Watershed Characterization - Final

Haskill Creek TMDL Planning Area

Prepared for:

Montana Department of
ENVIRONMENTAL QUALITY

Prepared by:

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WATERSHED CHARACTERIZATION

This section of the Haskill Creek watershed TMDL and water quality restoration plan provides general background information about the watershed, and sets the stage for a later discussion of water quality problems, and the underlying historical, current and projected future causes of impairment. It is designed to put the subject waterbodies into context of the watershed in which they occur. Haskill Creek lies within the North Rockies Level III eco-region (sub-regions Stillwater-Swan Woodland Valley and Flathead Valley). Nutrient and sediment levels in the watershed are best compared to nutrient guidelines for the Northern Rockies and Canadian Rockies (EPA 2000).

1.1 Location

Encompassing a geographic area of approximately 12.8 mi^2 (8,281 ac), Haskill Creek originates on the southwestern flank of the Whitefish Mountains two miles north and east of the City of Whitefish. It flows approximately 11 miles to its confluence with the Whitefish River (Figure 2.1). The entire watershed resides within Flathead County.

1.2 Regional and Local Basin Morphology

Map 2.1 in Appendix B displays the regional and local topography as well drainage pattern in the Haskill Creek TPA.

The Rocky Mountain Trench is the dominant geomorphic feature influencing the northern Flathead Basin. The trench is a 1,000 mile long narrow depression extending from the Northwest Flathead Lake north through British Columbia to the Yukon. In the focus area, the trench is bordered by the Salish Mountains to the west, and the Whitefish Range to the east (Coffin et al. 1971).

The Mountains bordering the trench are comprised of metasediments of the Belt Series Supergroup. Bedrock outcrops form the high ridges, while unconsolidated lateral moraine material forms the intermediary elevations or foothills. The valley is filled to various depths with glacio-fluvial materials derived from the Belt parent rock. Haskill Creek flows into the trench near its southern terminus and joins the Whitefish River a mile south of the city of Whitefish.

Haskill Basin is distinctive in its morphology and drainage pattern. Elevations in the Haskill drainage range from near 7,000 feet on Big Mountain, to 3000 feet at the confluence with the Whitefish River near Whitefish, Montana. Headwater tributaries originate in the steep, mountainous terrain of the Whitefish Mountains. They converge to form mainstem Haskill in the lateral moraines that comprise the foothill regions of the watershed. The system's five main tributaries, including First Creek, Second Creek, Third Creek, Fourth Creek, and Fifth Creek, enter Haskill Creek in the upper portion of the foothill areas. Stream gradients, while less than tributary slopes, encourage step-pool morphology. Lower Haskill flows through the fields and meadows of the valley bottom.

From there, downstream to the mouth, no further substantial tributaries contribute to the total flow. Mainstem sinuosity remains low in general, except for isolated reaches. With this drainage pattern and morphology, orographic storm events in the headwaters can create instantaneous peak flows and flashy runoff characteristics typical of northwest Montana streams.

1.3 Land Uses, Ownership, and Vegetative Cover

Primary landowners in the Haskill Creek TPA include the U.S. Forest Service Flathead National Forest (41%), FH Stoltze Land & Lumber Co. (28%), and private landowners (26%). Map 2.2 in Appendix B depicts the distribution of land ownership in the Haskill Creek TPA. The State of Montana, other owners and Burlington Northern Santa Fe own 4.8%, 0.8% and 0.10%, respectively. Table 1-1 summarizes land ownership statistics for the Haskill Creek TPA.

Table 1-1. Land ownership within the Haskill Creek TPA.

Land Owner	Acres	Sq. Miles	% of Total
US Forest Service	3357	5.25	40.9
FH Stoltze Land & Lumber Co.	2282	3.57	27.8
Private	2113	3.30	25.7
State of Montana	395	0.62	4.80
Other*	62.9	0.09	0.76
Railroad BNSF	7.43	0.01	0.09
Total	8,217	12.8	100

*Category includes all other lands such as those administered by city or county governments and Big Mountain public parking areas.

The predominant land uses in the TPA are residential and commercial developments, agriculture, commercial timber, and urban interface uses. Map 2.3 in Appendix B displays land management activities within the Haskill Basin TPA. Residential and commercial developments are largely situated in the headwaters of the basin in proximity to the Big Mountain Ski & Summer Resort. Recreational use in the area includes nordic and downhill skiing, hiking, hunting, walking, horseback riding, and mountain biking. Much of the recreation emanates from the Big Mountain Ski & Summer Resort on private and USFS lands.

Land use in the upper and middle portions of the Haskill Creek watershed is dominated by forested timberlands owned by Stoltze Land & Lumber Company, Winter Sports Incorporated, Inc., the USFS, and the DNRC. Contiguous forested lands (i.e. evergreen, deciduous, mixed forest cover types) comprise approximately 44% of the land use in the Haskill Creek watershed (Table 1-2). Commercial and other urban developments associated with the Big Mountain and Glacier Village comprised approximately 22% of the watershed area. These developments are largely confined to the First Creek and Second Creek drainages.

Silviculture was the primary land use in the upper watershed and led to the start of the Big Mountain Ski and Summer Resort. Significant timber harvesting and salvage harvesting occurred as a result of cleared and gladed ski run development. Most of the glading involved a combination of slashing, trampling and piling and burning of trees. In the late 1950s and 1960s, timber harvesting occurred on the north slopes. These areas were harvested due to a spruce bark beetle epidemic (USDA 1995). Regeneration and salvage harvests were applied. Additional salvage occurred in the early 1980s on the north slope. Presently, the old harvest areas are dominated by spruce and subalpine fir, huckleberries and alder. Few mature trees exist and average tree size is one to three inches in diameter and five to fifteen feet in height. Timber harvest activities are now limited to new residential developments located in the headwaters of First Creek. Silvicluture continues to be the primary land use in the middle portion of the watershed under FH Stoltze Land & Lumber Company ownership.

Table 1-2. Land management within the Haskill Creek TPA.

Land Management	Acres	Sq. Miles	% of Total
Forested	3653	5.70	44.4
Ski Resort/Commercial	1809	2.83	22.0
Timber Production	1782	2.78	21.6
Residential and Agricultural	973	1.52	12.0
Total	8217	12.8	100

Mixed crop, pasture, and other agriculture are the most common land uses in the lower valley. Mixed residential developments are scattered in the lower reaches of the watershed, the highest unit density occurring between Voermans Road and Monegan Road. Residences located adjacent to Haskill Creek have generally converted riparian stands to introduced grass species and post agricultural assemblages.

In 1995, the USFS prepared the Final Environmental Impact Statement for the Big Mountain Ski and Summer Resort (USDA 1995). The report summarized past management activities specific to actions in the First Creek and Second Creek watersheds (Table 1-3).

Table 1-3. Past management activities in the First Creek and Second Creek sub-basins[1].

Approximate Date	Description of Management Activity
1960	Stoltze land in the lower Haskill Creek watershed was logged. Trees on approximately half of the First Creek basin were harvested; relatively few trees were removed in the Second Creek watershed.
1960s	Extensive ski area development in the Upper Haskill Creek watershed.
1970	Substantial residential development initiated in the Haskill Creek watershed.
1970/1990/1992	Three wells drilled to supply water for base area (one per year).
1970	City of Whitefish discontinued use of First Creek for public water supply. Second and Third Creek diversions maintained.

Table 1-3. Past management activities in the First Creek and Second Creek sub-basins[1].

1979 and ongoing	Winters Sports, Inc. applies seed, fertilizer, and mulch each year to prevent erosion of ski runs and service roads.
1985	One mile of the paved Big Mtn. Road was built in the Haskill watershed. Several non-paved roads were built to access various portions of the ski area; gravel parking on Lots 1, 2, and 3 was also provided.
1988	First Creek channel (Big Ravine) relocated to accommodate the newly constructed Big Ravine ski run. The old reservoir at the base of the run was used as a sediment trap for runoff from Big Ravine Run.
1989 to present	Mitigation efforts to arrest erosion of Big Ravine continue. Big Ravine continues to discharge fine to coarse sediment to downstream reaches.
1990 and 1991	Sediment has been removed from the old reservoir (now a sediment trap) at the base of Big Ravine. Hay bales were placed in the overflow channel to trap fine sediment.
1991 to present	Addition of new roads, Chair 6 parking area developed, installation of Chair 11 and t-bar, major commercial and residential expansions associated with Glacier Village, including Sunrise Development, Sunrise Development Phase II –IV, Kintla Lodge, Northern Lights, Moose Run Phases I-II, and Morning Eagle.

[1] Modified from USDA Forest Service Big Mountain Ski and Summer Resort Final Environmental Impact Statement, 1995.

Road construction completed within the Haskill Creek TPA provides for commercial logging, residential and commercial development, and recreation. Maximum road densities, 3.94 miles of road per square mile of watershed area (3.94 mi/mi^2), are located in the headwaters of First Creek in association with Big Mountain Ski & Summer Resort and private residential developments.

2.4 Population

As of the 2000 Montana census, the population of Flathead County totaled 74,471 people (Montana Department of Commerce 2006) and estimated to be 81,217 by 2004. The largest town in the county, Kalispell (population 14,223), is 15 miles south of the Haskill Creek watershed.

Similar to Flathead County, the City of Whitefish is experiencing rapid growth. It is estimated that the population of the City of Whitefish has increased nearly 5% per year since the 2000 census. This growth included significant annexation of existing properties equaling approximately 800 residents. Areas within the City of Whitefish planning and zoning jurisdiction that were once comprised of forested and agricultural lands are now being developed into residential, commercial and other land uses. Resort residential development continues to occur in the headwaters of Haskill Creek, primarily in the First Creek sub-watershed. Increased development pressure in the headwaters of Haskill

Creek and in the lower agricultural reaches of the basin is anticipated as property values rise commensurate with surrounding properties located in city limits.

2.5 Geology

The geology of the Haskill Creek watershed is primarily influenced by surficial deposits of either glacial or alluvial origin. Most of the surficial deposits are composed of glacial till which is an unconsolidated, poorly sorted composite of silt, clay, sand, gravel and boulders. Two types of till are generally recognized: compact and friable glacial till. Compact glacial till is unconsolidated silt, sand, gravel and boulders, usually associated with continental ice sheet deposition. It typically forms moraines or mantles of glaciated mountain slopes and ridges. Soil associated with compact glacial till is relatively dense and brittle and tends to restrict water movement. Friable glacial till is typically associated with alpine glaciation, which is less dense than the compact till and does not restrict flow as effectively. Alluvial deposits are composed of unconsolidated material that is rounded and sorted as a result of deposition by water. Alluvium forms floodplains, terraces, and alluvial basins along the valley bottom located downstream of Haskill Basin Road.

Bedrock exposures are limited to ridges and high elevations in First Creek, Second Creek, and Third Creek. The bedrock geology is characterized by metasedimentary rocks of the Belt Supergroup and more specifically to eight formations of middle Proterozoic age. The metasedimentary rocks consist of argillite, siltite, dolomite, and argillites with varying amounts of carbonate and quartzite. These rocks tend to produce loamy soils with angular rock fragments.

2.6 Soils

Soils in the headwaters of Haskill Creek consist of the *Whitefish* series, a deep, well-drained, light-colored, silty soil containing gravel and underlain by gray, calcareous glacial till (USDA 1946). These soils have developed from calcareous, medium textured, glacial till containing a large percentage of rounded to angular gravel, cobbles, and large stones. This material was derived primarily from weathered argillite, quartzite, and dolomitic limestone, all of the Belt Supergroup formation.

In the lower valley (i.e. downstream of Haskill Basin Road), soil types are formed primarily from reworked and weathered alluvium and post-glacial lacustrine deposits (i.e. lake deposited silt and clay). The series is referred to as the *Half Moon* series, consisting of deep, light-colored, medium-textured soil (USDA 1946). The series has developed in calcareous, light-colored, thinly stratified silt and fine sand deposited by glacial streams in temporary lakes formed when the glaciers receded the Upper Flathead Valley area. Half Moon soils occupy broad, nearly level terraces associated with a majority of the agricultural lands in the lower portion of the valley, and generally display a silt loam-to loam texture. Soil profiles on Voermans Ranch provided evidence of historical wetland and lacustrine (i.e. lake bed) environments. Due to vegetation clearing and direct channel modifications, a majority of the agricultural lands are classified as prior converted wetlands. Remnant wetland indicator species are present in paleo-channels and are evident on historical as well as recent aerial photo series.

2.7 Climate

The climate of the Haskill Creek TPA varies greatly with elevation. Elevations in the watershed range from 7,000 ft at the top of Big Mountain to approximately 3,000 ft at the confluence with the Whitefish River. Average annual precipitation can be up to 62 inches in the higher elevations of the Haskill Creek drainage to 22.0 inches at its confluence with the Whitefish River (Western Regional Climate Center).

There are no NOAA weather stations within the Haskill TPA, however the closest NOAA station is located in the City of Whitefish, adjacent to Haskill Creek (Station 248902) (Figure 1-1). Although average annual precipitation is 22.0 inches in Whitefish, this value reflects lower, valley bottom elevations. This should be considered the lower range of precipitation within the TPA. Conversely, in headwater areas and at Big Mountain summit average precipitation can exceed 70-80 inches annually (USDA 1995). Approximately 60% of the mean annual precipitation falls as snow and forms the snowpack between November and April (on average).

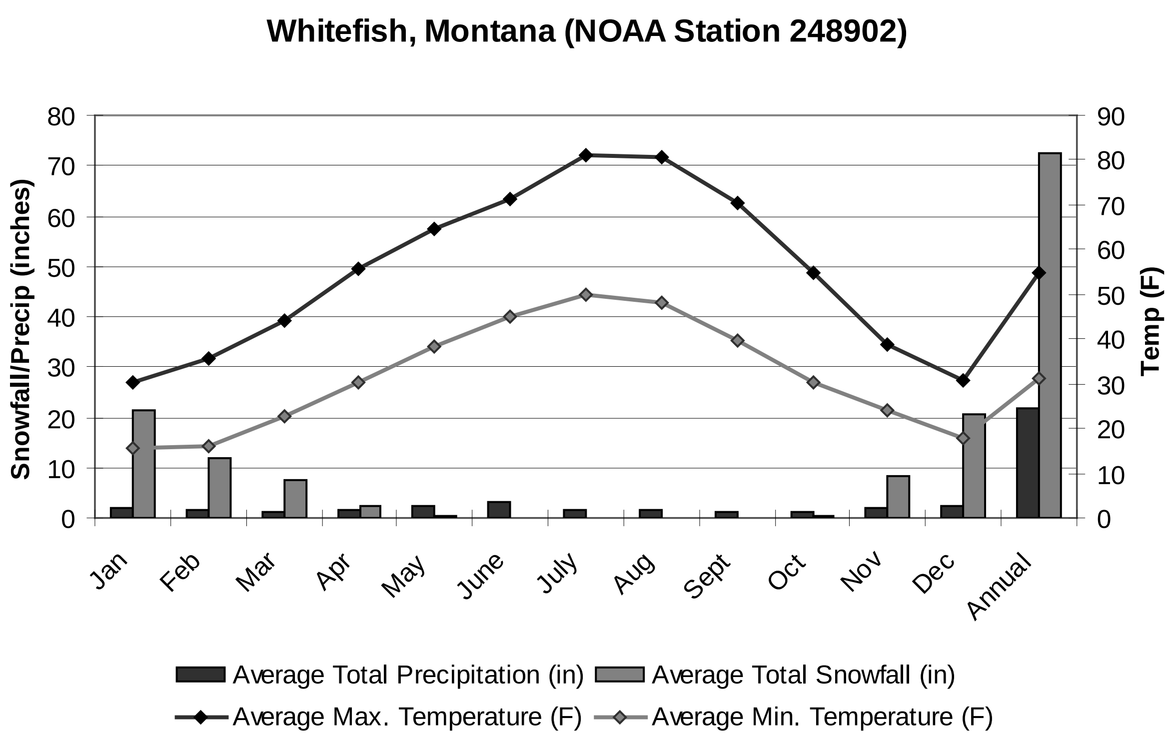

Figure 1-1. Climate data for Whitefish, Montana (Station 248902).

Average maximum temperature at the weather station in Whitefish ranges between 71^{o} and 81^{o}F in summer. Average minimum temperatures range between 16^{o} and 18^{o} F in winter. Milder temperatures can be assumed to prevail with increasing elevation.

2.8 Hydrology

The stream flow regime (i.e. timing, magnitude, and duration), and in particular spring runoff, is largely influenced by rain-on-snow and rain-on-snowmelt events that can occur anytime during the winter months in response to warm air temperatures and rain. Typically, however, the peak flow event occurs in May or early June.

The Haskill Creek flood frequency was calculated using U.S. Geological Survey (Omang 1992) regional equations. The estimated bankfull or average annual maximum discharge was estimated at 120 cubic feet/second (cfs). The 25, 50, and 100-year floods were estimated to be 290, 335, and 395 cfs, respectively (Table 1-4). High magnitude flood events have occurred in the Haskill Creek watershed over the past 20 years, most notably in 1967, 1969, 1973, and 1991 (USDA 1995). These events were attributed to multiple factors, including high snowfall and seasonal precipitation and warming temperatures, occurrence of rain-on-snow events in the spring, and other extrinsic influences including roading and logging, snowpack alteration due to wildfire, snowmaking, and residential and commercial developments in the headwaters (USDA 1995).

Table 1-4. Haskill Creek flood frequency analysis.

Recurrence Interval (yrs)	Discharge (cfs)
1.5	101
2.0	118
5.0	183
10	240
25	294
50	348
100	391

Base flow discharge on Haskill Creek is estimated to range from 2.0 to 4.0 cfs. Discharge measurements collected in August of 2005 and September of 2006 at Monegan Road, 500 ft. upstream of the confluence with the Whitefish River, were 3.7 cfs and 2.7 cfs, respectively.

Approximately 1,120 acre-feet of water per year are diverted from Second Creek and Third Creek for use by the City of Whitefish (USDA 1995). Up to 25.54 acre feet of water can be diverted annually for snowmaking by WSI (State Water Right #PO705111). Approximately one-quarter of the water that is diverted from First Creek for snowmaking is lost to evaporation. Flow records are not presently compiled for the City of Whitefish water treatment plant, but it is estimated the present diversions on Second and Third Creeks reduce streamflow in Haskill Creek by approximately 50% during base flow periods. Second Creek and Third Creek were dewatered downstream of the points of diversion during field surveys in 2002, 2003 and 2005, fragmenting fluvial connectivity with Haskill Creek.

Several private diversions occur in the lower portion of the watershed for the purposes of private ponds and crop irrigation. The effects of these diversions on Haskill Creek base flows are unknown at this time.

2.9 Channel Morphology

A detailed inventory of channel conditions in the Haskill Creek TPA was completed by Water Consulting, Inc. as part of the Haskill Creek Watershed Assessment project (WCI 2002). Reach breaks were delineated throughout the watershed based on slope, entrenchment ratio, width-to-depth ratio, valley morphology, and channel materials (Map 2.4 in Appendix B). Five reach breaks were delineated from the headwaters of Haskill Creek downstream to the confluence with the Whitefish River.

The headwater channels of Reach 1, including First Creek, Second Creek, and Third Creek, characterized by step-pool bedform features, were generally steep and confined within relatively narrow, glacial scoured valley types (Table 1-5 and Figure 1-2). These channel types displayed erosional processes that varied from very low and stable to highly erodible, depending on the degree of direct manipulation by management activities and inherent watershed characteristics (i.e. soils types, landform slopes). First Creek, in the vicinity of Big Ravine (USFS property), is an example where direct channel modification (i.e. channel relocation and straightening) has promoted channel instability, increasing sediment supply to First Creek. Second Creek and Third Creek are largely undeveloped, and as a result, exhibit stable channel conditions. Natural sediment sources consisting of shallow soils overlying steeply dipping bedrock were inventoried in the upper headwaters of these drainages, notably in the Third Creek drainage.

Table 1-5. Average channel dimensions for four Reach 1 tributaries.

BF Width (ft)	Mean D (ft)	Max D (ft)	W/D Ratio	XS Area (ft^2)	Slope (%)	FP Width (ft)	Entrenchment Ratio
8.15	0.95	1.45	8.85	7.78	10.7	16.0	1.90

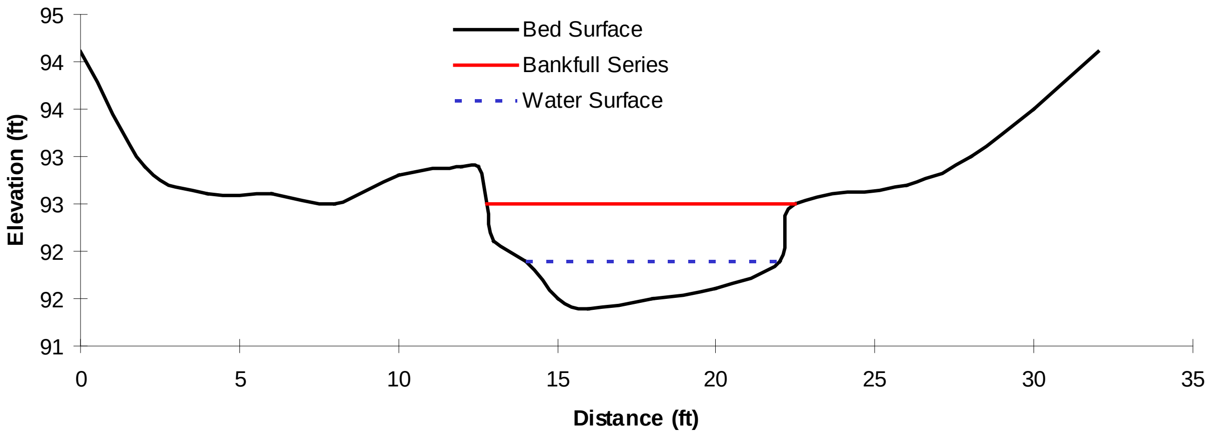

Figure 1-2. Typical channel cross-section in Reach 1, First Creek.

The middle portion of the watershed, including stream Reaches 2 and 3, located downstream of Big Mountain Ski and Summer Resort to Haskill Basin Road, consist of confined and moderately cascading channel types (Table 1-6 and Figure 1-3). These reaches are typically stable with a low sediment supply due to the relatively narrow valley morphology and coarse channel material. Sediment sources in this reach are related to natural terrace erosion and delivery of sediment and debris to the channel.

Table 1-6. Average channel dimensions for three cross-sections in Reach 3.

BF Width (ft)	Mean D (ft)	Max D (ft)	W/D Ratio	XS Area (ft^2)	Slope (%)	FP Width (ft)	Entrenchment Ratio
20.5	1.30	1.85	16.7	27.7	1.70	25.7	1.20

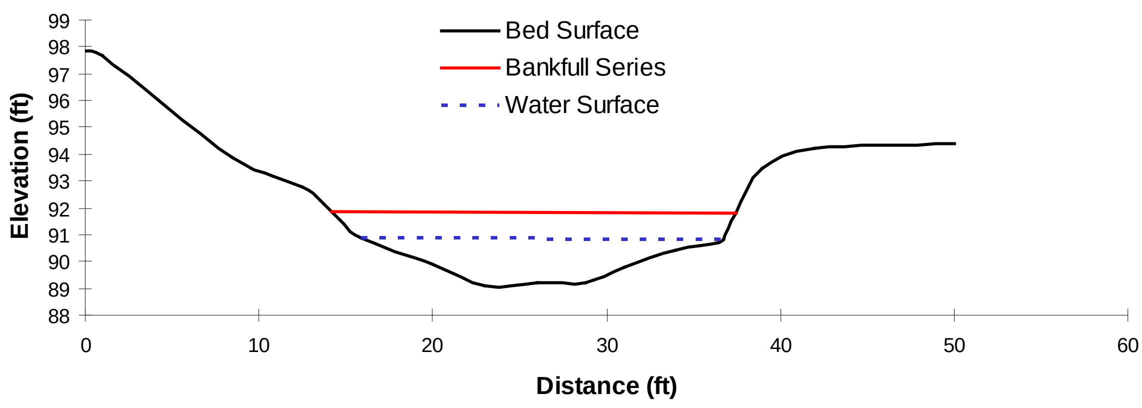

Figure 1-3. Typical channel cross-section in Reach Three, Haskill Creek.

Downstream of Haskill Basin Road, Reaches 4 and 5 in Haskill Creek transition to a low-gradient channel type as the valley broadens (Table 1-7 and Figure 1-4). This section of the drainage is formed in broad valleys with gentle, down-valley elevation relief. Channel modifications for agriculture have altered the channel form and function. Changes in vegetative cover types, channel straightening and relocation, and direct streambank modifications have resulted in impaired stream conditions and increased sediment supply to Haskill Creek. Historically, and prior to agricultural conversion, these channel types likely displayed very stable plan forms within a broad, accessible floodplain dominated by wetland and riparian plant species. Vegetation likely played an integral role in maintaining channel stability due to the fine-grained nature of the underlying soils. Spatial and temporal variability in channel stability was very likely, however, due to the influence of beaver activity and other natural processes including flooding. This is especially true within reach 6, downstream from Monegan Road, where a low gradient, E-type channel meanders through a well-vegetated floodplain corridor. Evidence of beaver activity and flooding is prevalent.

Table 1-7. Average channel dimensions for two Reach 5 cross-sections.

BF Width (ft)	Mean D (ft)	Max D (ft)	W/D Ratio	XS Area (ft^2)	Slope (%)	FP Width (ft)	Entrenchment Ratio
64.3	1.19	2.60	51.2	89.3	0.90	77.0	1.33

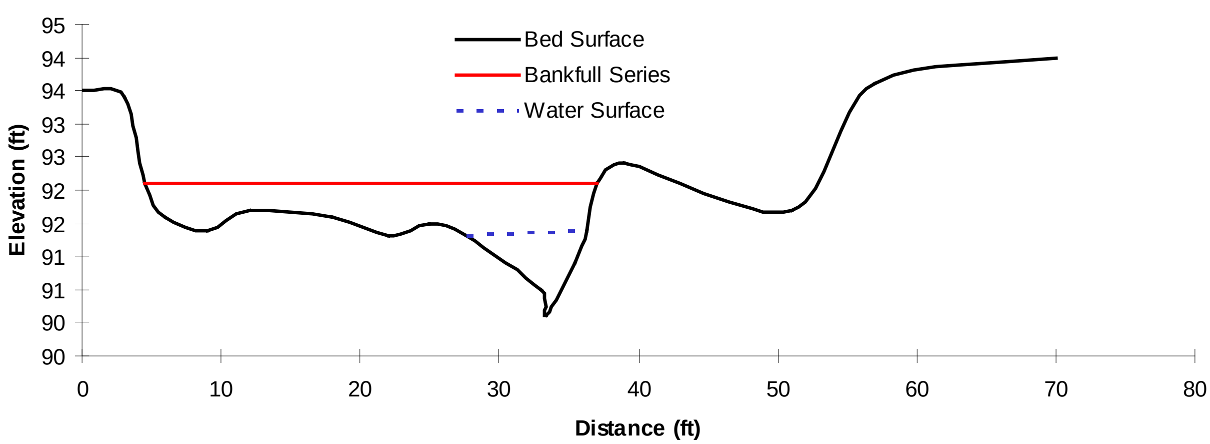

Figure 1-4. Typical channel cross-section in Reach Five, Haskill Creek.

2.10 Vegetation

Upland and riparian vegetation has been directly or indirectly impacted by land clearing for ski resort development, stream straightening and down-cutting, water diversions or ditching, crop production, livestock grazing, local extirpation of beaver populations, and the introduction of exotic vegetation. Several of these factors have played primary roles in reducing the amount of water available to riparian and wetland ecosystems. Changes in land use and riparian community composition have led to the replacement of native wetland and riparian plant communities by crops or post-agricultural assemblages, or mixed exotic species types. These non-native cover types lack the capacity for wetland and riparian ecosystem functions. Flooding, either by seasonal events or beaver ponding, was important in shaping riparian communities along the valley bottom of Haskill Creek. The frequency of over-bank floods has likely been diminished due to the incised nature of the channel from Haskill Basin Road downstream to the Voerman's homesite.

In the headwaters of Haskill Creek, forest vegetation is characterized by several dominant vegetation types including larch and Douglas-fir, subapline fire, spruce and alder. In general, forest health is good (USDA 1995) with the exception of areas cleared for ski run development, commercial and residential developments. Riparian vegetation conditions along tributaries to First Creek have been extensively modified by land clearing for ski run development, ditching and channelization. The Big Moutain Ski & Summer Resort is currently in the process of development a master restoration plan for the First Creek drainage in association with development activities. The restoration plan will attempt to recreate a more natural stream corridor reflective of the historical, pre-disturbance conditions. Downstream of the resort on private forest lands, riparian buffers have been maintained and are relatively intact, although past indications of riparian harvest activities are evident in most reaches of the creek.

Table 1-8 summarizes vegetation cover types in the Haskill Creek TPA.

Table 1-8. Summary of vegetation cover types in the Haskill Creek TPA.

Land Cover / Vegetation	Acres	Square Mile(s)	% of Total
Low/Moderate Cover Grasslands	108	0.17	1.31
Moderate/High Cover Grasslands	546	0.85	6.65
Montane Parklands and Subalpine Meadow	78	0.12	0.95
Mixed Broadleaf Forest	318	0.50	3.87
Lodgepole Pine	773	1.21	9.40
Grand Fir	4	0.01	0.05
Western Red Cedar	4	0.01	0.05
Douglas-fir	186	0.29	2.26
Western Larch	250	0.39	3.04
Douglas-fir/Lodgepole Pine	260	0.41	3.17
Mixed Whitebark Pine Forest	524	0.82	6.38
Mixed Subalpine Forest	1195	1.87	14.54
Mixed Mesic Forest	2546	3.98	31.0
Mixed Xeric Forest	4	0.01	0.05
Mixed Broadleaf and Conifer Forest	997	1.56	12.1
Water	4	0.01	0.05
Conifer Riparian	10	0.02	0.12
Broadleaf Riparian	6	0.01	0.07
Mixed Broadleaf and Conifer	6	0.01	0.07

Table 1-8. Summary of vegetation cover types in the Haskill Creek TPA.

Land Cover / Vegetation	Acres	Square Mile(s)	% of Total
Riparian			
Shrub Riparian	114	0.18	1.39
Mixed Riparian	54	0.08	0.66
Rock	28	0.04	0.34
Mixed Barren Sites	6	0.01	0.07
Mixed Mesic Shrubs	196	0.31	2.39
Total	8220	12.8	100

2.11 Fish

The Haskill Creek TPA likely supported populations of westslope cutthroat trout and potentially bull trout. Currently, non-native brook trout (*Salvelinus fontinalis*) dominate the Haskill Creek fish assemblage. Westslope cutthroat trout continue to inhabit the middle portion of the drainage but at low numbers. Habitat degradation and non-native species interactions throughout the watershed have likely led to competition between native westslope cutthroat trout and non-native brook trout.

A fish population survey suggested that brook trout dominate the fish community in portions of the Haskill Creek stream system (Figure 1-5). At each sampling location, numerous brook trout were found and multiple age classes were represented in the sample. Several brook trout spawning nests and spawning individuals were observed at each site. Subsequent spawning surveys in the lower reaches of Haskill Creek during the fall of 2001 revealed that brook trout spawn in the agricultural reach. These results indicate that brook trout are widely distributed, abundant, and established in the Haskill Creek system.

In contrast, a remnant and genetically pure westslope cutthroat trout population inhabits the middle portion of the Haskill Creek Watershed. Westslope cutthroat trout were detected at only one site located in the transitional reaches of the watershed. The population appears to be reproducing as evidenced by multiple age-classes. However, cutthroat trout were outnumbered by a ratio of 4:1 or 5:1 by brook trout at the site. Genetic testing of 25 westslope cutthroat trout indicated the fish comprise a genetically pure population (personal correspondence, M. Deleray, Montana Fish, Wildlife & Parks).

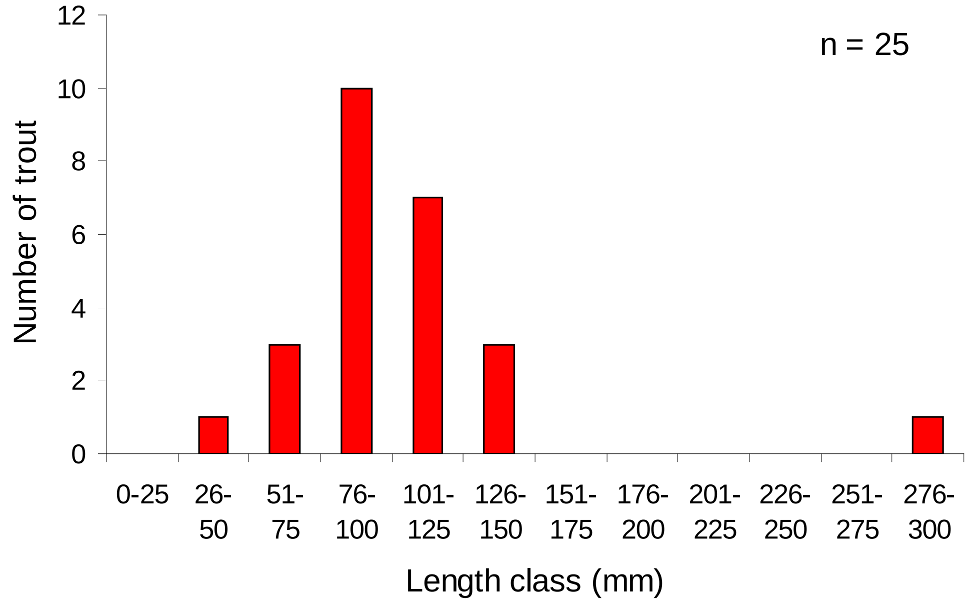

Figure 1-5. Length-frequency distribution of cutthroat trout captured in Haskill Creek during fall 2001.

APPENDIX A
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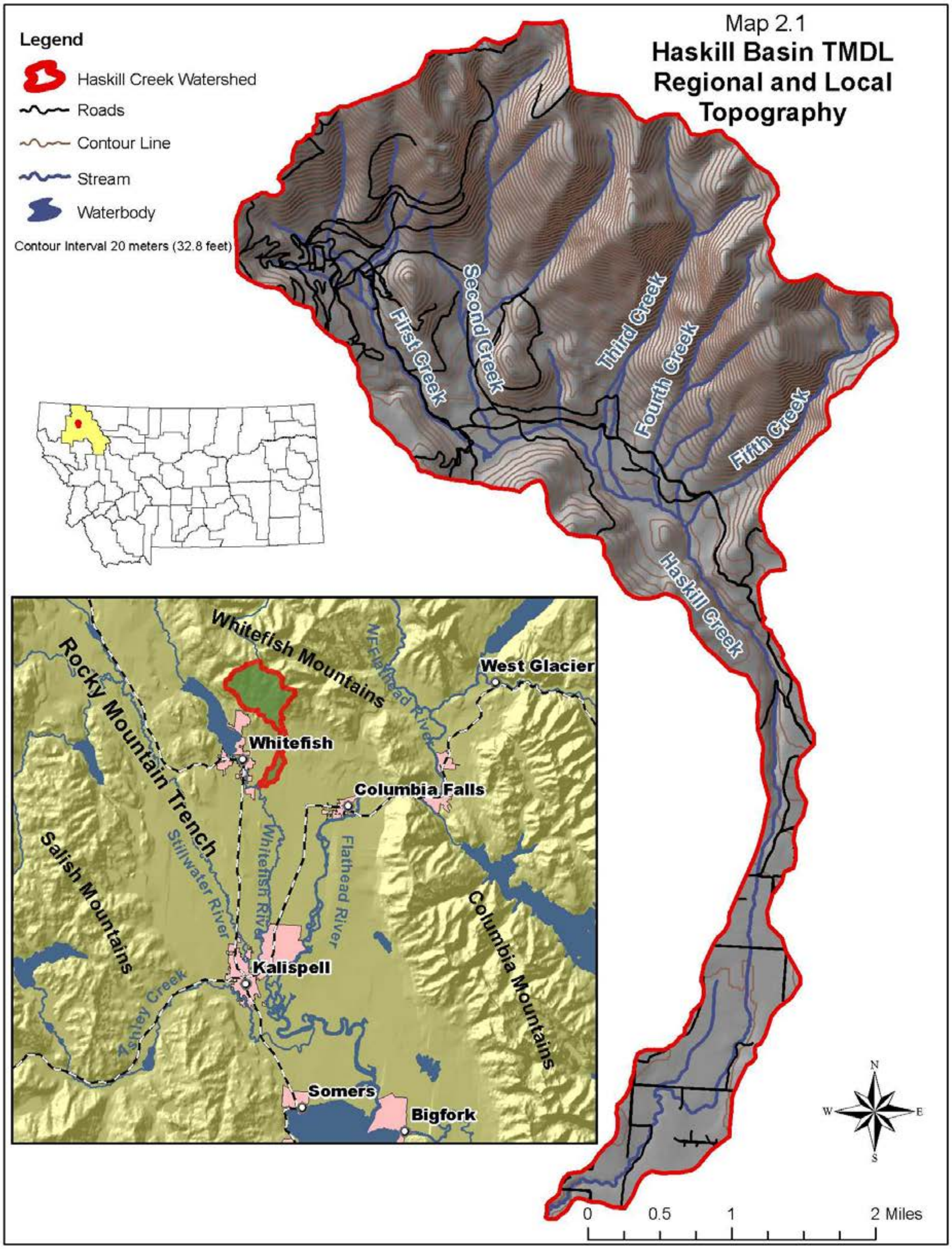
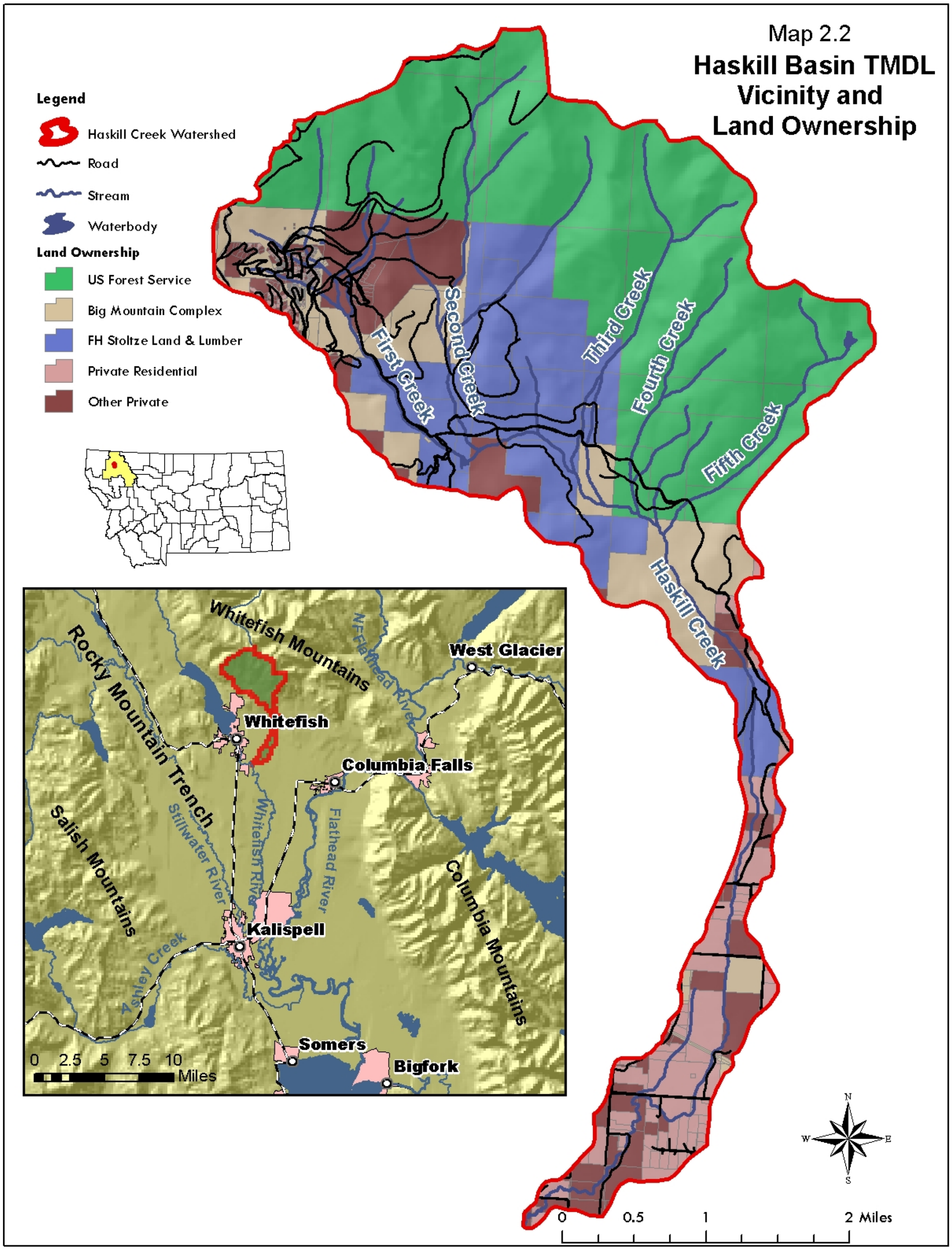
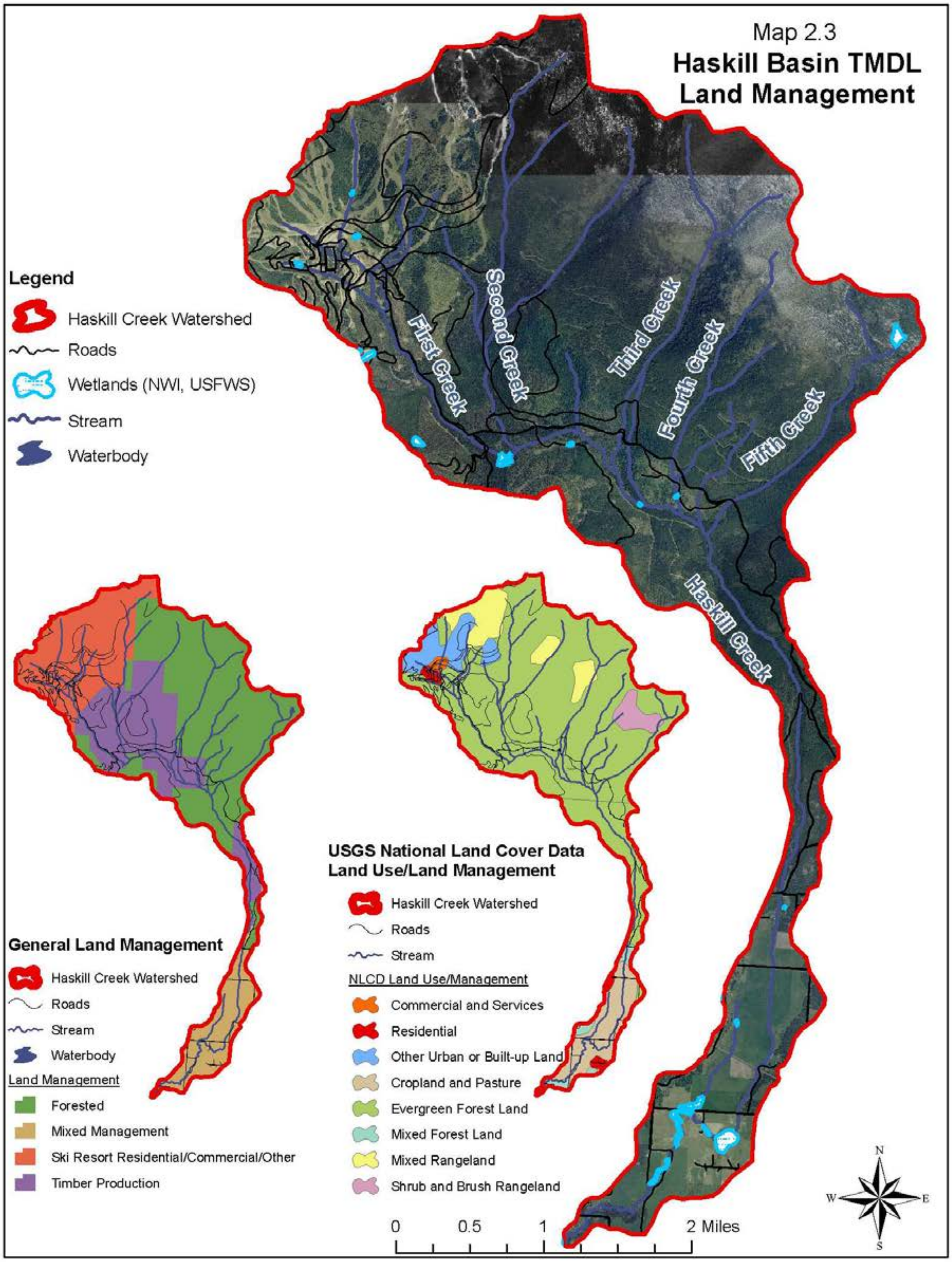
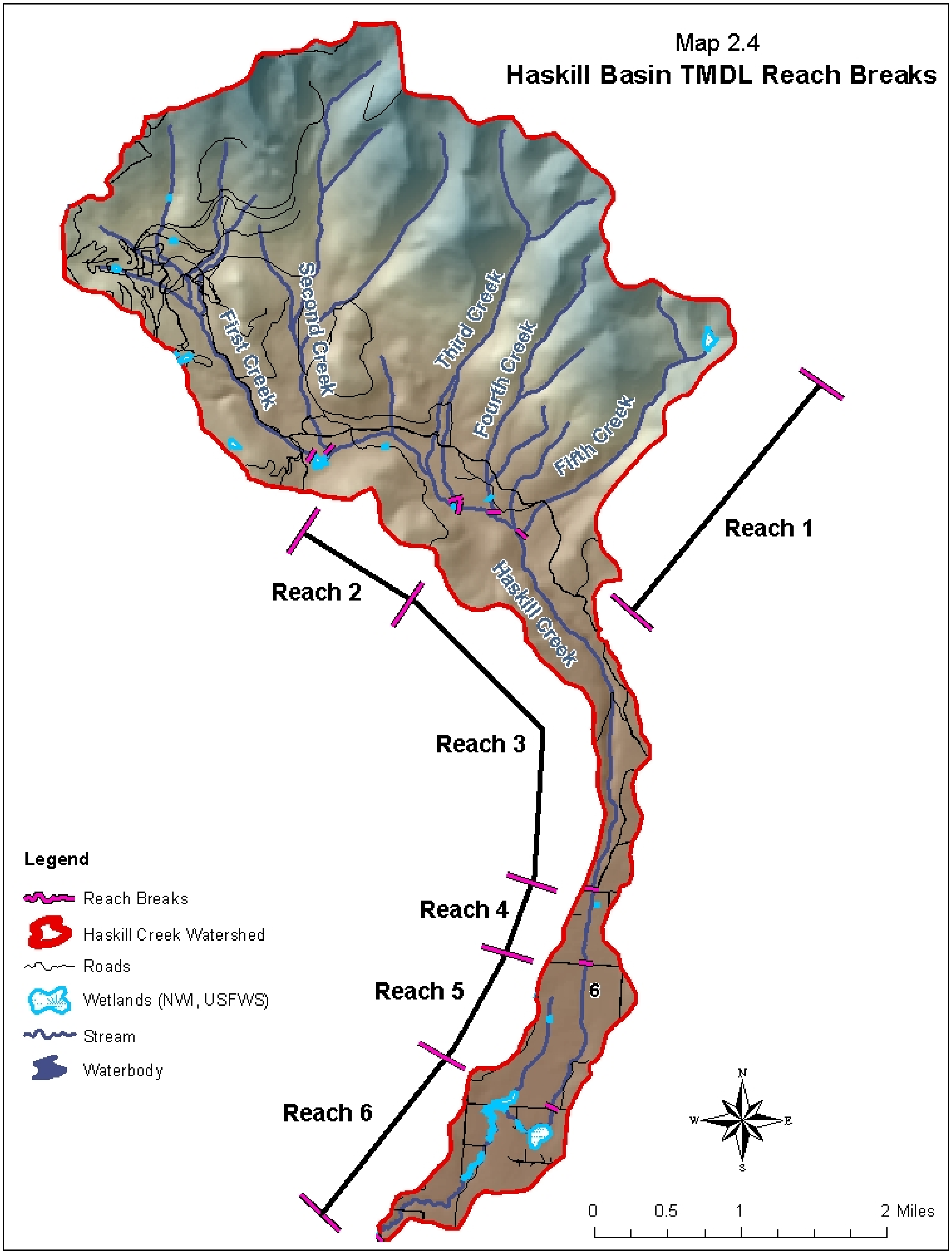
APPENDIX B
GIS MAPS


Map 2.1
Haskill Basin TMDL
Regional and Local
Topography
Legend
Haskill Creek Watershed
Roads
Contour Line
Stream
Waterbody
Contour Interval 20 meters (32.8 feet)
First Creek
Second Creek
Third Creek
Fourth Creek
Fifth Creek
Haskill Creek
Whitefish Mountains
Rocky Mountain Trench
Salish Mountains
Columbia Mountains
West Glacier
Whitefish
Columbia Falls
Kalispell
Somers
Bigfork
Stillwater River
Whitefish River
Flathead River
Ashley Creek
N
S
E
W
0
0.5
1
2 Miles


Map 2.2
Haskill Basin TMDL Vicinity and Land Ownership
Legend
Haskill Creek Watershed
Road
Stream
Waterbody
Land Ownership
US Forest Service
Big Mountain Complex
FH Stoltze Land & Lumber
Private Residential
Other Private
First Creek
Second Creek
Third Creek
Fourth Creek
Fifth Creek
Haskill Creek
Whitefish Mountains
Rocky Mountain Trench
Salish Mountains
Columbia Mountains
West Glacier
Whitefish
Columbia Falls
Kalispell
Somers
Bigfork
Stillwater River
Whitefish River
Flathead River
NF Flathead River
Ashley Creek
0 2.5 5 7.5 10 Miles
N
W
E
S
0 0.5 1 2 Miles


Map 2.3
Haskill Basin TMDL
Land Management
Legend
Haskill Creek Watershed
Roads
Wetlands (NWI, USFWS)
Stream
Waterbody
First Creek
Second Creek
Third Creek
Fourth Creek
Fifth Creek
Haskill Creek
General Land Management
Haskill Creek Watershed
Roads
Stream
Waterbody
Land Management
Forested
Mixed Management
Ski Resort Residential/Commercial/Other
Timber Production
USGS National Land Cover Data
Land Use/Land Management
Haskill Creek Watershed
Roads
Stream
NLCD Land Use/Management
Commercial and Services
Residential
Other Urban or Built-up Land
Cropland and Pasture
Evergreen Forest Land
Mixed Forest Land
Mixed Rangeland
Shrub and Brush Rangeland
0
0.5
1
2 Miles
N
E
S
W



Map 2.4
Haskill Basin TMDL Reach Breaks
First Creek
Second Creek
Third Creek
Fourth Creek
Fifth Creek
Haskill Creek
Reach 1
Reach 2
Reach 3
Reach 4
Reach 5
Reach 6
Legend
Reach Breaks
Haskill Creek Watershed
Roads
Wetlands (NWI, USFWS)
Stream
Waterbody
N
W
E
S
0
0.5
1
2 Miles