Tenderfoot Creek Experimental Forest Metadata Report (TEN)

Missoula, Montana

Created by E:\lter\climhy\sitePDF.pl
on Mon Jan 12 13:05:58 2009

Research Area Information

Tenderfoot Creek Experimental Forest .....TEN

Tenderfoot Creek Experimental Forest

Research Area Information

Harvest URL - Option 1

ftp://ftp.forestry.umt.edu/special/hydrodb/ten_data.txt

Site URL

http://www.fs.fed.us/rm/ecology/demo/tenderfoot/

Site north bounding coordinate (decimal degree) 46.95776

Site west bounding coordinate (decimal degree) .....-110.94757

Site south bounding coordinate (decimal degree) 46.89142

Site east bounding coordinate (decimal degree) .....-110.83292

Experimental Design

The Tenderfoot Research Project was designed to test an array of 2-aged management treatments for regenerating and restoring healthy lodgepole pine forests through emulation of natural disturbance processes, but avoiding catastrophic-scale disturbances. The project was developed to determine the effects of shelterwood with reserve harvest systems including prescribed burnining on regeneration response, growth and survival of regenerated trees, growth response of residual overstory, water production, changes in water chemistry, and suspended sediment production. Two harvest treatments are being tested (1) shelterwood with reserves with even distribution and (2) shelterwood with reserves with group or clumpy distribution of reserve trees. For each silvicultural treatment there are four replications of each with prescribed underburning and four replications with no underburning. Two uncut units with prescribed burning are used to compare results with the harvest and burn treatments. Water production is being measured with water level recorders at 15 minute intervals and water chemistry is manually collected and measured periodically. Suspended sediment production is measured daily with automatic sediment samplers.

Publications

http://www.fs.fed.us/rm/ecology/publications/

USGS Harvest URL

http://gce-lter.marsci.uga.edu/harvest/usgs/ten_lter.txt

Meteorlogical Stations

Onion Park Met Station ..... ONION
Stringer Creek Met Station ..... STRINGER

Onion Park Met Station

Meteorological Station

Latitude (decimal degrees) 46.913450
Longitude (decimal degrees) .....-110.852700
Elevation (meters; a.m.s.l.) 2259
Exposure (degrees) 35
Wind Exposure (degrees azimuth) 45
Begin Date..... 10/1/1993
End Date..... Present

Topography

gentle 5% slope

Surface

grass

Area Description

The ONION Park site is located in a 2.5 ha meadow surrounded by a dense stand of lodgepole pine, Engelmann spruce, and subalpine fir.

History

The ONION Park weather station was established in water year 1994. In water year 2001 the weather station was converted to a SNOTEL site. During the 2001 SNOTEL installation in Onion Park, several small trees were removed from the general area of the site but not from the actual site of the instruments.

Precipitation

Begin Date..... 10/1/1993
End Date..... Present

Instrumentation Description

SNOTEL Site

Stringer Creek Met Station

Meteorological Station

Latitude (decimal degrees) 46.926950
Longitude (decimal degrees) .....-110.901300
Elevation (meters; a.m.s.l.) 2008
Exposure (degrees) 35
Wind Exposure (degrees azimuth) 20
Begin Date..... 10/1/1995
End Date..... Present

Topography

valley bottom

Surface

mineral soil

Area Description

The STRINGER Creek site is located within an existing road corridor that was established in the early 1960's and is not used for vehicle traffic.

History

The STRINGER Creek weather station sites was established in water year 1994 and converted to a SNOTEL site in 2001. Date are available from October 1, 1995 to the present day.

Precipitation

Begin Date..... 10/1/1995
End Date..... Present

Instrumentation Description

SNOTEL Site

Watershed

Bubbling Creek Watershed.....BUBBLING
Lonesome Creek Watershed ..... LONESOME
Pack Creek Watershed.....PACK
Passionate Creek Watershed .....PASSIONATE
Spring Park Watershed.....SPRPARK
Stringer Creek Watershed ..... STRINGER
Sun Creek Watershed ..... SUN
Tenderfoot Creek Watershed .....TFOOT

Bubbling Creek Watershed

Watershed Spatial Characteristics

North bounding coordinate (decimal degrees) 46.922495
West bounding coordinate (decimal degrees) .....-110.907268
South bounding coordinate (decimal degrees) 46.898313
East bounding coordinate (decimal degrees) .....-110.884814
Area (hectares) 318
Aspect (degrees azmuth) 10
Minimum watershed elevation (meters; a.m.s.l) 2048
Maximum watershed elevation (meters; a.m.s.l) 2294

Watershed Ecological Characteristics

Mean annual precipitation (millimeters) 802
Slope (Percent) 10.93
Slope description

zonal statistics calculated from 30m DEM

Channel length (meters) 1609
Channel length description

Channel length is for perennial streams. Length estimates derived from Lewis and Clark National Forest hydrography dataset.

Drainage density (km/km2) 0.51
Mean snowpack description

401 mm SWE

Watershed Descriptions

Pre-treatment vegetation

Barren Ground <1 Grassland <1%, Shrubland <1%, Spruce-Fir Forest 36%, Lodge-pole Pine Forest 53%, Low Density / Disturbed Forsest 12%,

Pre-treatment description

See Tenderfoot Watershed description for more details

Soil description

See Tenderfoot Watershed description for more details

Geology description

See Tenderfoot Watershed description for more details

Succession description

See Tenderfoot Watershed description for more details

Lonesome Creek Watershed

Watershed Spatial Characteristics

North bounding coordinate (decimal degrees) 46.916608
West bounding coordinate (decimal degrees) .....-110.947584
South bounding coordinate (decimal degrees) 46.893484
East bounding coordinate (decimal degrees) .....-110.921236
Area (hectares) 311
Aspect (degrees azmuth) 350
Minimum watershed elevation (meters; a.m.s.l) 2065
Maximum watershed elevation (meters; a.m.s.l) 2258

Watershed Ecological Characteristics

Mean annual precipitation (millimeters) 802
Slope (Percent) 9.32
Slope description

zonal statistics calculated from 30m DEM

Channel length (meters) 3310
Channel length description

Channel length is for perennial streams. Length estimates derived from Lewis and Clark National Forest hydrography dataset.

Drainage density (km/km2) 1.07
Mean snowpack description

401 mm SWE

Watershed Descriptions

Pre-treatment vegetation

Barren Ground <1%, Grassland <1%, Shrubland <1%, Spruce-Fir Forest 23%, Lodgepole Pine Forest 75%, Low Density / Disturbed Forsest 2%,

Pre-treatment description

See Tenderfoot Watershed description for more details

Soil description

See Tenderfoot Watershed description for more details

Geology description

See Tenderfoot Watershed description for more details

Succession description

See Tenderfoot Watershed description for more details

Pack Creek Watershed

Watershed Spatial Characteristics

North bounding coordinate (decimal degrees) 46.926919
West bounding coordinate (decimal degrees) .....-110.926621
South bounding coordinate (decimal degrees) 46.896027
East bounding coordinate (decimal degrees) .....-110.904368
Area (hectares) 333
Aspect (degrees azmuth) 10
Minimum watershed elevation (meters; a.m.s.l) 1967
Maximum watershed elevation (meters; a.m.s.l) 2258

Watershed Ecological Characteristics

Mean annual precipitation (millimeters) 789
Slope (Percent) 13.42
Slope description

zonal statistics calculated from 30m DEM

Channel length (meters) 2354
Channel length description

Channel length is for perennial streams. Length estimates derived from Lewis and Clark National Forest hydrography dataset.

Drainage density (km/km2) 0.71
Mean snowpack description

395 mm SWE

Watershed Descriptions

Pre-treatment vegetation

Barren Ground <1%, Grassland 1%, Shrubland <1%, Spruce-Fir Forest <1%, Lodgepole Pine Forest 93%, Low Density / Disturbed Forsest 5%,

Pre-treatment description

See Tenderfoot Watershed description for more details

Soil description

See Tenderfoot Watershed description for more details

Geology description

See Tenderfoot Watershed description for more details

Succession description

See Tenderfoot Watershed description for more details

Passionate Creek Watershed

Watershed Spatial Characteristics

North bounding coordinate (decimal degrees) 46.949863
West bounding coordinate (decimal degrees) .....-110.922688
South bounding coordinate (decimal degrees) 46.929849
East bounding coordinate (decimal degrees) .....-110.898361
Area (hectares) 201
Aspect (degrees azmuth) 230
Minimum watershed elevation (meters; a.m.s.l) 1922
Maximum watershed elevation (meters; a.m.s.l) 2236

Watershed Ecological Characteristics

Mean annual precipitation (millimeters) 802
Slope (Percent) 17.78

Slope description

zonal statistics calculated from 30m DEM

Channel length (meters) 1776

Channel length description

Channel length is for perennial streams. Length estimates derived from Lewis and Clark National Forest hydrography dataset.

Drainage density (km/km2) 0.88

Mean snowpack description

401 mm SWE

Watershed Descriptions

Pre-treatment vegetation

Barren Ground <1%, Grassland <1%, Shrubland <1%, Spruce-Fir Forest <1%, Lodgepole Pine Forest 97%, Low Density / Disturbed Forsest 2%,

Pre-treatment description

See Tenderfoot Watershed description for more details

Soil description

See Tenderfoot Watershed description for more details

Geology description

See Tenderfoot Watershed description for more details

Succession description

See Tenderfoot Watershed description for more details

Spring Park Watershed

Watershed Spatial Characteristics

North bounding coordinate (decimal degrees) 46.946247
West bounding coordinate (decimal degrees) .....-110.882204
South bounding coordinate (decimal degrees) 46.923059
East bounding coordinate (decimal degrees) .....-110.852781
Area (hectares) 418
Aspect (degrees azmuth) 210
Minimum watershed elevation (meters; a.m.s.l) 2117
Maximum watershed elevation (meters; a.m.s.l) 2419

Watershed Ecological Characteristics

Mean annual precipitation (millimeters) 825
Slope (Percent) 15.07

Slope description

zonal statistics calculated from 30m DEM

Channel length (meters) 2176

Channel length description

Channel length is for perennial streams. Length estimates derived from Lewis and Clark National Forest hydrography dataset.

Drainage density (km/km2) 0.52

Mean snowpack description

413 mm SWE

Watershed Descriptions

Pre-treatment vegetation

Barren Ground <1%, Grassland 2%, Shrubland <1%, Spruce-Fir Forest 36%, Lodgepole Pine Forest 60%, Low Density / Disturbed Forsest 2%,

Pre-treatment description

See Tenderfoot Watershed description for more details

Soil description

See Tenderfoot Watershed description for more details

Geology description

See Tenderfoot Watershed description for more details

Succession description

See Tenderfoot Watershed description for more details

Stringer Creek Watershed

Watershed Spatial Characteristics

North bounding coordinate (decimal degrees) 46.957775

West bounding coordinate (decimal degrees) .....-110.901834

South bounding coordinate (decimal degrees) 46.926391

East bounding coordinate (decimal degrees) .....-110.869728

Area (hectares) 555

Aspect (degrees azmuth) 200

Minimum watershed elevation (meters; a.m.s.l) 2014

Maximum watershed elevation (meters; a.m.s.l) 2418

Watershed Ecological Characteristics

Mean annual precipitation (millimeters) 822

Slope (Percent) 16.83

Slope description

zonal statistics calculated from 30m DEM

Channel length (meters) 5250

Channel length description

Channel length is for perennial streams. Length estimates derived from Lewis and Clark National Forest hydrography dataset.

Drainage density (km/km2) 0.95

Mean snowpack description

411 mm SWE

Watershed Descriptions

Pre-treatment vegetation

Barren Ground 1%, Grassland 2%, Shrubland 1%, Spruce-Fir Forest <1%, Lodge-pole Pine Forest 85%, Low Density / Disturbed Forsest 11%,

Pre-treatment description

See Tenderfoot Watershed description for more details

Soil description

See Tenderfoot Watershed description for more details

Geology description

See Tenderfoot Watershed description for more details

Succession description

See Tenderfoot Watershed description for more details

Sun Creek Watershed

Watershed Spatial Characteristics

North bounding coordinate (decimal degrees) 46.919556

West bounding coordinate (decimal degrees) .....-110.890860

South bounding coordinate (decimal degrees) 46.891402

East bounding coordinate (decimal degrees) .....-110.868483

Area (hectares) 347

Aspect (degrees azmuth) 10

Minimum watershed elevation (meters; a.m.s.l) 2146

Maximum watershed elevation (meters; a.m.s.l) 2364

Watershed Ecological Characteristics

Mean annual precipitation (millimeters) 845

Slope (Percent) 10.44

Slope description

zonal statistics calculated from 30m DEM

Channel length (meters) 3580

Channel length description

Channel length is for perennial streams. Length estimates derived from Lewis and Clark National Forest hydrography dataset.

Drainage density (km/km2) 1.03

Mean snowpack description

423 mm SWE

Watershed Descriptions

Pre-treatment vegetation

Barren Ground 4%, Grassland 2%, Shrubland <1%, Spruce-Fir Forest 14%, Lodgepole Pine Forest 70%, Low Density / Disturbed Forsest 10%,

Pre-treatment description

See Tenderfoot Watershed Description for more details

Soil description

See Tenderfoot Watershed Description for more details

Geology description

See Tenderfoot Watershed Description for more details

Succession description

See Tenderfoot Watershed Description for more details

Tenderfoot Creek Watershed

Watershed Spatial Characteristics

North bounding coordinate (decimal degrees) 46.957780

West bounding coordinate (decimal degrees) .....-110.907280

South bounding coordinate (decimal degrees) 46.891355

East bounding coordinate (decimal degrees) .....-110.832812

Area (hectares) 2310

Aspect (degrees azmuth) 270

Minimum watershed elevation (meters; a.m.s.l) 1991

Maximum watershed elevation (meters; a.m.s.l) 2419

Watershed Ecological Characteristics

Mean annual precipitation (millimeters) 824

Slope (Percent) 14.19

Slope description

zonal statistics calculated from 30m DEM

Channel length (meters) 17,886

Channel length description

Channel length is for perennial streams. Length estimates derived from Lewis and Clark National Forest hydrography dataset.

Drainage density (km/km2) 0.77

Mean snowpack description

412 mm SWE

Watershed Descriptions

Pre-treatment vegetation

The Tenderfoot Creek Experimental Forest encompasses 3693 hectares (9,125 acres) at the headwaters of Tenderfoot Creek in the Little Belt Mountains on the Lewis and Clark National Forest in Meagher Country, Montana. It is approximately 64 kilometers (40 miles) north of White Sulphur Springs, Montana, or 114 kilometers (71 miles) southeast of Great Falls, Montana.This upper portion of the tenderfoot Creek watershed is heavily forested. Lodgepole pine (Pinus contorta) and mixed lodgepole pine with Engelmann spruce (Picea engelmannii) and subalpine fir (Abies lasiocarpa) stands are the dominant forest types and occupy about 95% (3,514 ha) of the experimental forest. Wet, irregularly shaped meadows are interspersed throughout the forest but only cover approximately 3.5% (125 ha), of the area. High, exposed hillsides with scree slopes and some dry grass communities make up the remaining 1.5% (54 ha) of the research area.

Pre-treatment description

Lodgepole pine stands on the experimental forest form a mosaic, typical of fire-prone upland forests at moderate to high altitudes in the Northern Rocky Mountains. The forest stands are classified as 1-aged (47% of the forested area) and 2-aged (53% of the forested area) which were created by past stand replacement and mixed severity fires. Engelmann spruce (Picea engelmannii) grows in the area"s sparse but species-rich wetlands, while whitebark pine (Pinus albicaulis) and sub-alpine fir (Abies lasiocarpa) grace the higher ridge tops. Average stocking density is 2150 stems/ha (870 stems/ac) Average basal area is 46 m2/ha (200 ft2/ac) LAI of dominant species: lodgepole pine = 2.8, spruce-fir = 3.0

Soil description

The most extensive soil groups are the loamy skeletal, mixed Typic Cryochrepts

and clayey, mixed Aquic Cryoboralfs. Rock talus slopes are prominent on the perimeter of the landscape, but rock outcrops are confined chiefly to areas adjacent to main stream channels. Soils in the grassland parks range from well to poorly drained. Seeps and springs are common over the entire Experimental Forest. No depth or porosity information is available at this time.

Geology description

The geology of the Tenderfoot Creek Experimental Forest is simple in terms of the rock and sediment units present and the geologic structure of the area. By contrast, the geologic history records a complex series of events that has influenced both the succession of rock units and the erosion that has produced the present physiography of the area. The rock units are exposed in the area and the surficial sediments that mantle the forest provide evidence of the history of events that led to the present configuration. The geology is characterized by igneous intrusive sills of quartz porphyry, Wolsey shales, Flathead quartzite, and granite gneiss. The northern part of the forest occupies the highest elevations and steepest upland topography and is underlain by igneous intrusive granitic rocks. The arched bedrock in the area was formed from metasediments of Cambrian Age consisting mainly of argillites and quartzites. Glaciation has influenced the landform producing broad basins in which the streams are beginning to regain a water-carved dendritic pattern.

Treatment History

Forest treatments in Sun Creek and Spring Park Creek sub-watersheds were initiated in fall of 1999 and completed in summer or 2000. Burning within treatments occurred in 2002 and 2003.

Succession description

Four forest habitat types are present on the Tenderfoot Creek Experimental Forest: subalpine fir/grouse whortleberry; subalpine fir/blue huckleberry; subalpine fir/ bluejoint; subalpine fir-whitebark pine/grouse whortleberry. Besides these four climax types, a portion of the Forest keys to the lodgepole pine/huckleberry community type. In this case, however, the community type is attributable to the subalpine fir/grouse whortleberry habitat type because of the extensive and continuous presence of fir regeneration and old growth throughout the Forest. Within each habitat type there are stands of different age classes occurring intermittently throughout the Forest. There are also four other general land descriptions classified for the forest: talus slopes, rock outcrops, grassland parks and wet meadows.

Comparison description

Recently installed treatment units are located in two sub-watersheds 1) Sun Creek which flows north into Tenderfoot Creek and 2) Spring Park Creek which flows south into Tenderfoot Creek. Sub-watersheds immediately west and adjacent to the treatment sub-watersheds (Bubbling Creek adjacent to Sun Creek and Upper Stringer adjacent to Spring Park Creek) are hydrologically matched with adjoining treatment sub-watersheds and are used as control sub-watersheds. The Onion Park RNA, which comprises the headwaters of Tenderfoot Creek and is adjacent and immediately upstream (east) from both treatment sub-watersheds, is also used as a control area.

Gauging Stations

Bubbling Creek Flume ..... BUBBLING
Lonesome Creek Flume ..... LONESOME
Lower Stringer Creek Flume ..... LSTRINGER
Lower Sun Creek Flume ..... LSUN
Lower Tenderfoot Creek Flume ..... LTFOOT
Pack Creek Flume ..... PACK
Passionate Creek Flume ..... PASSIONATE
Spring Park Creek Flume ..... SPRPARK
Upper Stringer Creek Flume ..... USTRINGER
Upper Sun Creek Flume ..... USUN
Upper Tenderfoot Creek Flume ..... UTFOOT

Bubbling Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.92223
Longitude (decimal degrees) .....-110.89540
Elevation (meters; a.m.s.l.) 2051
Begin Date..... 10/1/1993
End Date..... Present
Watershed Area (hectares) 318
Associated Watershed
BUBBLING
Associated meteorological station
ONION
Weir Description
H Flume

Stream Discharge

Begin Date..... 10/1/1993
End Date..... Present
Data Logger Sampling Interval..... 15 minutes
Summary Interval ..... daily
Instrumentation Description
H Flume

Lonesome Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.91365
Longitude (decimal degrees) .....-110.93870
Elevation (meters; a.m.s.l.) 2082
Begin Date..... 9/8/1994
End Date..... Present

Watershed Area (hectares) 311
Associated Watershed
LONESOME
Associated meteorological station
STRINGER
Weir Description
H Flume

Stream Discharge

Begin Date..... 9/8/1994
End Date..... Present
Data Logger Sampling Interval..... 15 minutes
Summary Interval ..... daily
Instrumentation Description
H Flume

Lower Stringer Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.92694
Longitude (decimal degrees) .....-110.90100
Elevation (meters; a.m.s.l.) 2008
Begin Date..... 9/7/1994
End Date..... Present
Watershed Area (hectares) 555
Associated Watershed
STRINGER
Associated meteorological station
STRINGER
Weir Description
H Flume

Stream Discharge

Begin Date..... 9/7/1994

End Date ..... Present
Data Logger Sampling Interval ..... 15 minutes
Summary Interval ..... daily
Instrumentation Description
H Flume

Lower Sun Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.91980
Longitude (decimal degrees) .....-110.87800
Elevation (meters; a.m.s.l.) 2138
Begin Date 10/1/1992
End Date ..... Present
Watershed Area (hectares) 347
Associated Watershed
SUN
Associated meteorological station
ONION
Weir Description
Parshall

Stream Discharge

Begin Date 10/1/1992
End Date ..... Present
Data Logger Sampling Interval ..... 15 minutes
Summary Interval ..... daily
Instrumentation Description
Parshall

Lower Tenderfoot Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.92693
Longitude (decimal degrees) .....-110.90190
Elevation (meters; a.m.s.l.) 1998
Begin Date..... 10/1/1992
End Date..... Present
Watershed Area (hectares) 2310
Associated Watershed
TFOOT
Associated meteorological station
ONION
Weir Description
Parshall

Stream Discharge

Begin Date..... 10/1/1992
End Date..... Present
Data Logger Sampling Interval..... 15 minutes
Summary Interval ..... daily
Instrumentation Description
Parshall

Pack Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.92719
Longitude (decimal degrees) .....-110.91010
Elevation (meters; a.m.s.l.) 1960
Begin Date..... 8/15/1996
End Date..... Present
Watershed Area (hectares) 333
Associated Watershed
PACK
Associated meteorological station
STRINGER

Weir Description

Parshall

Stream Discharge

Begin Date 8/15/1996
End Date ..... Present
Data Logger Sampling Interval ..... 15 minutes
Summary Interval ..... daily
Instrumentation Description

Parshall

Passionate Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.93003
Longitude (decimal degrees) .....-110.92200
Elevation (meters; a.m.s.l.) 1925
Begin Date 8/21/1996
End Date ..... Present
Watershed Area (hectares) 201
Associated Watershed

PASSIONATE

Associated meteorological station

STRINGER

Weir Description

Cipolletti

Stream Discharge

Begin Date 8/21/1996
End Date ..... Present
Data Logger Sampling Interval ..... 15 minutes
Summary Interval ..... daily
Instrumentation Description

Cipolletti

Spring Park Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.92364
Longitude (decimal degrees) .....-110.88220
Elevation (meters; a.m.s.l.) 2115
Begin Date..... 10/1/1993
End Date..... Present
Watershed Area (hectares) 418
Associated Watershed
SPRPARK
Associated meteorological station
ONION
Weir Description
Parshall

Stream Discharge

Begin Date..... 10/1/1993
End Date..... Present
Data Logger Sampling Interval..... 15 minutes
Summary Interval ..... daily
Instrumentation Description
Parshall

Upper Stringer Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.93484
Longitude (decimal degrees) .....-110.89270
Elevation (meters; a.m.s.l.) 2100
Begin Date..... 8/16/1996
End Date..... Present

Watershed Area (hectares) 391
Associated Watershed
STRINGER
Associated meteorological station
ONION
Weir Description
H Flume

Stream Discharge

Begin Date..... 8/16/1996
End Date..... Present
Data Logger Sampling Interval..... 15 minutes
Summary Interval ..... daily
Instrumentation Description
H Flume

Upper Sun Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.90951
Longitude (decimal degrees) .....-110.87890
Elevation (meters; a.m.s.l.) 2208
Begin Date..... 6/10/1999
End Date..... Present
Watershed Area (hectares) 227
Associated Watershed
SUN
Associated meteorological station
ONION
Weir Description
Open Channel

Stream Discharge

Begin Date..... 6/10/1999

End Date ..... Present
Data Logger Sampling Interval ..... 15 minutes
Summary Interval ..... daily
Instrumentation Description
Open Channel

Upper Tenderfoot Creek Flume

Hydrologic Gauging Station

Latitude (decimal degrees) 46.92016
Longitude (decimal degrees) .....-110.87340
Elevation (meters; a.m.s.l.) 2159
Begin Date 10/1/1992
End Date ..... Present
Watershed Area (hectares) 444
Associated Watershed
TFOOT
Associated meteorological station
ONION
Weir Description
Parshall

Stream Discharge

Begin Date 10/1/1992
End Date ..... Present
Data Logger Sampling Interval ..... 15 minutes
Summary Interval ..... daily
Instrumentation Description
Parshall