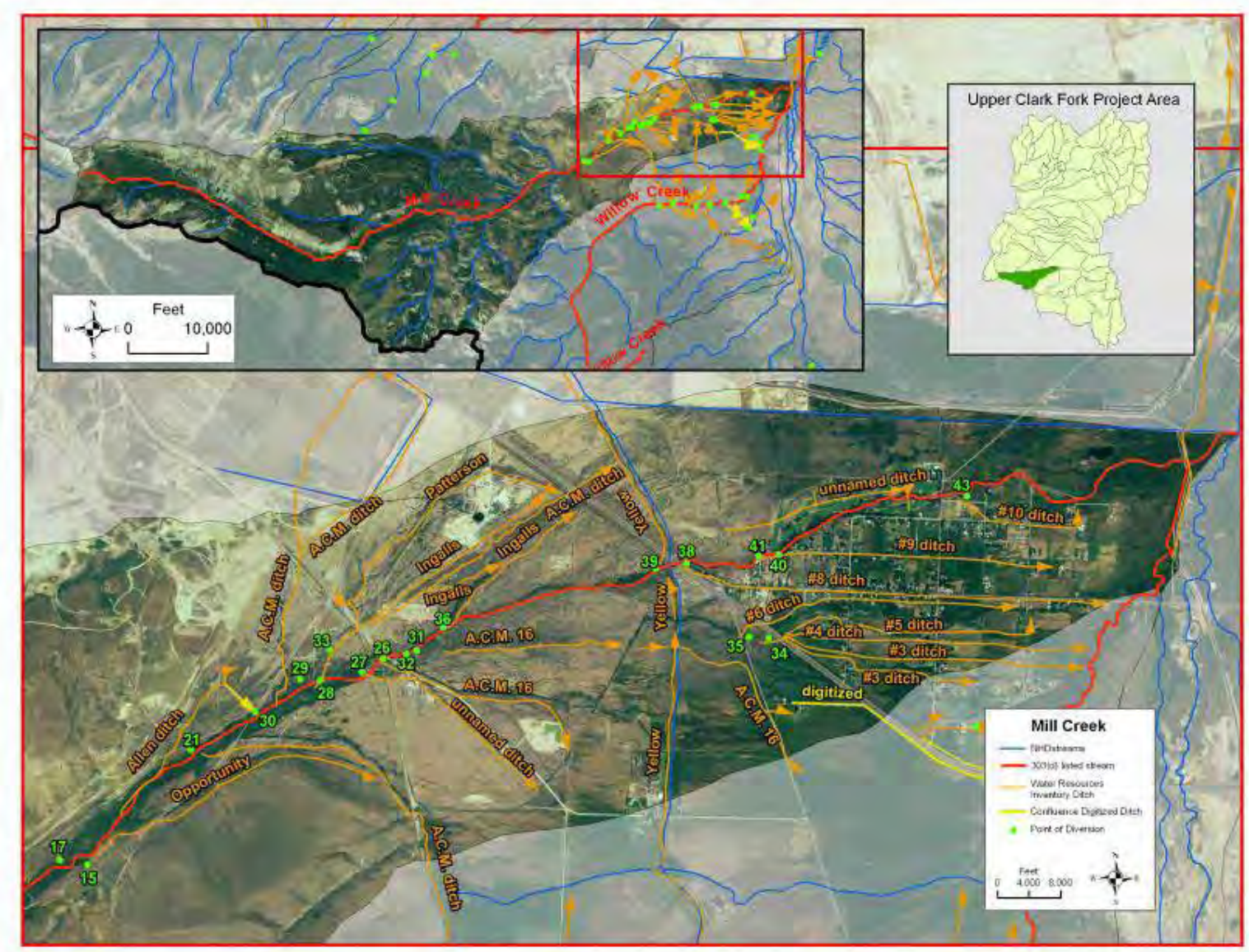

Figure 4-13. Mill Creek watershed

4.12 Modesty Creek

Modesty Creek is an east flowing stream draining into the Clark Fork River. This watershed is situated between the Lost Creek and Racetrack Creek drainages. Approximately 33.9 miles of stream channels have been mapped within the Modesty Creek basin **(Figure 4-14)**. The entire 14.0 mile reach of Modesty Creek from the headwaters to the mouth is 303(d) listed. Private lands account for 96.3% of this 21.1 square mile watershed; USFS property encompasses a small portion (<1%) of the upper watershed; State lands account for 3.4% of the drainage and are the adjacent land for one mile of the 303(d) listed reach. This basin contains 13 unique water rights and 12 point of diversion locations, and receives from or provides water to ditches associated with 21 point of diversion locations in the Lost Creek and Racetrack Creek watersheds (POD ID 114, 116, 137, 139, 145, 170, 203, 53, and 97). These 21 unique point of diversion locations are associated with a total maximum flow of 25.79 CFS. Approximately 32.64 miles of irrigation ditches were identified within the basin **(Table 4-21**). The Old Pozega ditch has the potential to deliver water from the adjacent Racetrack Creek watershed. Fairweather and Gardiner ditch systems could contribute water into or from the Antelope and Lost Creek drainages. Additional water may be contributed from the Lost Creek drainage into Modesty Creek via AA Beck and Jacobsen systems. The Fifer-Cummock ditch originates along Racetrack Creek and may deliver water into the Modesty basin.

Table 4-20. Unique Point of Diversion Locations and associated water rights within the Modesty Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
162	291114-1	76G 215551 00	3.75
164	160108-1	76G 90454 00	5.00
164	301355-1	76G 90453 00	1.50
164	160150-1	76G 90479 00	6.06
165	160150-1	76G 90479 00	6.06
165	301355-1	76G 90453 00	1.50
165	160108-1	76G 90454 00	5.00
166	190503-1	76G 108049 00	0.25
167	160224-1	76G 90521 00	0.64
168	160219-1	76G 90518 00	0.25
171	160223-1	76G 90520 00	6.25
172	190499-1	76G 108047 00	0.83
173	190499-1	76G 108047 00	0.83
173	303347-1	76G 108046 00	0.63
174	162890-1	76G 92071 00	0.63
175	214498-2	76G 126456 00	
176	209834-1	76G 121083 00	

Table 4-21. Ditches identified in the Modesty Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
114	Fifer-Commock	2,581
116	Fifer-Cummock	287
137	Jacobson	4,276
139	A A Beck	7,743
145	Jacobson	6,728
162	digitized	712
164	Galen	1,060
165	Beck	4,663
165	No. 21 (lower)	13,771
166	digitized	4,796
167	digitized	11,493
168	No. 20	9,752
168	No. 21 (lower)	11,443
168	digitized	13,006
170	digitized	2,219
171	Beck	9,595
172	trace of old	13,858
173	trace of old	642
174	trace of old	18,637
175	Meyer	2,225
175	Meyer-Donich	3,440
176	Meyer-Donich	13,771
203	old Pozega	3,369
53	Gardiner	240
97	Gardiner	12,005

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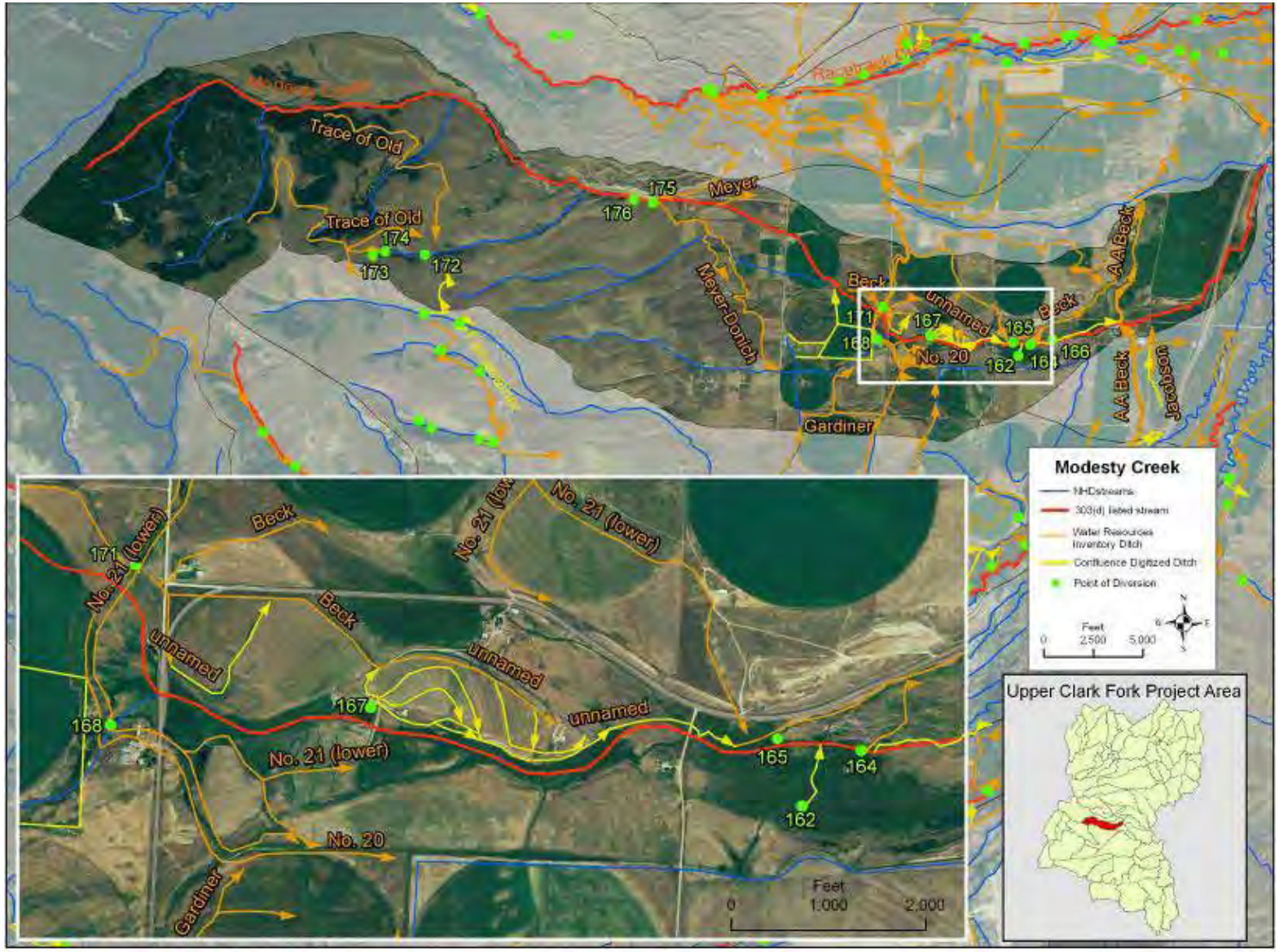

Figure 4-14 Modesty Creek Watershed

4.13 Peterson Creek

Peterson Creek flows west out of the Elkhorn Mountains into the Clark Fork River. Significant tributaries include Dieders Fork, Spring Creek, Jack Creek, and Burnt Hollow Creek. Thirty-nine miles of NHD stream channels have been mapped in the Peterson Creek drainage. The 303(d) listed reaches of Peterson Creek (MT76G002_131 and MT76G002_132) extend 12.9 miles from the headwaters to the mouth (Clark Fork River). The Deerlodge National Forest encompasses the majority of the headwaters in this drainage with the USFS managing 30% of this 31.1 square mile basin. State lands account for 7% of this drainage with 63% of the watershed in private ownership. This basin contains 49 unique water rights, 31 points of diversion, and an allocated max flow of 76.3 CFS (**Table 4-22**). The basin contains an identified 27 miles of irrigation ditches **Table 4-23**). POD ID's 186, 205, 208, and 210 have the potential to divert water from Peterson Creek into the ditches that carry water into the tributaries of the Clark Fork. Additional water could be contributed into Peterson Creek from the Reese Anders Creek and other adjacent drainages via Christopherson ditch (POD ID 241), Bertin ditch (273), Cowan ditch (273), Riley-Moore ditch (277), and a digitized ditch (296).

Table 4-22. Unique Point of Diversion Locations and associated water rights within the Peterson Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
186	215584-1	76G 127714 00	6.25
186	215585-1	76G 127716 00	2.50
186	215590-1	76G 127721 00	3.75
205	269315-1	76G 189746 00	2.50
205	269317-1	76G 189748 00	1.25
205	269316-1	76G 189747 00	0.62
205	269318-1	76G 189749 00	0.50
208	215584-1	76G 127714 00	6.25
208	215585-1	76G 127716 00	2.50
208	215590-1	76G 127721 00	3.75
210	269317-1	76G 189748 00	1.25
210	269315-1	76G 189746 00	2.50
210	269318-1	76G 189749 00	0.50
210	269316-1	76G 189747 00	0.62
255	292589-1	76G 7467 00	1.38
255	20412-1	76G 7468 00	0.38
256	20400-1	76G 7463 00	1.25
259	160568-1	76G 90725 00	4.00
261	20406-1	76G 7466 00	1.00
263	162340-1	76G 91749 00	0.63
265	20405-1	76G 7465 00	1.00
265	20402-1	76G 7464 00	1.00
265	20400-1	76G 7463 00	1.25
265	20412-1	76G 7468 00	0.38
267	162834-1	76G 92039 00	4.00
271	162834-1	76G 92039 00	4.00

Table 4-22 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
272	292589-1	76G 7467 00	1.38
272	20406-1	76G 7466 00	1.00
274	301501-1	76G 91744 00	1.25
274	301501-1	76G 91744 00	1.25
274	162330-1	76G 91743 00	0.63
274	162330-1	76G 91743 00	0.63
274	170786-1	76G 96664 00	0.76
275	170786-1	76G 96664 00	0.76
276	162327-1	76G 91741 00	5.00
280	170784-1	76G 96663 00	2.00
281	162328-1	76G 91742 00	3.38
281	301501-1	76G 91744 00	1.25
281	162337-1	76G 91747 00	0.38
281	162330-1	76G 91743 00	0.63
281	160611-1	76G 90754 00	0.63
281	162335-1	76G 91746 00	0.25
281	162343-1	76G 91750 00	0.50
281	160614-1	76G 90755 00	0.88
281	162345-1	76G 91751 00	0.25
281	162338-1	76G 91748 00	0.63
281	162340-1	76G 91749 00	0.63
282	170784-1	76G 96663 00	2.00
282	301501-1	76G 91744 00	1.25
282	162328-1	76G 91742 00	3.38
282	162340-1	76G 91749 00	0.63
282	162338-1	76G 91748 00	0.63
282	162345-1	76G 91751 00	0.25
282	162343-1	76G 91750 00	0.50
282	162330-1	76G 91743 00	0.63
283	301501-1	76G 91744 00	1.25
283	162328-1	76G 91742 00	3.38
283	162340-1	76G 91749 00	0.63
283	162338-1	76G 91748 00	0.63
283	162345-1	76G 91751 00	0.25
283	162343-1	76G 91750 00	0.50
283	162335-1	76G 91746 00	0.25
283	162330-1	76G 91743 00	0.63
283	162337-1	76G 91747 00	0.38
284	160611-1	76G 90754 00	0.63
284	160611-1	76G 90754 00	0.63
284	160614-1	76G 90755 00	0.88
284	160614-1	76G 90755 00	0.88
285	162327-1	76G 91741 00	5.00
286	219625-1	76G 132371 00	1.00
286	219628-1	76G 132374 00	0.50
286	219616-1	76G 132361 00	3.75
286	219619-1	76G 132364 00	6.25
286	219626-1	76G 132372 00	1.50

Table 4-22 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
286	219627-1	76G 132373 00	2.00
287	219627-1	76G 132373 00	2.00
287	219619-1	76G 132364 00	6.25
287	219626-1	76G 132372 00	1.50
287	219625-1	76G 132371 00	1.00
287	219628-1	76G 132374 00	0.50
287	219616-1	76G 132361 00	3.75
288	219616-1	76G 132361 00	3.75
288	219628-1	76G 132374 00	0.50
288	219625-1	76G 132371 00	1.00
288	219626-1	76G 132372 00	1.50
288	219619-1	76G 132364 00	6.25
288	219627-1	76G 132373 00	2.00
289	219616-1	76G 132361 00	3.75
289	219625-1	76G 132371 00	1.00
289	219628-1	76G 132374 00	0.50
289	25607-1	76G 9629 00	2.00
289	219627-1	76G 132373 00	2.00
289	219619-1	76G 132364 00	6.25
289	219626-1	76G 132372 00	1.50
289	288200-1	76G 211534 00	2.50
289	288199-1	76G 211533 00	2.50
293	288211-1	76G 211547 00	1.25
294	288221-1	76G 211558 00	0.62
294	156183-2	76G 88190 00	0.25
295	31913-1	76G 12927 00	0.38
295	293198-1	76G 12926 00	0.63
295	96234-1	76G 49964 00	0.63
295	161304-1	76G 91151 00	0.38
295	4566-1	76G 1684 00	0.13
295	161302-1	76G 91150 00	0.63
302	31913-1	76G 12927 00	0.38
303	162536-1	76G 91864 00	0.60

Table 4-23. Ditches identified in the Peterson Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
186	elieson ditch	5,770
205	barnden no 1 ditch	2,826
208	gabelhei-sneberger ditch	2,316
210	gabelhei ditch	4,957
241	christopherson ditch	6,060
255	schurch ditch	6,407
256	digitized	394
259	digitized	7,569
261	digitized	1,755
263	schurch ditch	9,186
265	digitized	7,308
267	evans ditch	1,472
271	bertin ditch	2,996
273	bertin ditch	2,198
273	cowan ditch	4,121
274	wisner ditch	901
275	schurch ditch	12,829
276	moore ditch	2,739
277	riley-moore ditch	4,243
280	digitized	2,891
281	digitized	742
283	digitized	3,661
284	elberson ditch	2,635
284	elberson-beck ditch	5,702
285	digitized	8,917
286	digitized	3,474
288	johnson-beck ditch	7,956
289	johnson ditch	999
293	valiton ditch	3,105
294	digitized	12,506
295	digitized	389
296	digitized	2,713
302	digitized	575
303	digitized	322

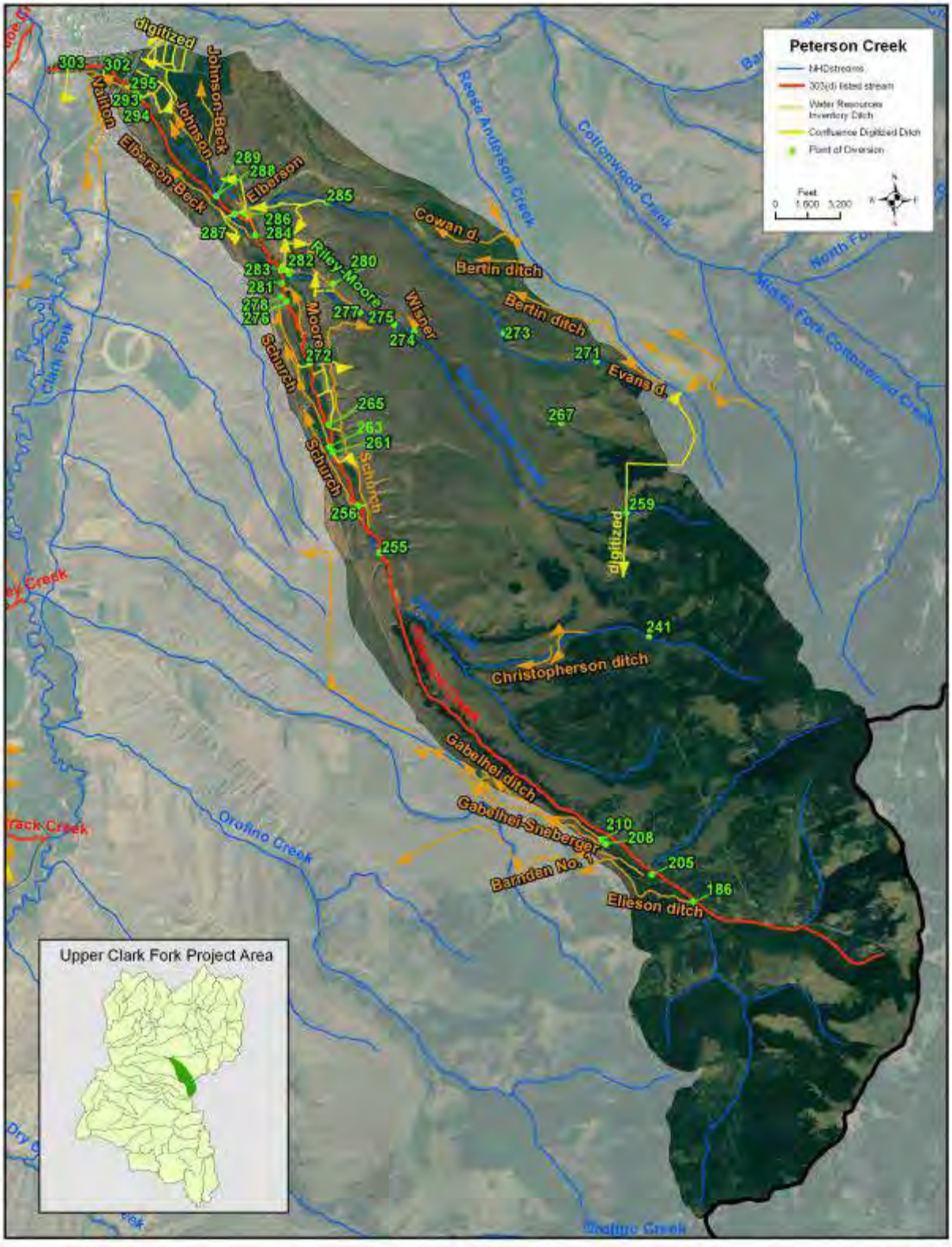

Figure 4-15. Peterson Creek watershed

4.14 Racetrack Creek

Racetrack Creek is an east flowing tributary of the upper Clark Fork River originating in the Deer Lodge National Forest **(Figure 4-16)**. Forest Service property accounts for 40.0 sq mi (77.9%) of this 51.5 square mile basin and encompass the majority of the upper watershed. Private lands account for 21.6% of the Racetrack Creek basin; State lands encompass <1% of the drainage yet includes lands adjacent to roughly 1-mile of the 303(d) listed stream. Of the 53.7 miles of NHD stream channels within the Racetrack Creek watershed, 9.5 miles are 303(d) listed. This basin contains 115 unique water rights, 42 point of diversion locations, and a max flow allocation of 429.1 CFS **(Table 4-24)**. These point of diversion locations are associated with 48.5 miles of identified irrigation ditches within the basin **(Table 4-25)**. These ditches are concentrated in the downstream one third of the basin, and many ditches transport water across watershed boundaries. Significant ditches connecting the adjacent Dempsey Creek and Modesty Creek watersheds include the No. 1 and No. 2 ditches, Upper #13 (Vanisko), Lower #13, #10, # 5 & 6, Johnson ditch, and the Johnson-eliason ditch. POD ID 261 is located outside the Racetrack Creek watershed and may divert water into this basin via unnamed (digitized) ditch.

Table 4-24. Unique Point of Diversion Locations and associated water rights within the Racetrack Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
168	160219-1	76G 90518 00	0.25
177	209844-1	76G 121095 00	2.73
177	209849-1	76G 121100 00	10.00
177	160309-1	76G 90570 00	2.50
177	160278-1	76G 90552 00	1.88
177	209845-1	76G 121096 00	7.50
177	209835-1	76G 121084 00	1.83
177	160274-1	76G 90549 00	10.00
177	160281-1	76G 90554 00	1.25
177	301454-1	76G 91340 00	17.50
177	304897-1	76G 121085 00	1.24
177	161512-1	76G 91272 00	0.13
177	209832-1	76G 121081 00	7.50
177	209833-1	76G 121082 00	10.00
177	209847-1	76G 121098 00	3.75
177	161190-1	76G 91086 00	3.79
177	42093-1	76G 18791 00	5.00
177	13187-1	76G 4828 00	1.00
177	160276-1	76G 90551 00	1.25
177	160275-1	76G 90550 00	2.50
177	161630-1	76G 91339 00	2.50
177	161628-1	76G 91338 00	4.28
177	209836-1	76G 121086 00	3.23
177	209846-1	76G 121097 00	1.83
177	209848-1	76G 121099 00	7.50

Table 4-24 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
177	301366-1	76G 90553 00	7.50
177	42091-1	76G 18790 00	0.44
177	161516-1	76G 91274 00	0.69
179	79581-1	76G 40356 00	1.25
179	301454-1	76G 91340 00	17.50
179	79585-1	76G 40358 00	2.50
179	79575-1	76G 40352 00	3.90
179	161630-1	76G 91339 00	2.50
179	161628-1	76G 91338 00	4.28
179	296320-1	76G 40353 00	2.75
180	214450-2	76G 126400 00	1.25
180	214454-1	76G 126405 00	10.00
180	160572-1	76G 90729 00	1.25
180	160577-1	76G 90734 00	7.50
180	162618-3	76G 91913 00	3.75
180	288274-1	76G 211619 00	1.50
180	214453-2	76G 126404 00	1.25
180	160576-1	76G 90733 00	1.25
180	160571-1	76G 90728 00	1.00
180	214449-2	76G 126399 00	7.50
180	25661-1	76G 9649 00	3.75
180	25658-1	76G 9648 00	2.50
180	288273-1	76G 211618 00	3.22
180	160574-1	76G 90731 00	0.63
180	160575-1	76G 90732 00	0.63
180	25636-1	76G 9640 00	0.17
180	25641-1	76G 9641 00	0.61
180	292819-1	76G 9620 00	0.08
180	305596-2	76G 126402 00	0.63
180	25581-1	76G 9619 00	0.30
180	160573-1	76G 90730 00	0.63
180	214452-2	76G 126403 00	0.63
180	214451-2	76G 126401 00	0.63
180	288277-1	76G 211623 00	3.75
181	162573-1	76G 91886 00	2.50
181	162620-1	76G 91914 00	0.00
182	301354-1	76G 90446 00	10.00
182	301354-1	76G 90446 00	10.00
182	214490-1	76G 126446 00	6.25
182	214492-1	76G 126449 00	1.29
182	215477-1	76G 127592 00	1.23
182	160095-1	76G 90447 00	3.68
182	160095-1	76G 90447 00	3.68
182	160213-1	76G 90514 00	6.44
182	160213-1	76G 90514 00	6.44
182	160216-1	76G 90516 00	3.68
182	160216-1	76G 90516 00	3.68
182	161421-1	76G 91219 00	2.50
182	160158-1	76G 90483 00	15.00
182	160158-1	76G 90483 00	15.00

Table 4-24 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
182	161379-1	76G 91194 00	20.00
182	161382-1	76G 91196 00	2.50
182	161413-1	76G 91214 00	6.00
182	215479-1	76G 127594 00	1.88
182	161416-1	76G 91216 00	9.84
182	160214-1	76G 90515 00	10.00
182	160214-1	76G 90515 00	10.00
182	215483-1	76G 127599 00	11.83
182	214491-1	76G 126448 00	0.56
183	162931-1	76G 92095 00	2.25
183	317304-1	76G 214795 00	5.00
184	89736-1	76G 46211 00	6.25
185	301366-1	76G 90553 00	7.50
185	161017-1	76G 90987 00	1.25
185	160274-1	76G 90549 00	10.00
185	160281-1	76G 90554 00	1.25
187	161013-1	76G 90984 00	3.75
187	161313-1	76G 91157 00	5.00
187	161010-1	76G 90983 00	7.50
187	161015-1	76G 90985 00	1.13
187	301435-1	76G 91158 00	1.88
188	301435-1	76G 91158 00	1.88
188	161313-1	76G 91157 00	5.00
189	72193-1	76G 36109 00	0.25
190	161015-1	76G 90985 00	1.13
190	161010-1	76G 90983 00	7.50
190	161013-1	76G 90984 00	3.75
191	161313-1	76G 91157 00	5.00
191	301435-1	76G 91158 00	1.88
192	160281-1	76G 90554 00	1.25
192	160281-1	76G 90554 00	1.25
192	160274-1	76G 90549 00	10.00
192	160274-1	76G 90549 00	10.00
192	214493-1	76G 126450 00	6.25
192	214493-1	76G 126450 00	6.25
192	301366-1	76G 90553 00	7.50
192	301366-1	76G 90553 00	7.50
192	161194-1	76G 91089 00	3.50
193	89737-2	76G 46212 00	0.56
194	72192-1	76G 36108 00	0.09
195	161206-1	76G 91095 00	1.63
196	161013-1	76G 90984 00	3.75
196	228868-1	76G 143023 00	7.50
196	228868-1	76G 143023 00	7.50
196	228870-1	76G 143025 00	1.25
196	228870-1	76G 143025 00	1.25
196	307762-1	76G 143026 00	10.00
196	307762-1	76G 143026 00	10.00
196	214493-1	76G 126450 00	6.25
196	161010-1	76G 90983 00	7.50

Table 4-24 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
196	228869-1	76G 143024 00	2.60
196	228869-1	76G 143024 00	2.60
196	161015-1	76G 90985 00	1.13
197	161013-1	76G 90984 00	3.75
197	161010-1	76G 90983 00	7.50
197	161015-1	76G 90985 00	1.13
198	161013-1	76G 90984 00	3.75
198	161313-1	76G 91157 00	5.00
198	160581-1	76G 90737 00	7.50
198	301388-1	76G 90735 00	2.50
198	301435-1	76G 91158 00	1.88
198	161010-1	76G 90983 00	7.50
199	214495-1	76G 126452 00	6.25
200	161015-1	76G 90985 00	1.13
200	161010-1	76G 90983 00	7.50
200	161013-1	76G 90984 00	3.75
201	214495-1	76G 126452 00	6.25
202	161017-1	76G 90987 00	1.25
203	161017-1	76G 90987 00	1.25
204	72196-1	76G 36110 00	0.11
206	79578-1	76G 40354 00	0.63
206	79580-1	76G 40355 00	2.50
206	79583-1	76G 40357 00	1.25
207	161015-1	76G 90985 00	1.13
209	161206-1	76G 91095 00	1.63
210	269317-1	76G 189748 00	1.25
210	269315-1	76G 189746 00	2.50
212	160588-1	76G 90740 00	3.75
212	160580-1	76G 90736 00	7.50
212	160589-1	76G 90741 00	3.75
213	220740-1	76G 133648 00	0.00
214	162620-1	76G 91914 00	0.00
215	161626-1	76G 91337 00	2.50
216	96278-1	76G 49989 00	1.88
216	96281-1	76G 49990 00	2.50
226	215484-1	76G 127600 00	2.50
226	161515-1	76G 91273 00	0.25
246	290292-1	76G 214587 00	1.39
246	290293-1	76G 214588 00	2.78
246	161054-2	76G 91008 00	1.39
252	160285-1	76G 90556 00	2.08
252	160287-1	76G 90557 00	4.17
253	160287-1	76G 90557 00	4.17
253	160285-1	76G 90556 00	2.08
257	160285-1	76G 90556 00	2.08
257	160287-1	76G 90557 00	4.17
260	301427-1	76G 91087 00	2.50

Table 4-25. Ditches identified in the Racetrack Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
168	No. 20	7,006
168	No. 21 (lower)	6,140
168	No. 9	2,848
168	vanisko new ditch	4,919
177	#15 ditch	14,263
177	Bowman No. 4	2,124
179	#8 ditch	4,235
179	Munker-Ferguson No. 4	7,442
179	No. 1	20,296
180	#21 ditch	828
180	#32 ditch	8,514
180	#8 ditch	1,377
180	Munker-Ferguson No. 4	4,190
180	morrison ditch	1,553
181	No. 8	9,175
181	No. 8 & 21	4,746
182	#1 ditch	2,450
182	Bowman No. 4	2,985
183	#29 ditch	7,107
184	#6 (best) ditch	4,950
185	#8 ditch	1,818
185	#9 ditch	250
185	Vanisko	3,209
185	lower #4 ditch	5,628
185	schutty (stern) ditch	3,756
185	stern ditch	1,241
185	unnamed ditch	10,523
187	#19 ditch	12,474
187	peterson ditch	710
188	#24 ditch	3,701
188	donich ditch	1,964
188	jacobsen-strickland ditch	3,576
188	peterson drain ditch	2,103
189	jette ditch	3,679
190	peterson ditch	825
191	#24 ditch	3,335
191	old #8 ditch	3,159
192	digitized	4,466
193	digitized	2,671
195	donich ditch	3,916
196	#5 & #6 ditch	1,249
197	#10 ditch	1,143
198	peterson ditch	6,123
199	lower #13 ditch	1,736
199	peterson ditch	60

Table 4-25 (cont.)

POD ID	Ditch Name	Ditch Length (ft)
200	peterson ditch	1,432
201	#22 (r kelley) ditch	1,532
201	upper #13 (vanisko) ditch	2,158
202	old pozega ditch	2,066
203	old Pozega	13,995
204	schutty (stern) ditch	371
206	beck ditch	3,333
206	high water ditch	4,639
206	jacobsen ditch	4,790
206	johnson ditch	2,018
207	digitized	1,210
209	eliason ditch	2,769
212	evans ditch	635
212	johnson-eliason ditch	1,105
212	west side canal	4,753
213	johnson ditch	482
213	johnson-eliason ditch	4,155
216	hanson ditch	1,324
261	digitized	2,770

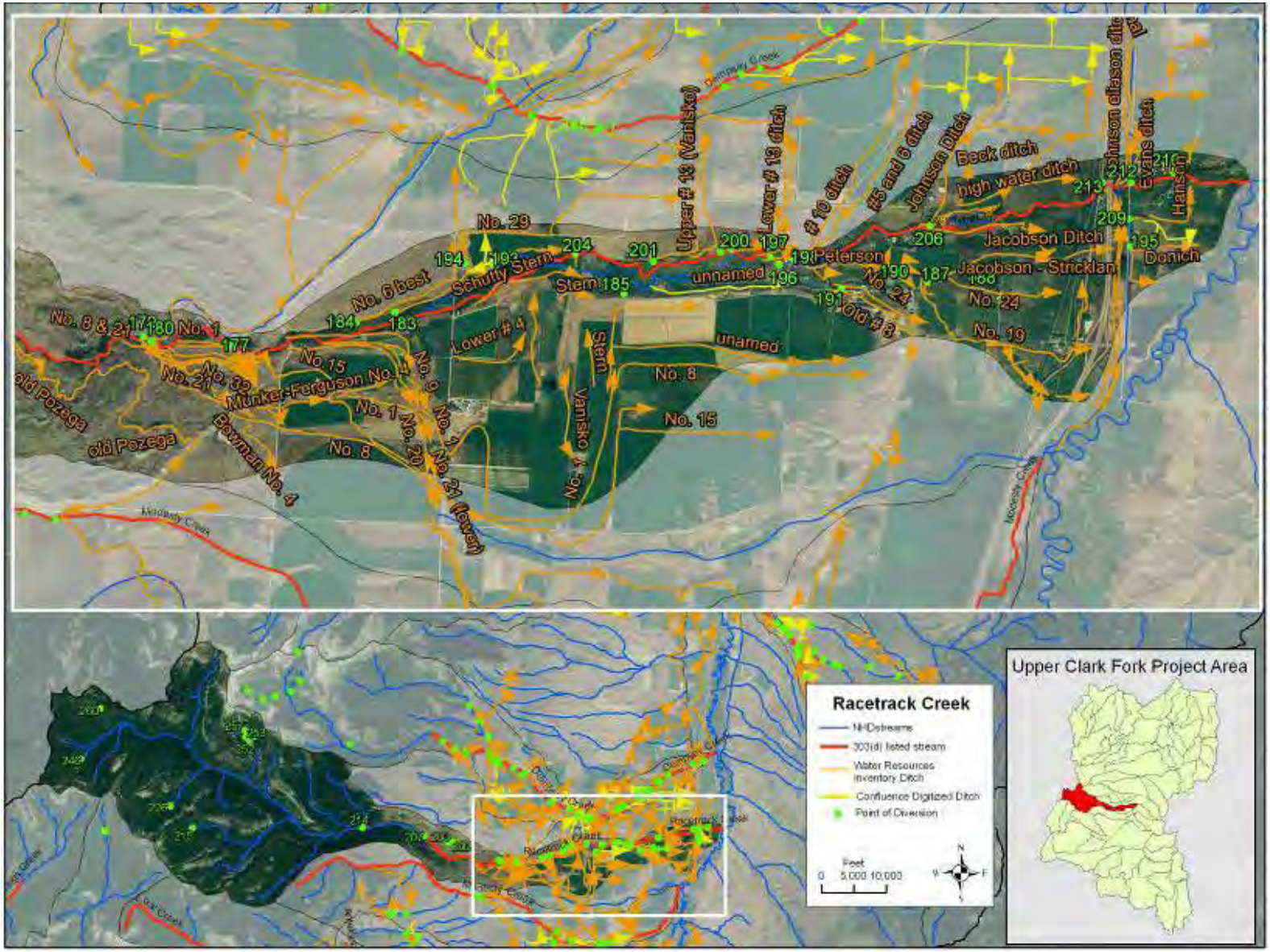

Figure 4-16. Racetrack Creek Watershed

4.15 Tin Cup Joe Creek

Similar to many of the 303(d) listed streams flowing east into the Clark Fork River, Tin Cup Joe Creek originates in the Anaconda Mountains in the Deerlodge National Forest with the USFS managing the vast majority of the upper watershed. USFS property accounts for 42.9% of this 23.0 square mile drainage; State-owned land covers 52.4% of this basin and includes the State Prison Ranch. Local government lands include 2.7% of the watershed and lie adjacent to approximately 1-mile of the 303(d) listed stream. Private lands account for only 2% of the Tin Cup Joe Creek basin. There are 30.9 miles of NHD mapped streams within the Tin Cup Joe Creek watershed with significant tributaries including Morrison Gulch and Robison Gulch (**Figure 4-17**). 6.6-miles of 303(d) listed stream (MT76G002_110) have been indentified in this drainage and extend from Tin Cup Lake to the mouth (Clark Fork River). This basin contains 21 unique water rights, 30 points of diversion, and a max flow of 82.5 CFS **(Table 4-26)**. The basin includes an identified 35 miles of irrigation ditches (**Table 4-27)**. Pauly ditch and Taylor ditch have the potential to contribute water into the Tin Cup Joe Creek drainage from the adjacent northern basin. The White House, Prison New, #8, #7, and Irvine ditches have the potential to carry water out of the Tin Cup Joe basin to the south. The West Side ditch originates near the mouth of Modesty Creek, traverses across the Dempsey and Racetrack Creek watersheds, and through the Tin Cup Joe Creek watershed.

Table 4-26. Unique Point of Diversion Locations and associated water rights within the Tin Cup Joe Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
279	161670-1	76G 91362 00	2.50
290	310993-1	76G 167135 00	1.25
291	162927-1	76G 92092 00	7.92
292	162919-1	76G 92088 00	5.00
296	249743-2	76G 167138 00	5.00
296	162995-2	76G 92132 00	5.00
296	163002-2	76G 92136 00	6.25
296	162988-2	76G 92128 00	7.50
296	163000-2	76G 92135 00	2.50
296	162992-2	76G 92130 00	5.00
296	162996-4	76G 92133 00	5.00
296	301546-2	76G 92131 00	2.50
296	162998-4	76G 92134 00	10.00
296	162990-2	76G 92129 00	2.50
296	163003-4	76G 92137 00	3.13
297	162925-1	76G 92091 00	2.50
298	228789-1	76G 142933 00	0.30
299	51173-1	76G 24017 00	2.50
300	209385-1	76G 120566 00	4.00
301	209385-1	76G 120566 00	4.00
304	179592-1	76G 101751 00	0.89
305	162919-1	76G 92088 00	5.00
306	162996-4	76G 92133 00	5.00
306	162996-4	76G 92133 00	5.00
306	162992-2	76G 92130 00	5.00
306	162992-2	76G 92130 00	5.00

Table 4-26 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
306	301546-2	76G 92131 00	2.50
306	301546-2	76G 92131 00	2.50
306	163003-4	76G 92137 00	3.13
306	163003-4	76G 92137 00	3.13
306	162990-2	76G 92129 00	2.50
306	162990-2	76G 92129 00	2.50
306	162998-4	76G 92134 00	10.00
306	162998-4	76G 92134 00	10.00
306	163000-2	76G 92135 00	2.50
306	163000-2	76G 92135 00	2.50
306	162988-2	76G 92128 00	7.50
306	162988-2	76G 92128 00	7.50
306	163002-2	76G 92136 00	6.25
306	163002-2	76G 92136 00	6.25
306	162995-2	76G 92132 00	5.00
306	162995-2	76G 92132 00	5.00
307	162995-2	76G 92132 00	5.00
307	163002-2	76G 92136 00	6.25
307	162988-2	76G 92128 00	7.50
307	163000-2	76G 92135 00	2.50
307	162998-4	76G 92134 00	10.00
307	162990-2	76G 92129 00	2.50
307	163003-4	76G 92137 00	3.13
307	301546-2	76G 92131 00	2.50
307	162996-4	76G 92133 00	5.00
307	162992-2	76G 92130 00	5.00
308	162990-2	76G 92129 00	2.50
308	162998-4	76G 92134 00	10.00
308	163003-4	76G 92137 00	3.13
308	162996-4	76G 92133 00	5.00
308	162992-2	76G 92130 00	5.00
308	301546-2	76G 92131 00	2.50
308	162988-2	76G 92128 00	7.50
308	163000-2	76G 92135 00	2.50
308	162995-2	76G 92132 00	5.00
308	163002-2	76G 92136 00	6.25
309	163002-2	76G 92136 00	6.25
309	162995-2	76G 92132 00	5.00
309	163000-2	76G 92135 00	2.50
309	162988-2	76G 92128 00	7.50
309	163003-4	76G 92137 00	3.13
309	162998-4	76G 92134 00	10.00
309	162990-2	76G 92129 00	2.50
309	301546-2	76G 92131 00	2.50
309	162996-4	76G 92133 00	5.00
309	162992-2	76G 92130 00	5.00
310	162992-2	76G 92130 00	5.00
310	162996-4	76G 92133 00	5.00
310	301546-2	76G 92131 00	2.50
310	163003-4	76G 92137 00	3.13
310	162990-2	76G 92129 00	2.50
310	162998-4	76G 92134 00	10.00

Table 4-26 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
310	163000-2	76G 92135 00	2.50
310	162988-2	76G 92128 00	7.50
310	163002-2	76G 92136 00	6.25
310	162995-2	76G 92132 00	5.00
311	162990-2	76G 92129 00	2.50
311	162998-4	76G 92134 00	10.00
311	163003-4	76G 92137 00	3.13
311	162992-2	76G 92130 00	5.00
311	162996-4	76G 92133 00	5.00
311	301546-2	76G 92131 00	2.50
311	162988-2	76G 92128 00	7.50
311	163000-2	76G 92135 00	2.50
311	163002-2	76G 92136 00	6.25
311	162995-2	76G 92132 00	5.00
312	249743-2	76G 167138 00	5.00
313	301546-2	76G 92131 00	2.50
313	162992-2	76G 92130 00	5.00
313	162996-4	76G 92133 00	5.00
313	162990-2	76G 92129 00	2.50
313	162998-4	76G 92134 00	10.00
313	163003-4	76G 92137 00	3.13
313	162988-2	76G 92128 00	7.50
313	163000-2	76G 92135 00	2.50
313	163002-2	76G 92136 00	6.25
313	162995-2	76G 92132 00	5.00
314	162913-1	76G 92084 00	1.25
315	162992-2	76G 92130 00	5.00
315	162996-4	76G 92133 00	5.00
315	301546-2	76G 92131 00	2.50
315	162990-2	76G 92129 00	2.50
315	162998-4	76G 92134 00	10.00
315	163003-4	76G 92137 00	3.13
315	163000-2	76G 92135 00	2.50
315	162988-2	76G 92128 00	7.50
315	162995-2	76G 92132 00	5.00
315	163002-2	76G 92136 00	6.25
316	301546-2	76G 92131 00	2.50
316	162992-2	76G 92130 00	5.00
316	162996-4	76G 92133 00	5.00
316	162990-2	76G 92129 00	2.50
316	163003-4	76G 92137 00	3.13
316	162998-4	76G 92134 00	10.00
316	163002-2	76G 92136 00	6.25
316	162995-2	76G 92132 00	5.00
316	163000-2	76G 92135 00	2.50
316	162988-2	76G 92128 00	7.50
317	163002-2	76G 92136 00	6.25
317	162995-2	76G 92132 00	5.00
317	162988-2	76G 92128 00	7.50

Table 4-26 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
317	163000-2	76G 92135 00	2.50
317	301546-2	76G 92131 00	2.50
317	162992-2	76G 92130 00	5.00
317	162996-4	76G 92133 00	5.00
317	162998-4	76G 92134 00	10.00
317	162990-2	76G 92129 00	2.50
317	163003-4	76G 92137 00	3.13
318	163003-4	76G 92137 00	3.13
318	162990-2	76G 92129 00	2.50
318	162998-4	76G 92134 00	10.00
318	162996-4	76G 92133 00	5.00
318	162992-2	76G 92130 00	5.00
318	301546-2	76G 92131 00	2.50
318	163000-2	76G 92135 00	2.50
318	162988-2	76G 92128 00	7.50
318	162995-2	76G 92132 00	5.00
318	163002-2	76G 92136 00	6.25
319	162998-4	76G 92134 00	10.00
319	162990-2	76G 92129 00	2.50
319	163003-4	76G 92137 00	3.13
319	301546-2	76G 92131 00	2.50
319	162992-2	76G 92130 00	5.00
319	162996-4	76G 92133 00	5.00
319	163002-2	76G 92136 00	6.25
319	162995-2	76G 92132 00	5.00
319	163000-2	76G 92135 00	2.50
319	162988-2	76G 92128 00	7.50
320	162988-2	76G 92128 00	7.50
320	163000-2	76G 92135 00	2.50
320	162995-2	76G 92132 00	5.00
320	163002-2	76G 92136 00	6.25
320	162996-4	76G 92133 00	5.00
320	162992-2	76G 92130 00	5.00
320	301546-2	76G 92131 00	2.50
320	162990-2	76G 92129 00	2.50
320	162998-4	76G 92134 00	10.00
320	163003-4	76G 92137 00	3.13
321	163003-4	76G 92137 00	3.13
321	162998-4	76G 92134 00	10.00
322	163003-4	76G 92137 00	3.13
322	162998-4	76G 92134 00	10.00
322	162990-2	76G 92129 00	2.50
322	301546-2	76G 92131 00	2.50
322	162992-2	76G 92130 00	5.00
322	162996-4	76G 92133 00	5.00
322	163002-2	76G 92136 00	6.25
322	162995-2	76G 92132 00	5.00
322	163000-2	76G 92135 00	2.50
322	162988-2	76G 92128 00	7.50

Table 4-27. Ditches identified in the Tin Cup Joe Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
290	deer lodge farms dit*	21,457
290	prison new ditch	9,728
291	deer lodge farms dit*	1,077
291	digitized	7,377
292	white house ditch	2,612
297	digitized	3,063
298	west side ditch	561
299	meyers ditch	4,300
300	digitized	18,237
300	irvine ditch	1,985
301	west side ditch	3,969
304	digitized	2,272
306	digitized	1,494
307	deer lodge farms dit*	2,816
308	digitized	1,237
310	deer lodge farms dit*	3,845
311	Taylor ditch	412
311	deer L. farms ditch	353
311	deer lodge farms dit*	5,103
311	taylor ditch	3,097
312	digitized	8,498
315	#7 ditch	207
315	#7 ditch	2,114
315	#8 ditch	11,676
315	drain ditch	3,638
316	foxley ditch	4,431
317	6 ditch	5,223
317	deer lodge farms dit*	2,330
317	white house ditch	7,440
319	deer lodge farms dit*	10,315
320	digitized	3,038
321	digitized	10,452
322	deer lodge farms dit*	12,005
322	pauly ditch	8,554

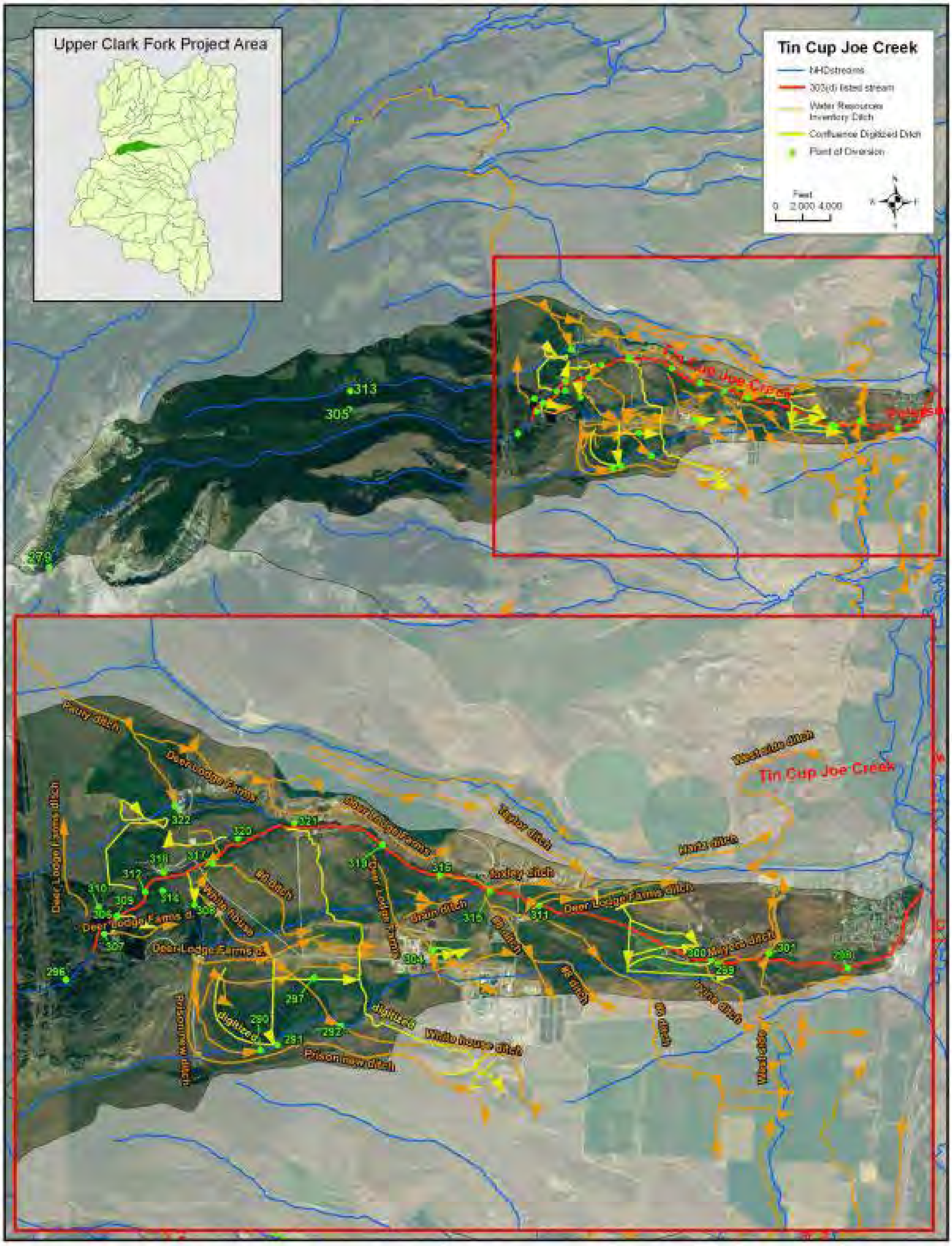

Figure 4-17. Tin Cup Joe Creek watershed

4.16 Twin Lakes Creek

Numerous lake basins are present within the upper elevations (7000-8800 ft) of the Twin Lakes watershed and include Lake of the Isle, Twin Lakes, and Four Mile Basin. Twenty miles of NHD streams are mapped within this 23.0 square mile drainage (**Figure 4-18**). The 303(d) listed stream reach (MT76G002_020) begins half way down the watershed at the confluence of Twin Lakes with the East Fork and continues to the mouth of Warm Springs Creek *South*. Property ownership in the watershed is a mosaic of USFS (59.0%), private (32.6%), and other US Government (8.3%). This basin contains 8 unique water rights and 6 points of diversion **(Table 4-28)**. These points of diversion are located high in the drainage and apparently unassociated with any significant irrigation ditches. One ditch (Forsman) was identified within this basin and originates from POD ID 102, which is located outside the Twin Lakes watershed **(Table 4-29)**. A potential max flow of 127.8 CFS are allocated through water rights within the Twin Lakes Creek basin.

Table 4-28. Unique Point of Diversion Locations and associated water rights within the Twin Lakes Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
7	214531-1	76G 126493 00	23.61
7	214520-1	76G 126481 00	17.55
16	214505-1	76G 126464 00	18.19
19	214524-1	76G 126485 00	18.75
23	214506-1	76G 126465 00	9.40
24	214528-1	76G 126490 00	18.75
37	214668-1	76G 126649 00	9.38
37	214507-1	76G 126466 00	12.13

Table 4-29. Ditches identified in the Twin Lakes Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
102	Forsman	20

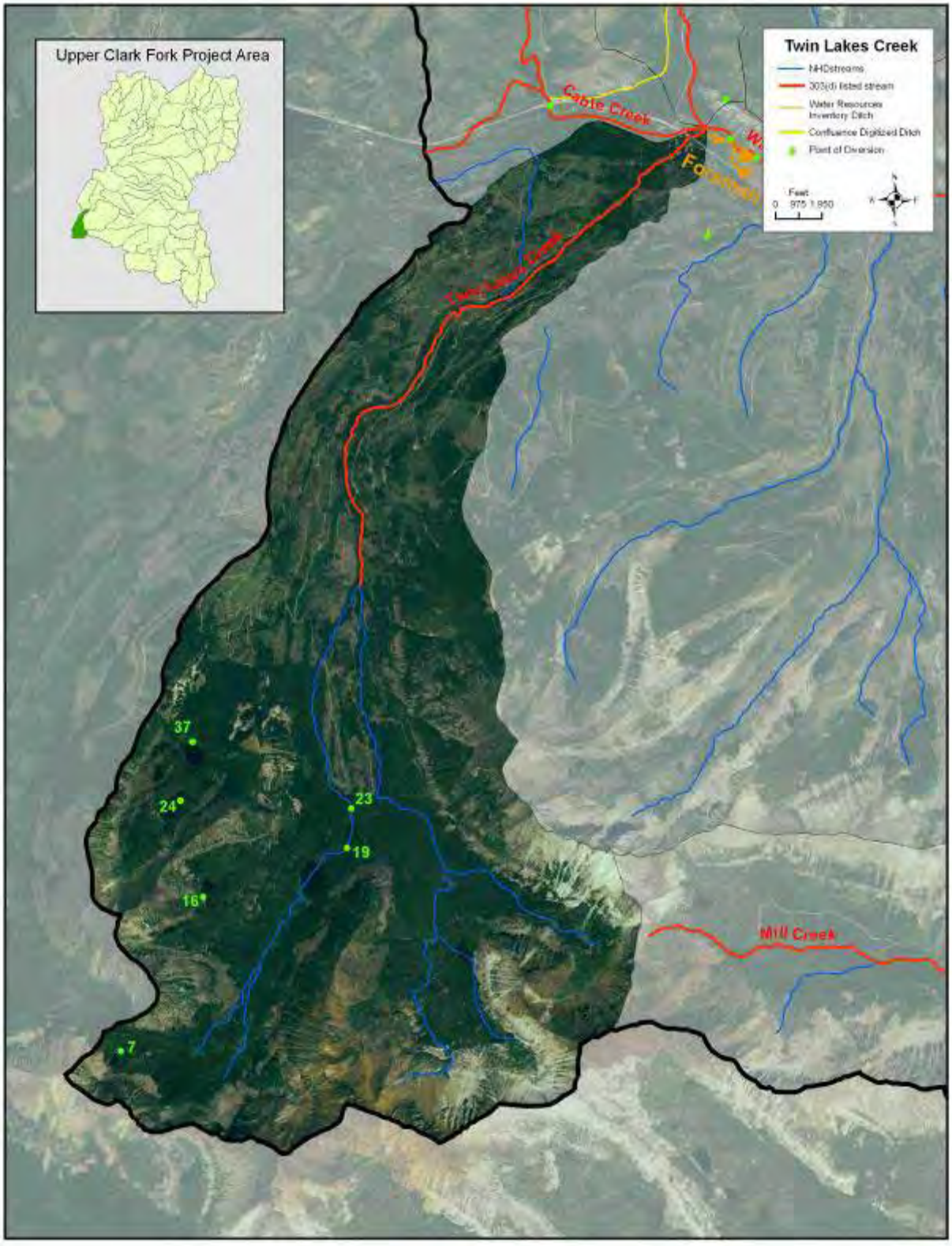

Figure 4-18. Twin Lakes Creek watershed

4.17 Warm Springs Creek

Two Warm Springs Creeks are identified within the UCF on the 303(d) list. These streams drain separate basins and have been given an additional descriptor for the purpose of differentiating the two in this report. Warm Springs Creek *South* converges with Silver Bow Creek in the upper portion of the UCF basin to form the head of the Clark Fork River. Warm Springs Creek *North* drains into the Clark Fork River roughly 15 miles upstream of the mouth of the UCF basin.

4.17.1 North

Warm Springs *North* drains approximately 37.4 sq miles through a stream network totaling approximately 54 miles in length. 303(d) listed streams within this basin account for 14 miles and include reach ID's MT76G005_111 and MT76G005_112. Property within this drainage is mostly private (75%) with grazing and logging the prominent landuses. The Bureau of Land Management owns and manages about 15% of this watershed, primarily within the headwaters of the drainage. This basin contains 9 unique water rights and 8 points of diversion (**Table 4-30**). A max flow of 34.2 CFS is associated with an identified 8.7 miles of irrigation ditches. The entire identified irrigation network infrastructure is located within the lower elevations of this basin. POD ID 365 is associated with an unnamed ditch with the potential for cross watershed water movement into The Warm Springs *South* drainage.

Table 4-30. Unique Point of Diversion Locations and associated water rights within the Warm Springs Creek North watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
350	305188-1	76G 123335 00	1.74
350	305188-1	76G 123335 00	1.74
352	160686-1	76G 90797 00	8.75
354	160689-1	76G 90798 00	5.00
356	211794-1	76G 123337 00	1.14
364	211790-1	76G 123332 00	8.50
364	47969-1	76G 22170 00	1.11
368	211790-1	76G 123332 00	8.50
371	211791-1	76G 123333 00	4.17
375	160826-1	76G 90877 00	3.79

Table 4-31. Ditches identified in the Warm Springs Creek North watershed

POD ID	Ditch Name	Ditch Length (ft)
352	sessions ditch	3,458
352	skinner ditch	2,850
364	klein peterson ditch	2,171
365	digitized	4,616
368	chapple ditch	29,167
368	klein & peterson ditch	1,778
368	klein peterson ditch	2,018

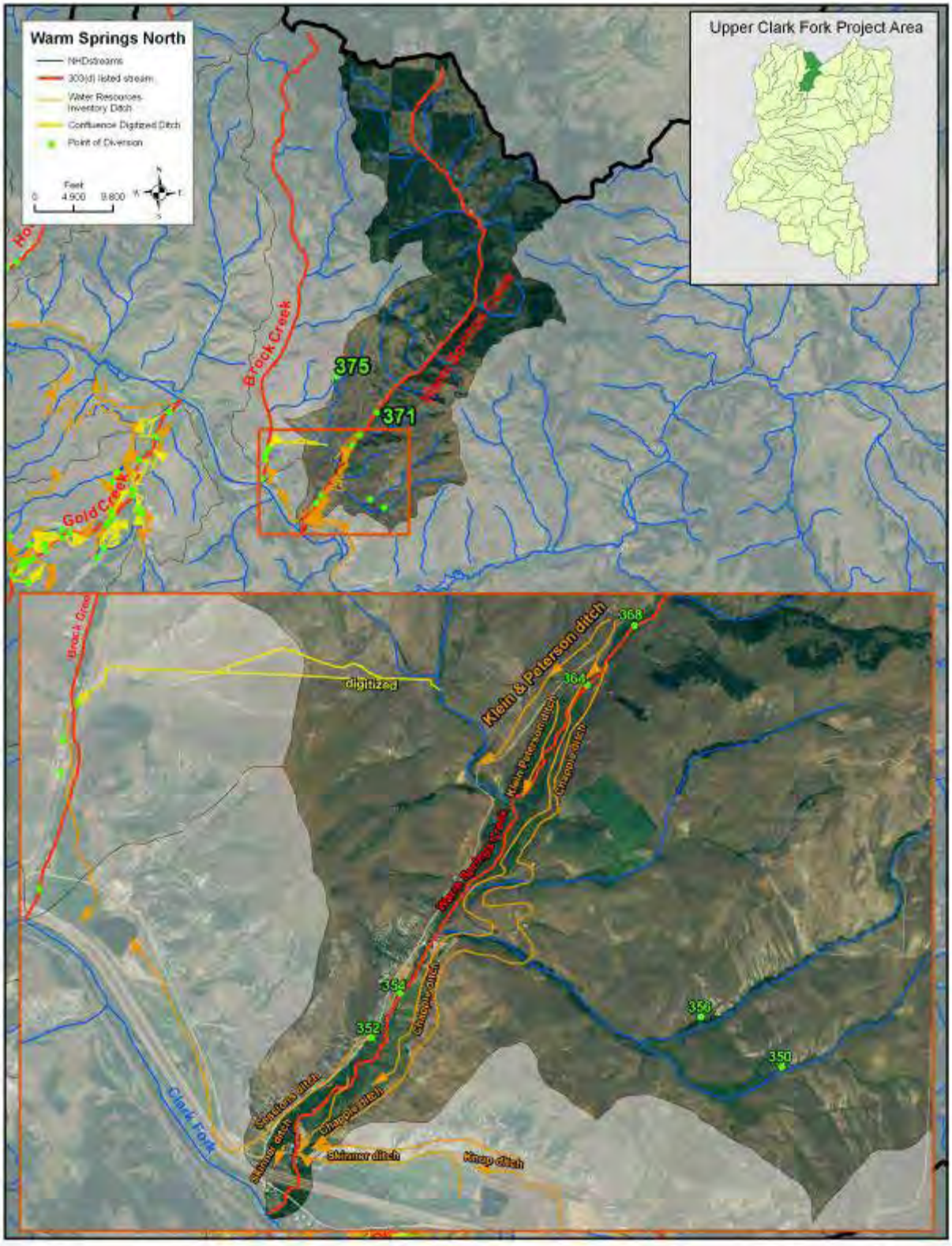

Figure 4-19. Warm Springs Creek North watershed

4.17.2 South

The Warm Springs Creek *South* watershed originates in the Flint Creek Range and the Pintlar Mountains of the Anaconda Range. Main tributaries to Warm Spring *South* include Twin Lakes Creek, Cable Creek, Barker Creek and Foster Creek. Twin Lakes and Cable Creeks are each 303(d) listed and are discussed elsewhere in this report. A total of 118 miles of streams were identified on the NHD GIS stream layer within this 100 square mile drainage **(Figure 4-20)**. The Foster Creek drainage flows into Warm Springs *South* and contributes another 15.5 miles of stream channel and 17.4 square miles of drainage. Warm Springs Creek *South* includes two 303(d) listed stream reaches (MT 76G002_011 & MT 76G002_012) that account for 32.2 miles of the waterway from the headwaters to the mouth (Clark Fork). This basin contains 214 unique water rights and 48 points of diversion (**Table 4-32**). A max flow of 1200.2 CFS is associated with these 214 water rights. An identified 37.4 miles of irrigation ditches are located within this basin (**Table 4-33)**. The Elmer Jones, Gardiner, and "drain" ditches have the potential to carry water out of the Warm Springs basin. POD ID's 54, 111, 149, 352, 364, 365, and 368 are located outside the Warm Springs Creek *South* watershed, yet could provide water into this basin via Sessions ditch, Skinner ditch, Klein Peterson ditch, Chapple ditch, and unnamed (digitized) ditches.

Table 4-32. Unique Point of Diversion Locations and associated water rights within the Warm Springs Creek South watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
25	65701-1	76G 32380 00	2.00
42	9917-1	76G 3641 00	0.09
45	87240-1	76G 44772 00	0.01
46	304299-1	76G 116513 00	0.46
47	304299-1	76G 116513 00	0.46
47	304299-1	76G 116513 00	0.46
49	211805-1	76G 123350 00	1.25
51	211806-1	76G 123351 00	1.00
51	292319-1	76G 4774 00	1.88
52	161976-1	76G 91538 00	
52	161919-1	76G 91507 00	
52	161978-1	76G 91540 00	
52	161966-1	76G 91532 00	
52	161921-1	76G 91508 00	
52	161936-1	76G 91516 00	
52	161941-1	76G 91519 00	
52	301477-1	76G 91539 00	
52	162032-1	76G 91572 00	
52	162001-1	76G 91554 00	
52	301475-1	76G 91517 00	
52	161973-1	76G 91537 00	
52	161934-1	76G 91515 00	
52	161980-1	76G 91541 00	
53	214649-2	76G 126628 00	1.88
53	214660-1	76G 126640 00	9.38
53	214618-2	76G 126592 00	1.44
53	214515-1	76G 126476 00	11.75
53	214534-1	76G 126497 00	56.25

Table 4-32 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
53	214554-2	76G 126520 00	7.80
53	214558-1	76G 126525 00	28.13
53	214497-2	76G 126455 00	5.25
53	214501-1	76G 126459 00	25.81
53	65636-2	76G 32343 00	3.00
53	65648-2	76G 32350 00	1.25
53	341900-1	76G 30005818	1.25
53	305628-1	76G 126656 00	9.38
53	214690-1	76G 126675 00	9.38
53	214584-2	76G 126554 00	1.50
53	214588-1	76G 126559 00	1.41
53	214526-1	76G 126488 00	28.13
53	214546-2	76G 126511 00	0.75
53	214553-2	76G 126519 00	56.25
53	214512-1	76G 126472 00	16.49
53	214671-1	76G 126653 00	9.38
53	214678-1	76G 126661 00	9.38
53	214610-2	76G 126583 00	1.83
53	214629-2	76G 126605 00	2.60
53	214570-2	76G 126538 00	3.75
53	214536-1	76G 126499 00	28.13
53	214539-2	76G 126503 00	4.31
53	214608-2	76G 126581 00	1.25
53	214612-1	76G 126585 00	1.38
53	214615-2	76G 126589 00	1.56
53	214634-2	76G 126611 00	1.25
53	214688-1	76G 126673 00	6.25
53	214695-1	76G 126680 00	9.38
53	214702-1	76G 126688 00	25.00
53	214657-1	76G 126637 00	9.38
53	214664-1	76G 126645 00	9.38
53	214669-1	76G 126651 00	9.38
53	214676-1	76G 126659 00	6.25
53	214517-1	76G 126478 00	23.44
53	317397-1	76G 215449 00	3.26
53	341903-1	76G 30005821	1.75
53	214509-1	76G 126469 00	22.74
53	214511-1	76G 126471 00	17.55
53	214513-1	76G 126474 00	28.13
53	214525-1	76G 126486 00	3.75
53	214658-1	76G 126638 00	6.25
53	214661-1	76G 126641 00	9.38
53	214663-1	76G 126644 00	9.38
53	214665-1	76G 126646 00	1.25
53	214583-2	76G 126553 00	0.75
53	214585-2	76G 126555 00	3.94
53	214516-1	76G 126477 00	9.66
53	214518-1	76G 126479 00	28.13

Table 4-32 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
53	214569-2	76G 126536 00	3.75
53	214573-1	76G 126541 00	2.00
53	214555-2	76G 126521 00	1.88
53	214533-2	76G 126496 00	1.88
53	214535-1	76G 126498 00	12.81
53	214537-1	76G 126500 00	86.07
53	214538-2	76G 126502 00	1.88
53	214542-1	76G 126506 00	71.29
53	214543-2	76G 126507 00	5.50
53	214545-2	76G 126510 00	0.75
53	214550-2	76G 126516 00	0.94
53	214670-1	76G 126652 00	9.38
53	214672-1	76G 126654 00	9.38
53	214675-1	76G 126658 00	6.25
53	214607-2	76G 126580 00	1.00
53	214619-2	76G 126593 00	0.63
53	214633-2	76G 126610 00	1.31
53	214687-1	76G 126672 00	6.25
53	214694-1	76G 126679 00	18.75
53	214696-1	76G 126681 00	3.13
53	214701-1	76G 126687 00	9.38
53	214703-1	76G 126689 00	9.38
53	214642-2	76G 126620 00	1.25
53	214647-2	76G 126626 00	1.56
53	305606-1	76G 126473 00	18.75
53	305608-1	76G 126494 00	28.13
53	305618-2	76G 126570 00	1.00
53	341897-1	76G 30005815	1.25
53	341904-1	76G 30005822	0.13
53	305607-1	76G 126487 00	3.75
53	305615-2	76G 126550 00	0.75
53	305626-1	76G 126643 00	9.38
53	161409-1	76G 91212 00	2.50
53	214510-1	76G 126470 00	11.37
53	214693-1	76G 126678 00	6.25
53	214700-1	76G 126685 00	9.38
53	214662-1	76G 126642 00	9.38
53	214674-1	76G 126657 00	9.38
53	214560-1	76G 126527 00	4.13
53	214541-1	76G 126505 00	28.13
53	214549-2	76G 126514 00	4.69
53	65666-2	76G 32360 00	1.88
53	65658-2	76G 32355 00	1.88
53	65659-3	76G 32356 00	3.75

Table 4-32 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
53	65634-2	76G 32342 00	1.25
53	65653-2	76G 32353 00	1.50
53	65722-2	76G 32393 00	1.75
53	214617-2	76G 126591 00	1.88
53	214502-1	76G 126460 00	9.59
53	214579-2	76G 126548 00	1.88
53	214514-1	76G 126475 00	12.81
53	214540-1	76G 126504 00	18.75
53	214548-2	76G 126513 00	4.88
53	214699-1	76G 126684 00	7.81
53	214704-1	76G 126690 00	9.38
53	214650-2	76G 126629 00	18.75
53	214654-1	76G 126633 00	2.19
53	214666-1	76G 126647 00	1.25
53	214673-1	76G 126655 00	6.25
53	305611-1	76G 126515 00	2.25
53	65721-2	76G 32392 00	0.19
53	65642-2	76G 32346 00	0.56
53	341898-1	76G 30005816	1.00
53	343147-1	76G 30007157	0.63
53	214641-1	76G 126619 00	0.50
53	214648-1	76G 126627 00	0.75
53	214599-2	76G 126572 00	0.01
53	214611-2	76G 126584 00	0.25
53	214622-1	76G 126597 00	0.47
53	214630-2	76G 126606 00	0.50
53	214637-2	76G 126615 00	0.25
53	305623-1	76G 126614 00	0.19
53	215486-2	76G 127603 00	0.63
53	305614-1	76G 126544 00	0.75
53	305621-1	76G 126601 00	0.25
53	341905-1	76G 30005823	0.58
53	214551-2	76G 126517 00	0.75
53	305620-2	76G 126594 00	0.63
53	214594-1	76G 126566 00	0.75
53	214606-1	76G 126579 00	0.94
53	214614-2	76G 126588 00	0.25
53	214626-2	76G 126602 00	0.25
53	341899-1	76G 30005817	0.19
53	341901-1	76G 30005819	0.50
53	341906-1	76G 30005824	0.06
53	214643-1	76G 126622 00	0.01
53	214620-2	76G 126595 00	0.63
53	214636-1	76G 126613 00	0.19

Table 4-32 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
53	214616-1	76G 126590 00	0.56
53	214635-1	76G 126612 00	0.84
53	214605-2	76G 126578 00	0.25
53	305619-2	76G 126587 00	0.31
53	341902-1	76G 30005820	0.62
55	131679-1	76G 71130 00	0.08
56	162713-1	76G 91969 00	0.88
57	287776-1	76G 211039 00	
59	295417-2	76G 32359 00	0.75
60	28135-1	76G 10761 00	0.06
63	295417-2	76G 32359 00	0.75
65	28135-1	76G 10761 00	0.06
72	36027-1	76G 15306 00	0.75
72	36031-1	76G 15308 00	2.25
72	305190-1	76G 123349 00	1.94
75	295418-2	76G 32366 00	0.38
76	211804-1	76G 123348 00	1.50
77	213115-1	76G 124860 00	0.62
78	15978-2	76G 5855 00	1.25
78	15981-2	76G 5856 00	0.50
78	15985-3	76G 5857 00	4.67
78	15977-2	76G 5854 00	2.00
78	15972-2	76G 5853 00	3.00
80	15972-2	76G 5853 00	3.00
80	15977-2	76G 5854 00	2.00
80	15978-2	76G 5855 00	1.25
80	15981-2	76G 5856 00	0.50
81	287583-1	76G 210817 00	0.10
82	15972-2	76G 5853 00	3.00
82	15977-2	76G 5854 00	2.00
82	15985-3	76G 5857 00	4.67
82	15981-2	76G 5856 00	0.50
82	15978-2	76G 5855 00	1.25
83	161919-1	76G 91507 00	
83	161976-1	76G 91538 00	
83	161978-1	76G 91540 00	
83	161921-1	76G 91508 00	
83	161966-1	76G 91532 00	
83	161941-1	76G 91519 00	
83	161936-1	76G 91516 00	
83	162001-1	76G 91554 00	
83	162032-1	76G 91572 00	
83	301477-1	76G 91539 00	
83	161973-1	76G 91537 00	

Table 4-32 (cont.)

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
83	161980-1	76G 91541 00	
83	161934-1	76G 91515 00	
83	301475-1	76G 91517 00	
84	28135-1	76G 10761 00	0.06
85	217590-1	76G 130031 00	0.01
86	51232-1	76G 24051 00	3.75
86	15981-2	76G 5856 00	0.50
86	15978-2	76G 5855 00	1.25
86	15972-2	76G 5853 00	3.00
86	15977-2	76G 5854 00	2.00
87	211784-1	76G 123325 00	0.08
88	36029-1	76G 15307 00	2.25
89	161189-1	76G 91085 00	0.10
90	15978-2	76G 5855 00	1.25
90	15981-2	76G 5856 00	0.50
90	15985-3	76G 5857 00	4.67
90	15977-2	76G 5854 00	2.00
90	15972-2	76G 5853 00	3.00
91	301423-1	76G 91053 00	0.04
92	228940-1	76G 143105 00	0.05
94	161398-2	76G 91206 00	8.75
95	161043-1	76G 91001 00	0.25
95	95560-1	76G 49575 00	0.13
95	86558-1	76G 44377 00	0.15
95	213054-2	76G 124790 00	0.03
95	17004-1	76G 6226 00	0.13
95	19793-2	76G 7237 00	0.05
96	65772-1	76G 32421 00	0.45
96	65773-1	76G 32422 00	0.09
99	214600-1	76G 126573 00	18.75
99	200192-1	76G 113653 00	0.07
102	15259-1	76G 5588 00	3.51
104	161334-1	76G 91169 00	0.13
105	163144-2	76G 92217 00	0.03
107	161170-1	76G 91074 00	1.59
110	76386-1	76G 38513 00	0.06
117	215431-1	76G 127539 00	0.75
119	57099-1	76G 27434 00	0.23
120	215432-1	76G 127540 00	0.76
121	294857-1	76G 27433 00	0.57
122	215433-1	76G 127542 00	2.13

Table 4-33. Ditches identified in the Warm Springs Creek South watershed

POD ID	Ditch Name	Ditch Length (ft)
47	Glover	1,675
47	digitized	765
49	Ward	700
51	Nates	3,909
52	Elmer Jones	1,549
52	Elmer Jones	244
53	Gardiner	828
54	drain	1,035
55	Johnson	3,538
55	Johnson	3,076
57	digitized	6,903
57	unnamed	778
57	A.C.M.	2,578
57	unnamed	1,210
60	Anderson	2,871
60	digitized	1,504
63	digitized	9,909
65	Jones-Stuckey Levengood	10,936
72	digitized	6,878
75	Strom-Hellstrom	4,518
77	Lacovich	3,828
78	Jergenson	4,169
78	Jergenson Southside	1,201
78	digitized	1,372
80	Herman Johnson	2,847
81	digitized	3,281
82	digitized	2,802
84	digitized	319
86	Asylum	13,570
87	digitized	277
88	Vincent-Jones	4,860
88	digitized	194
89	Vincent-Jones	12,744
90	digitized	442
91	Lacovich	863
92	digitized	3,749
94	Asylum	4,172
96	digitized	1,982
102	Forsman	4,473
104	digitized	280
105	Forsman	1,243
107	Lacovich	1,369
107	digitized	6,127
111	digitized	3,803
122	digitized	3,756
149	trace of	2,453
352	sessions ditch	3,458
352	skinner ditch	2,850
364	klein peterson ditch	2,171
365	digitized	4,616
368	chapple ditch	29,167
368	klein & peterson ditch	1,778
368	klein peterson ditch	2,018

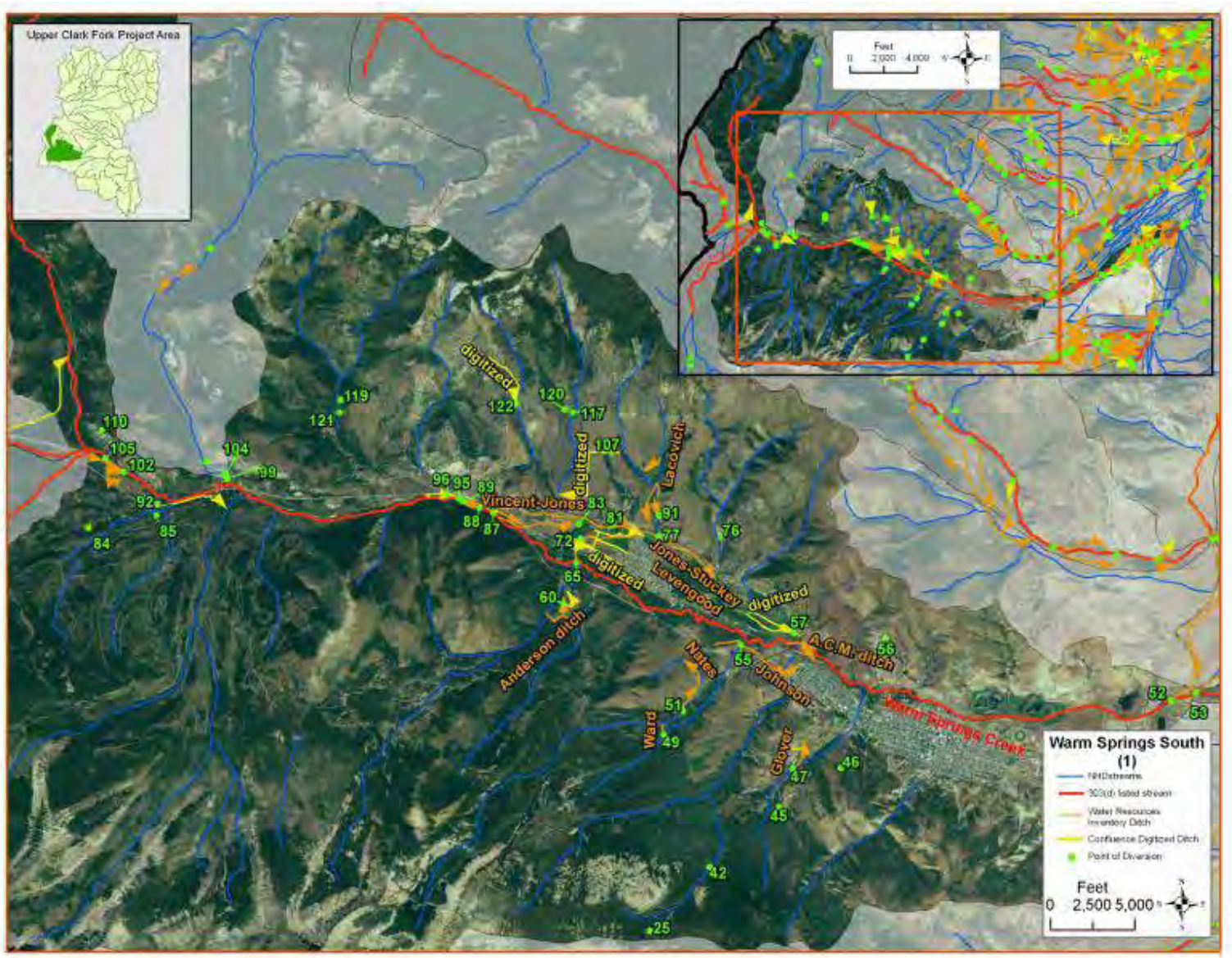

Figure 4-20. Warm Springs Creek South (1) watershed

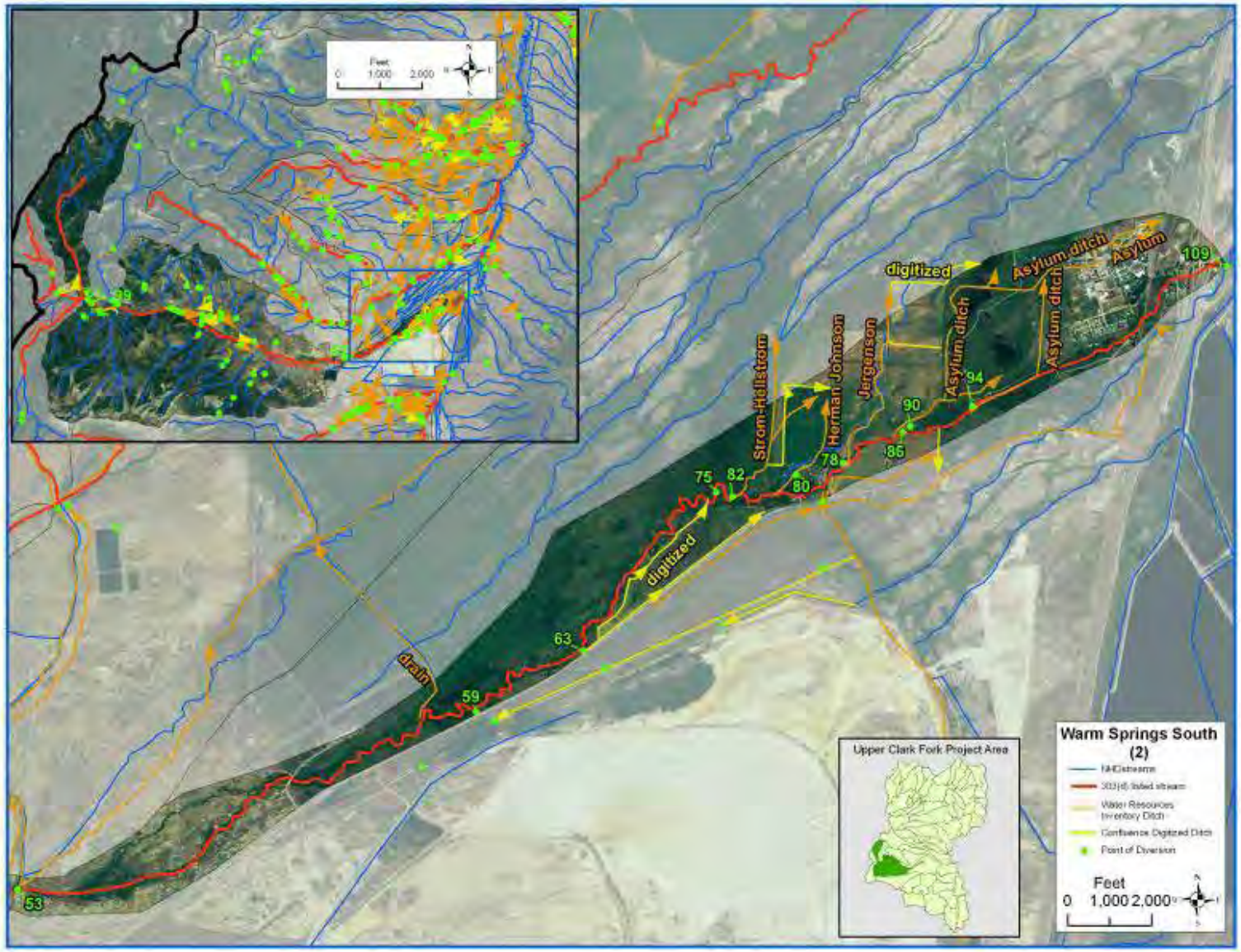

Figure 4-21. Warm Springs Creek South (2) watershed

4.18 Willow Creek

Willow Creek flows into Mill Creek just above its confluence with Silver Bow Creek. The entire upper portion (58.4%) of this watershed is State owned and managed as the Mount Haggin State Wildlife Management Area. Several streams within the Willow Creek drainage originate within this management area. The lower 36.7% of the watershed is privately owned and predominantly managed in agriculture until Willow Creek flows under MT Hwy 1, at which point the dominant landuse is residential. 46.9-miles of NHD stream were mapped in this 28.6 square mile basin **(Figure 4-22)**. Willow Creek is 303(d) listed from the headwaters to the mouth for a total of 12.9 miles. This basin contains 13 unique water rights and 11 points of diversion for a max flow of 74.7 CFS from the basin **(Table 4-34)**. All irrigation infrastructure identified was located within the lower one third of the basin and included 19 miles of irrigation ditches (**Table 4-35)**. Water diverted into Yellow ditch from Silver Bow Creek flows north along the topographical lines and crosses both the Willow and Mill Creek drainages. Additional water is conveyed into the Willow Creek basin from Mill Creek irrigation ditches, including the A.C.M. ditch, A.C.M. 16 ditch, #3, #4, and #8 ditches, and other unnamed ditches. POD IS's 13, 21, 31, 32, 34, 38, and 82 are located outside the Willow Creek basin and are associated with these iter-watershed ditches.

Table 4-34. Unique Point of Diversion Locations and associated water rights within the Willow Creek watershed

POD ID	WRKEY	Water Right Number	Max Flow (cfs)
4	12879-1	76G 4713 00	12.50
6	215496-1	76G 127614 00	25.00
6	215493-1	76G 127611 00	5.00
8	305755-1	76G 127623 00	0.25
8	215512-1	76G 127633 00	0.25
9	215492-1	76G 127610 00	5.00
9	215496-1	76G 127614 00	25.00
9	215494-1	76G 127612 00	5.00
9	215495-1	76G 127613 00	7.50
10	161540-1	76G 91288 00	0.20
11	215496-1	76G 127614 00	25.00
11	215494-1	76G 127612 00	5.00
11	215495-1	76G 127613 00	7.50
12	161540-1	76G 91288 00	0.20
14	214499-1	76G 126457 00	7.50
18	12875-1	76G 4712 00	6.25
20	215410-1	76G 127516 00	0.23
22	160462-1	76G 90659 00	0.02

Table 4-35. Ditches identified in the Willow Creek watershed

POD ID	Ditch Name	Ditch Length (ft)
10	A.C.M.	5,766
10	Yellow	28,847
11	A.C.M.	2,115
12	unnamed	4,400
13	digitized	2,227
14	unnamed	1,694
18	digitized	3,628
20	digitized	2,424
21	A.C.M.	8,956
22	#1	1,822
22	#2	930
31	digitized	3,726
32	A.C.M. 16	577
34	#3	3,305
34	#4	1,575
38	#8	75
4	Notestine	4,862
4	digitized	2,199
6	digitized	2,673
82	digitized	3,659
8	Furst	5,883
9	Yellow	8,767

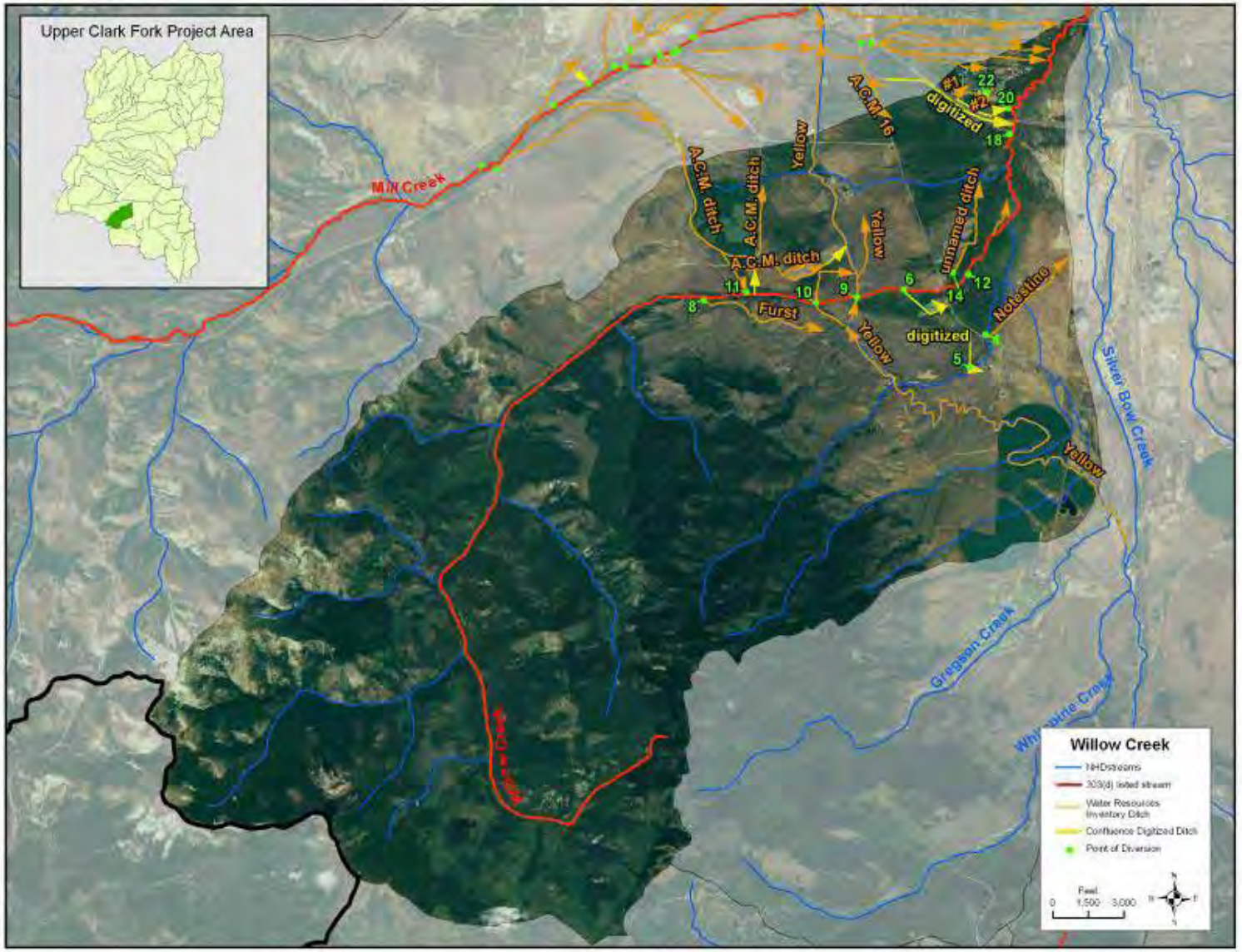

Figure 4-22. Willow Creek watershed

REFERENCES

(State Engineer's Office, 1955). Powell Co, 1959; Lewis and Clark Co, 1965; Deerlodge Co, 1955; Granite Co, 1959; and Silver Bow Co, 1955
Link to water resource surveys: http://dnrc.mt.gov/wrd/water_rts/survey_books/