UPPER POUDRE WATERSHED RESILIENCE PLAN

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Coalition for the Poudre River Watershed

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1. INTRODUCTION

This document presents an analysis of conditions in the Upper Poudre Watershed and recommends treatments and strategies to improve long-term watershed resilience. The analysis that formed the basis of this plan leads to the identification of specific target areas and prioritization of actions within those areas that would increase watershed resilience.

Why Resilience is Important

Resilience has been defined in terms of natural systems by Holling (1973) as -

> *The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.*

The State of Colorado defines community resilience as –

> *The ability of communities to rebound, positively adapt to, or thrive amidst changing conditions or challenges – including disasters and climate change – and maintain quality of life, healthy growth, durable systems, and conservation of resources for present and future generations.*

Resilience has recently been more widely adopted as an important concept because of the critical role that diverse ecosystems, including forests and streams, play in supplying our communities with life sustaining products and services. Examples of the products communities rely upon include clean water and wood products. Examples of services include mitigation of natural hazards such as fires and floods, recreation opportunities, cultural heritage and aesthetic values, and carbon sequestration. There is a long-term need and desire to maintain or improve these products and services. This is a challenge during a time of a changing climate that will alter precipitation patterns, increase fire risk and likely result in long periods of drought. Despite the reality of these challenges, local communities continue to depend on our forests and watersheds to provide relatively stable outputs, despite natural disturbances that could affect the quantity and quality of these ecosystem services and products.

WATERSHED RESILIENCE

Resilient watersheds are those with structural and biological characteristics that allow them to experience disturbances, moderate the intensity or effects of disturbances, and then recover functionality relatively quickly.

Watershed managers can proactively take actions to protect watersheds from existing and future stresses such as wildfire and climate change by focusing on the characteristics that build watershed resilience. This strategy can guide decisions surrounding development in terms of disruption of hydrologic systems, impacts to riparian zones, and protection of streams from excess flow and sediment.

Example Characteristics of a Resilient Watershed

In-Stream & Riparian Areas

- Natural stream flow regime, including peak and low flows
- Healthy riparian areas with native vegetation
- Intact and connected wetlands
- Functional floodplains connected to streams

Uplands

- Healthy and diverse upland vegetation
- High wildfire hazard areas that are disconnected from other similar areas
- Mix of forest densities including meadows
- Good ground cover with native vegetation
- Wildfire behavior within natural disturbance regimes

Development

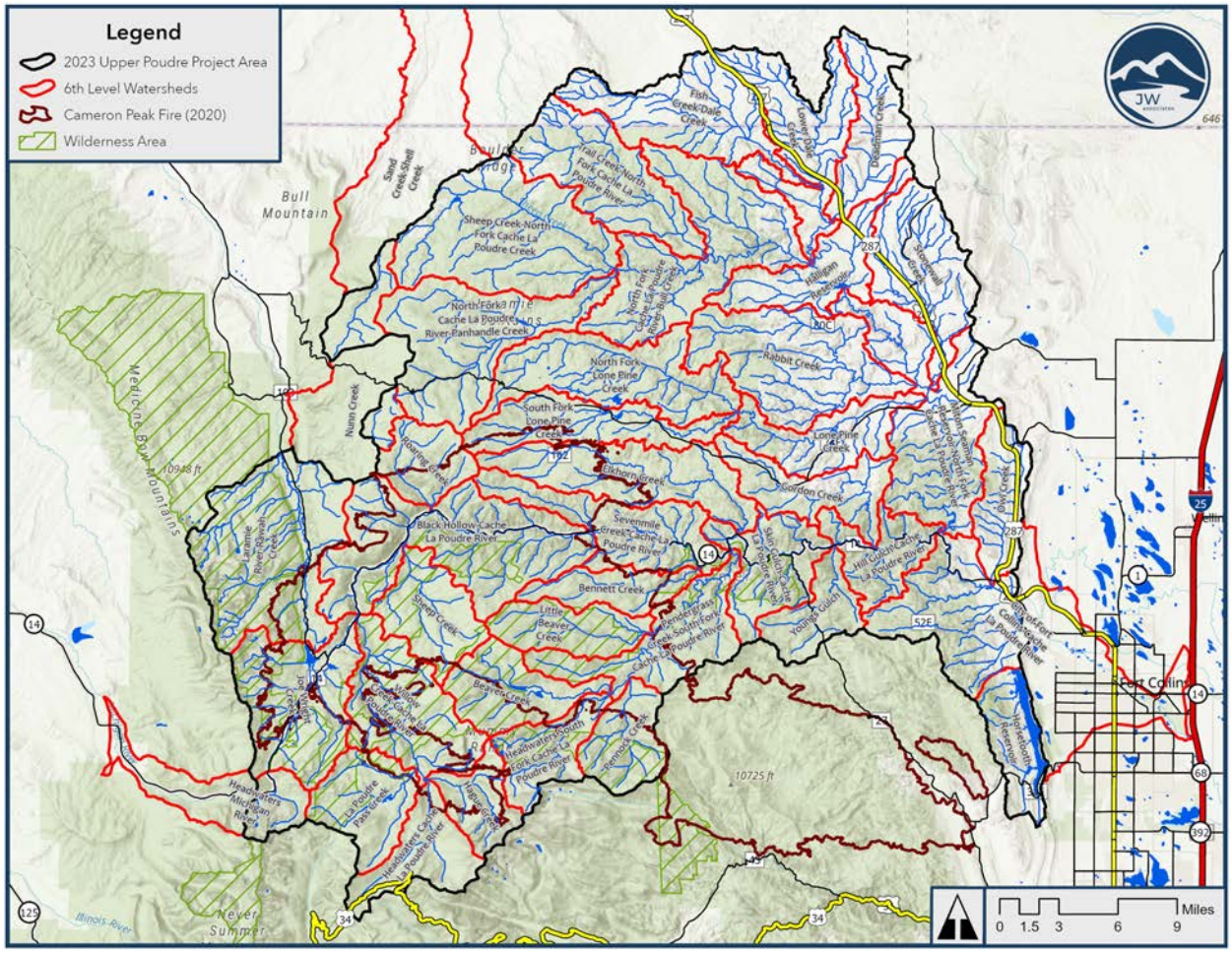
- Minimal impervious or compacted surfaces
- Low road density
- Trails designed to minimize erosion
- Well-designed stream/road and stream/trail crossings
- Well-designed BMPs with a monitoring plan
- Invasive weed prevention and eradication programs

GEOGRAPHIC SCOPE OF THE PLAN

The project area for the Upper Poudre Watershed Resilience Plan includes the watersheds above the mouth of the canyon, west of Fort Collins. The Upper Poudre Watershed is a portion of the fourth-level (8-digit) Cache la Poudre Watershed (HUC 10190007), which drains into the South Platte River. It includes 37 6th Level watersheds (12-digit) across 688,678 acres. The stakeholder group requested the inclusion of a few additional 6th Level watersheds outside of the Upper Poudre Watershed, but whose runoff is diverted into its waters. These include:

- Michigan River: Michigan Ditch diverts water into Joe Wright Creek
- Laramie River: Laramie River Tunnel diverts water into Tunnel Creek
- Nunn Creek: Bob Creek Ditch diverts water into Upper Roaring Creek and Columbine Ditch diverts water into Headwaters North Fork-Panhandle Creek
- Sand Creek-Shell Creek: Wilson Ditch diverts water into Eaton Reservoir on the North Fork of the Poudre River

The 6th Level watersheds were further divided into 7th Level (14-digit HUC) watersheds, establishing the units for this analysis. Sub-dividing into the smaller 7th Level watersheds provides improved accuracy in the identification of areas that have a lower resilience ranking, the specific reasons for their ranking, and the subsequent targeting of projects that could increase both local and overall watershed resilience. From the four 6th Level watersheds requested for inclusion by stakeholders, only the 7th Level watersheds within those areas that impact the water supply infrastructure were added. There are 397 7th Level watersheds in this analysis. The total area for the updated assessment encompasses 41 6th Level watersheds that cover 739,858 acres (Map 1 and Appendix A).



Map 1. Upper Poudre Watershed Project Area

STAKEHOLDER PROCESS

The Plan was developed through a stakeholder review and revision process. The Coalition for the Poudre River Watershed (CPRW) led the stakeholder process and began discussions prior to development of the technical analysis. The Stakeholder Group includes a number of key agencies, groups, citizens and other organizations (shown in the graphic below). Following the development of a draft plan, this group provided guidance for revisions and reviewed progress during two collaborative meetings in 2023.

VALUES FOR ANALYSIS

The analysis considers three watershed values that functionally describe the resilient condition of a watershed. These values are used to evaluate conditions in the existing watershed and target where hazardous conditions could develop. These values are

Value A: Resilient Uplands
Value B: Resilient Watersheds and River Corridor
Value C: Reliable Water Supply

Value A: Resilient Uplands

Upland habitats maintain key ecological characteristics that, when healthy and functioning properly, increase the likelihood that the watershed can withstand and recover from natural disturbances. Some of these characteristics include historical disturbance regimes, appropriate forest canopy cover and age structure, native vegetation, and healthy and diverse soils to support native vegetation, maximize infiltration and reduce runoff volume.

Healthy uplands provide numerous ecosystem benefits and services. They support biodiversity, carbon sequestration, protection against invasive species, and limit sediment delivery to receiving streams. They also provide services for human use including natural resource extraction (such as timber), recreation, and lands for agriculture and grazing.

Uplands are at risk from both natural and human caused disturbances including wildfire, drought, insect and disease outbreaks, floods, development in the Wildland Urban Interface (WUI), land use and landscape segmentation. If their functional ecological characteristics are compromised, the overall resilience of the watershed could be reduced, particularly in those watersheds that are already showing signs of stress.

The components used to evaluate the three factors of upland habitat resilience are illustrated in Figure 1. The analysis is discussed in detail in *Section 3: Resilience Analysis*.

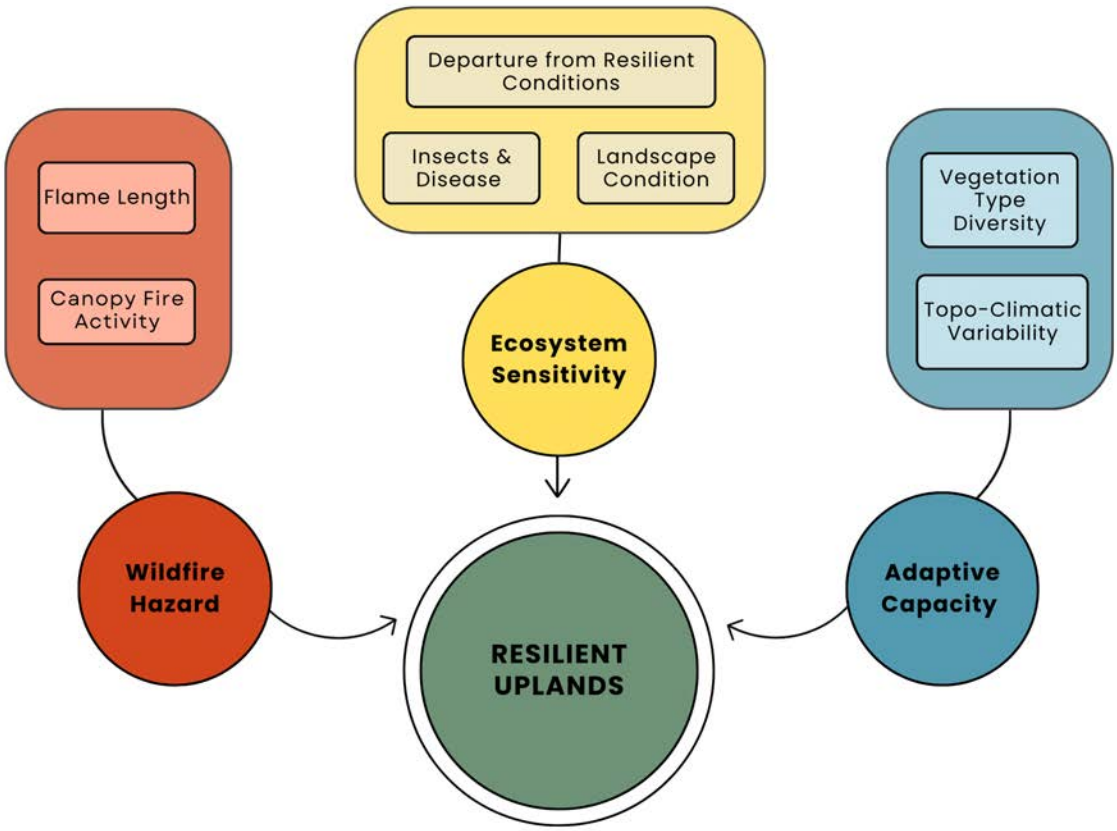


Figure 1. Resilient Uplands Assessment Components

Value B: Resilient Watersheds and River Corridors

Characteristics of the forested uplands dictate watershed health and forest resilience. Hillslopes and roads are two of the main sources of sediment that can impact the river corridor. Riparian ecosystems are the connection point between the forested uplands and the river corridor; when functioning properly, floodplains and riparian vegetation protect downstream habitats and human uses. Some of these include diverse aquatic habitats, appropriate water quality conditions (physical, chemical and biological) and the connection between uplands, the river and the floodplain.

Restoring and maintaining healthy, functioning wetlands where possible, re-connecting the river to its floodplain, and improving the health of riparian vegetation are all vital components to restoring watershed function and improving water quality.

A resilient watershed and river corridor provides numerous ecosystem benefits and services including biodiversity, downstream flood and erosion protection, habitat for native fish, reduced sediment delivery to downstream resources and infrastructure, and recreation. Four factors were used to evaluate the resilience of watersheds and river corridors in the Upper Poudre Watershed and to target areas in need of restoration.

The components used to evaluate the four factors of watershed and river corridor resilience are illustrated in Figure 2. The analysis is discussed in detail in *Section 3: Resilience Analysis*.

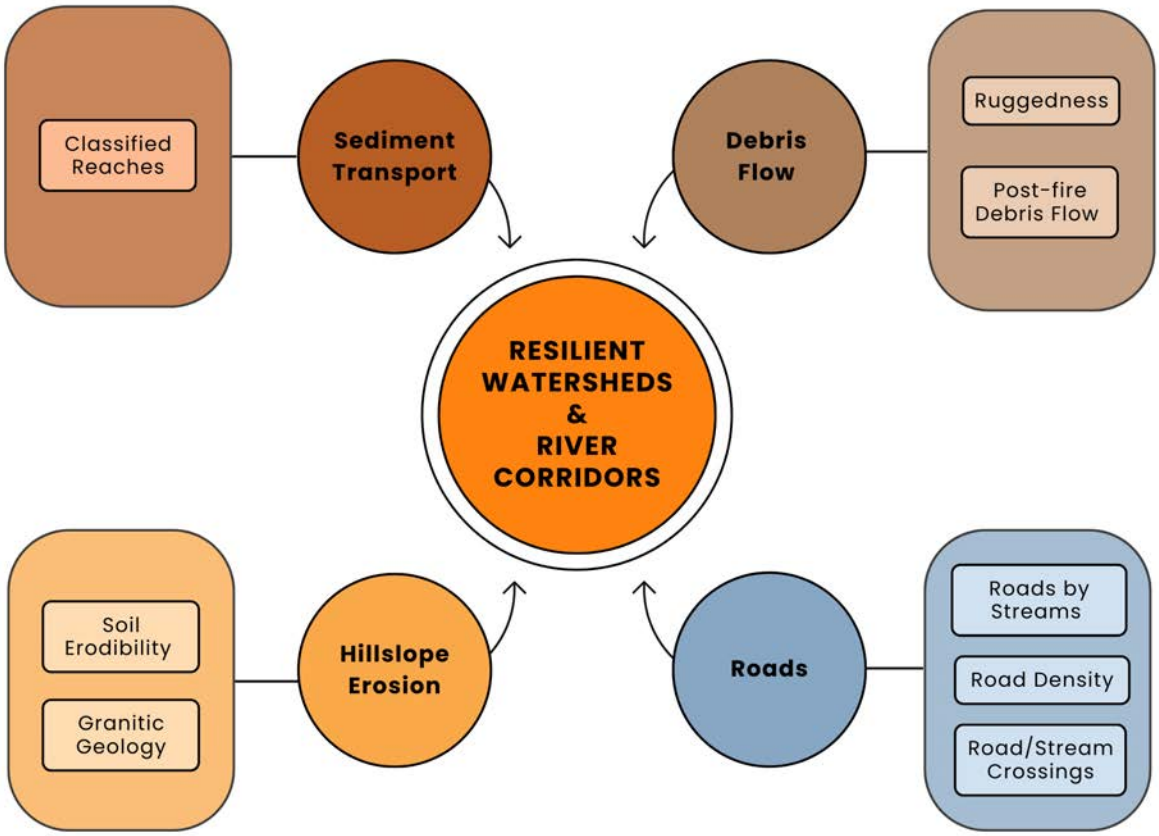


Figure 2. Resilient Watershed & River Corridors Assessment Components

Value C: Reliable Water Supply

The Cache la Poudre River and its tributaries are critical to the municipal water supply for Front Range and local residents. Reliably maintaining this water supply depends on clean water that is free of excess sediment or other pollutants. A clean and reliable water supply provides a predictable source of drinking and irrigation water. The water supply is at risk from both natural and human caused disturbances including wildfire, drought, insect and disease outbreaks, land use, and pollution.

The components are illustrated in Figure 3, and are discussed in detail in *Section 3: Resilience Analysis*

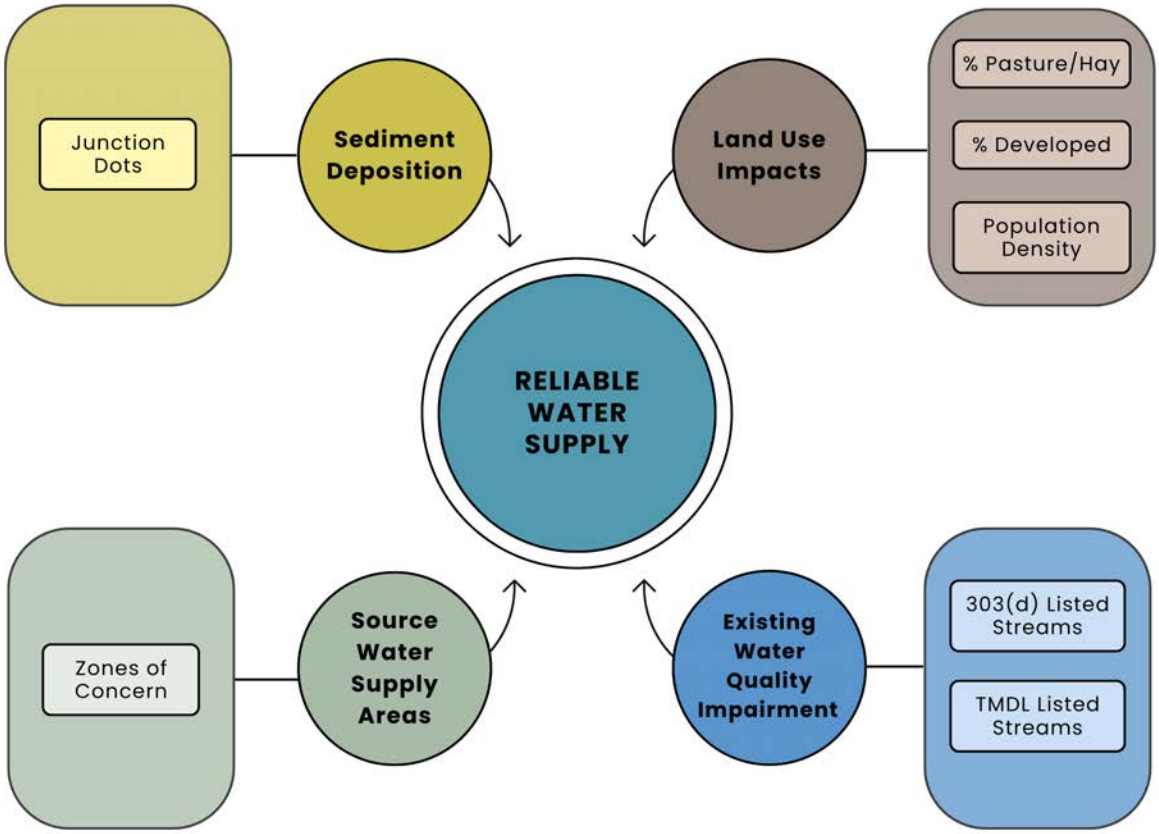


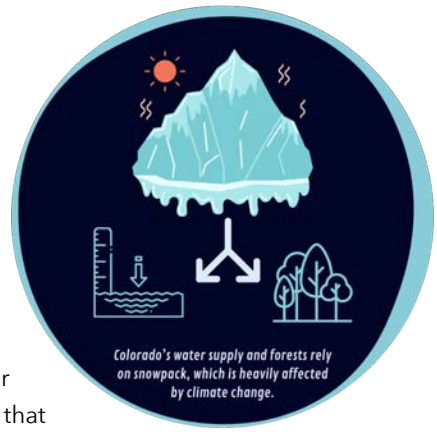
Figure 3. Reliable Water Supply Assessment Components

2. RESILIENT CONDITIONS

This section defines resilient conditions for the Upper Poudre Watershed. The analysis examines resilience for each of the three values: resilient uplands, resilient watersheds and river corridors, and reliable water supply.

Watersheds that have strayed significantly from a resilient condition are more likely to experience hazardous consequences following disturbances, threatening downstream use and watershed function. Climate change and human influences interact with wildfire. Resilient watershed conditions can help moderate these combined effects. This plan utilizes the comparison to resilient conditions described below to identify areas in need of protection and restoration.

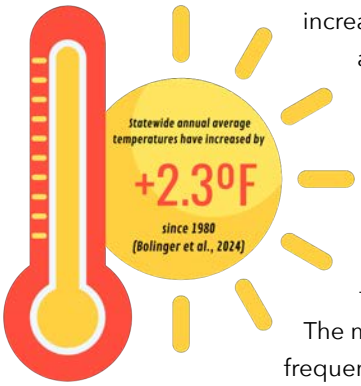
THE IMPACT OF CLIMATE CHANGE AND FUTURE CONDITIONS



Colorado is one of the many states in the west that rely on a dependable winter snowpack to provide a sustainable water for its population. Streams and rivers supply 83% of the water used by the ever increasing population of Colorado (CWCB, 2023). This surface water is often stored in reservoirs to be used at drier times of the year. The remaining water supply comes from ground water that is often replenished in the short term by alluvial aquifers that are strongly connected to surface waters. Additionally, the forests and ecosystems of Colorado are highly adapted to the rhythm of a snowpack dominated water cycle.

Researchers have found that temperatures at higher elevations are warming faster than at sea level. Around the world, this will impact communities and ecosystems that are dependent on the winter snowpack for water supply and ecosystem sustainability through the summer and fall months. Warmer winters will have shorter periods of minimum temperatures below freezing. This shrinks the period of time for snowpack accumulation and increases the likelihood that precipitation will fall as rain, rather than snow. Warmer temperatures are also likely to reduce the snowpack during winter months through direct sublimation of the snow surface.

The current trend of statewide annual temperatures in Colorado shows a steep increase beginning in 1900 and accelerating around 1980 (Figure 4). Statewide annual average temperatures have increased by 2.3°F since 1980 (Bolinger et al., 2024). It should be noted that by 1980, the average temperature had already risen significantly from the pre-1900 average.



As we approach mid-century, the Colorado statewide annual average temperatures are likely to warm another 1-4°F, under the medium-low emissions scenario RCP4.5. At this rate, the average year in Colorado will be as warm as the warmest years on record to date. In the Upper Poudre watershed, summer and fall are likely to warm slightly more than winter and spring (Figure 5). These increasing temperatures will further impact changes that the watershed is already experiencing. The magnitude of ecological disturbance is likely to increase in both extent and frequency.

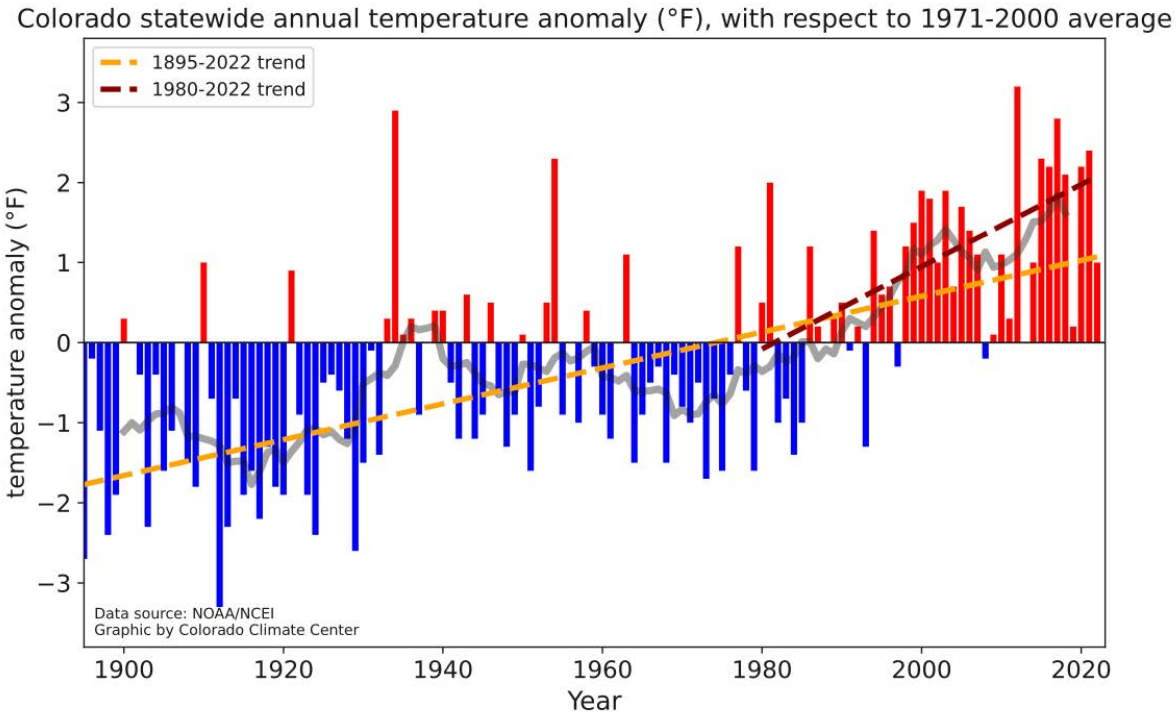


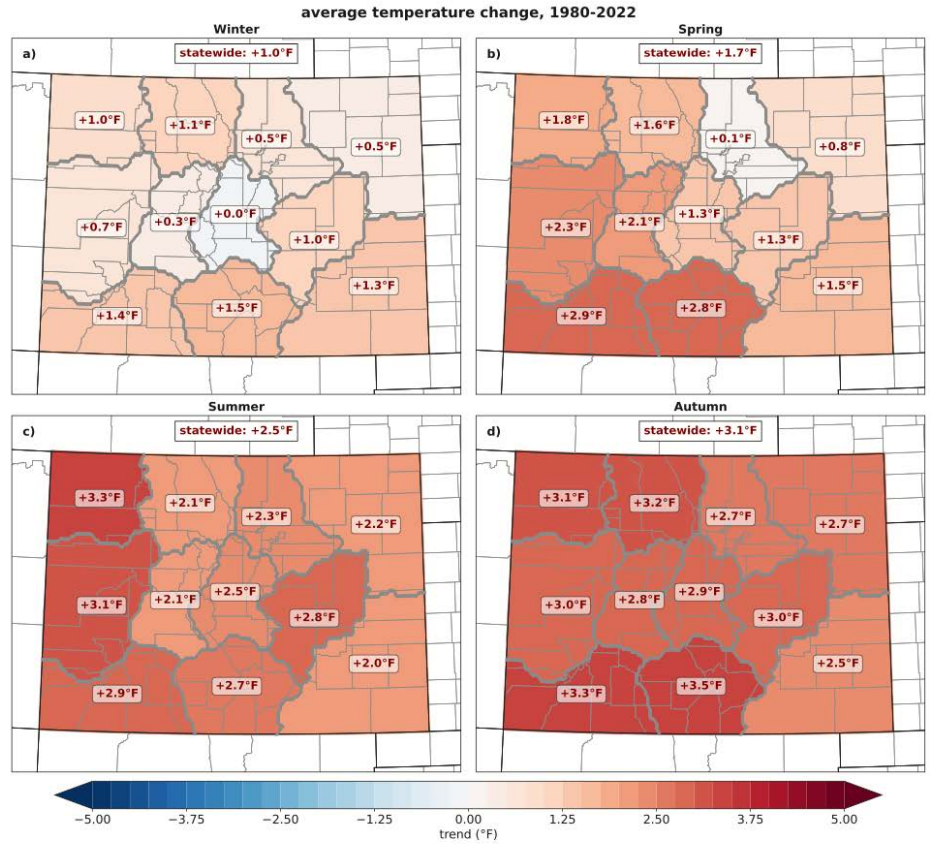
Figure 4. Colorado Statewide Annual Temperature Anomaly[1]

Like a sponge, the atmosphere absorbs available water; evaporative demand of the atmosphere increases with temperature. In Colorado, that effect is projected to increase evaporation by 8-17% since 1950 (Bolinger et al., 2024). This will not only reduce snowpack and alter spring runoff due to direct sublimation from the snow surface and faster and earlier snowmelt, but once soils are exposed, they will dry out more rapidly in the spring. This creates a feedback loop that increases local surface warming: the sun's energy first is used to dry out soils, but when the moisture is depleted that energy goes into direct heating of the soil surface, rather than evaporation.

Impacts from a warming climate will not be limited to higher temperatures but will also include changes in precipitation patterns. These changes will affect the entire ecosystem by altering habitat suitability in both dramatic and subtle ways, impacting both flora and fauna. Just some of the types of alterations that can affect a wide variety of species include changes in stream flows and the timing of runoff, intensity and duration of storms, the frequency and intensity of wildfire, rapid temperature changes that make adaptation to new conditions difficult, availability of sustained soil moisture for spring growth, and stress from heat.

Colorado lies in a transition zone between greater model consensus on future precipitation patterns. The northern US and Canada are likely to see increased annual precipitation, while the Southwestern US and Mexico will have lower precipitation. Although precipitation projections are mixed, most models align with an increase in winter precipitation and a decrease in summer precipitation across the state (Bolinger et al., 2024). The Upper Poudre watershed will likely see little change in precipitation amounts in winter and spring but a decrease (-11%) in summer and an increase (+4%) in fall (Figure 5). In addition, it is likely that Colorado will see greater variability in annual precipitation, and more frequent oscillations between very dry and very wet years, such as from 2018 to 2019 (Pendergrass et al., 2017).

[1] Adapted from Figure 2.3 (Bolinger et. al., 2024). The trend lines for 1895-2022 (yellow dashed) and 1980-2022 (red dashed) are included.



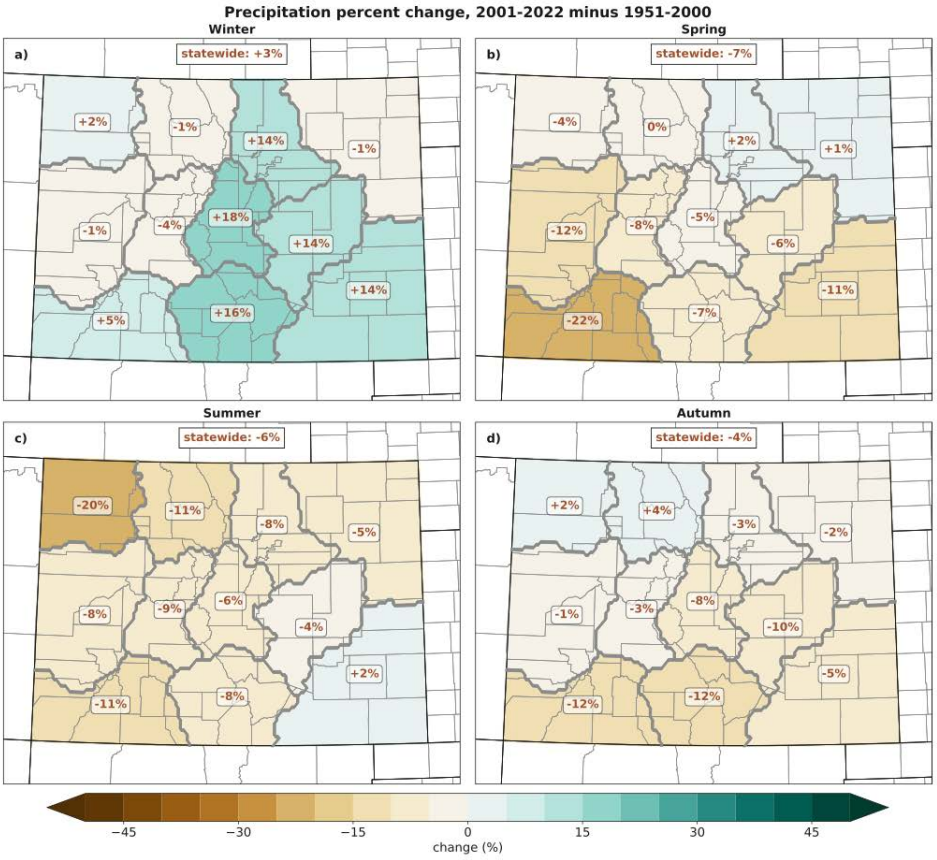


Figure 5. Observed changes in temperature and precipitation by climate divisions[2]

[2] Adapted from Figures 2.4 and 2.11 (Bolinger et. al., 2024). (a) winter, Dec-Feb, (b) spring, March-May, (c) summer, June-Aug, and (d) fall, Sept-Nov.

For the majority of the state, winter precipitation has shown an increase since the start of the century (Figure 5); however, warmer spring temperatures have led to decreases in the April 1st snow water equivalent (SWE) across Colorado's major river basins. This illustrates the effect of increased sublimation and early melting due to rising temperatures, which opposes the expected effect from increased precipitation alone. This shift could be further accelerated by more frequent and intense dust-on-snow events. The expected increase in temperature, combined with dust-on-snow events, is likely to result in increased evaporation throughout the winter, lower spring snowpack, earlier snow melt and runoff, and reduced annual runoff. As temperatures rise, more of the precipitation will fall as rain rather than snow; this, in addition to increased sublimation from the snowpack, reduces the benefit of high snowfall years. Precipitation that is stored in the snowpack until spring runoff is released quickly at a high volume. This melt pulse is more likely to make it through the soil column; as the soils become saturated and can no longer hold all the moisture, the melting water flows into streams as surface water. Precipitation that falls as rain is less likely to oversaturate the soils (Li et al., 2017); instead it may be used by plants or lost to evaporation. Recent studies suggest that every 1°F of warming reduces streamflow in Colorado by 3-5% (Vano and Lettenmaier 2014; Milly and Dunne 2020).

	Current Trends: Compared to 1951-2000	Future Projections: Compared to 1971-2000
Temperature	Statewide annual average temperatures have increased by 2.3°F since 1980, with the most warming in the fall.	By 2050: Temperatures will increase by 2.5°F to 5.5°F By 2070: Temperatures will increase by 3.0°F to 6.5°F
Precipitation	Northwest Colorado: summer precipitation has decreased 20% Southwest Colorado: spring precipitation has decreased 22%	Although precipitation projections are mixed, most models align with an increase in winter precipitation and a decrease in summer precipitation across Colorado.
Snow Water Equivalent (SWE)	April 1 SWE has decreased by 3% to 23%	By 2050: Decrease in April 1 SWE of 5% to 30%
Streamflow	Annual streamflow in all major Colorado river basins has declined by 3% to 19%	By 2050: Seasonal runoff peak will shift earlier by 1–4 weeks. Summer and Fall streamflows will therefore decline significantly.

Climate warming will reduce the total annual streamflow volume and will also shift the timing of snowmelt, and therefore peak streamflow. Bolinger et al. (2024) estimates that by 2050 the timing of these events will shift by 1-4 weeks. The hydrography will begin to peak in May, rather than June, and decline more quickly in the late summer months. Baseflows over the fall and winter will also likely be lower. Dust-on-snow events, which both increase evaporation and accelerate melting, will compound this shift, especially affecting Colorado's southwestern river basins (Deems et al. 2013; Painter et al. 2018).

Droughts, which are a natural part of Colorado's ecosystem, are likely to become more intense as higher temperatures increase evaporation and soil moisture loss. Drought and excess heat will put stress on trees and other vegetation, reducing resistance to insects and disease which may lead to larger areas of dead or dying trees, contributing to increased wildfire risk and intensity. Dead trees become large fuels that can increase the intensity of wildfires and make them more difficult to control.

Intense droughts have occurred multiple times in Colorado in the 21st century including in 2002, 2012, 2018, and 2020. These years also saw the largest and most intense wildfires in Colorado history (Figure 6). Since 2000, Colorado has experienced an increase in both the number of wildfires and the total area burned annually; wildfires are also moving up in elevation into lodgepole and spruce-fir dominated forests, which were previously considered to have a low likelihood of burning (Dennison et al. 2014; Jolly et al. 2015; Abatzoglou and Williams 2016; Westerling 2016; Parks and Abatzoglou 2020; Higuera et al. 2021; Parks et al. 2023). The average elevation at which wildfires are occurring has shifted up by over 1,000 feet in elevation between 1984 and 2017, similar to the upwards shift in temperature regimes (Alizadeh et al., 2021). The wildfire season is also expanding, with fires burning in the fall, spring, and even winter; this trend is likely to continue (Bolinger et al., 2024).

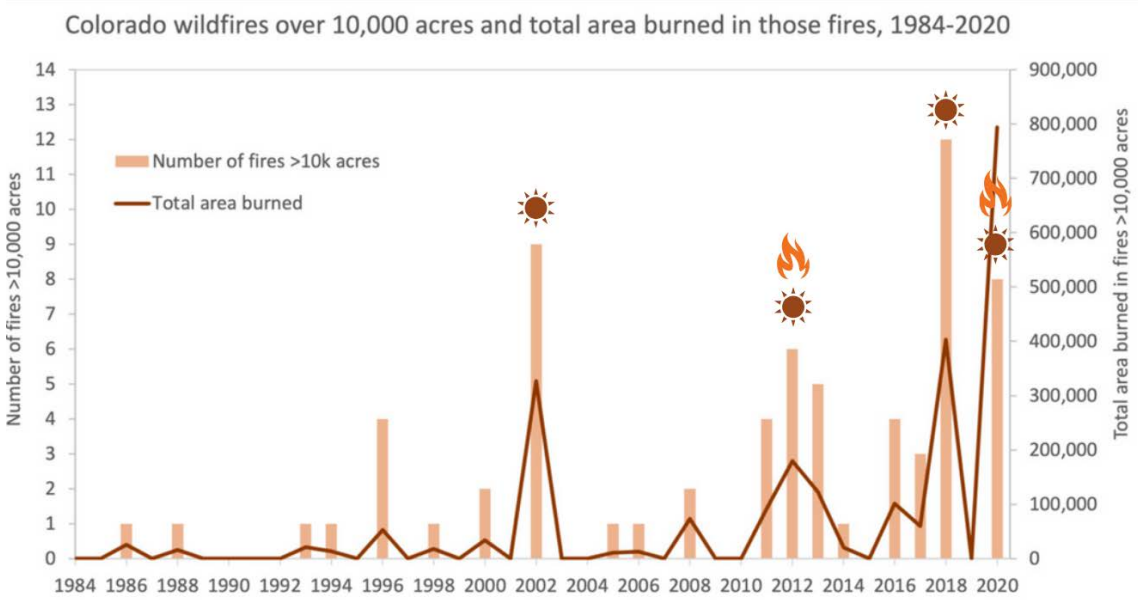


Figure 6. Colorado Wildfires Over 10,000 acres and Total Area Burned (☀) Indicates drought year and (🔥) indicates years of large wildfires in the Upper Poudre Watershed.[3]

Along with the increasing threat of wildfire in a changing climate comes the subsequent risks of post-wildfire flash flooding and debris flows. In recently burned areas, the changes to vegetation and soil properties especially following high severity fire can lead to significant flooding and life-threatening debris flows, even at rainfall intensities as low as 0.25" in 15 minutes (Bolinger et al., 2024). Across the west, Touma et al. (2021) identified an increase in the likelihood of extreme rain events occurring within one year of intense wildfires. Extreme rainfall events are a signature of climate warming. Multiple catastrophic debris flows and flash floods occurred on the Cameron Peak Burn scar in both years 1 and 2 post-fire, killing 6 people and washing away several homes and roads. These types of compounded hazards are often mis-judged once the flames are out and people return to their homes in recently burned landscapes.

[3] Adapted from Figure 4.8 (Bolinger et. al., 2024). Data: Monitoring Trends in Burn Severity (MTBS), https://www.mtbs.gov/direct-download).

Climate change may also favor invasive species due to their ability to out-compete native vegetation in changing conditions. These species can disrupt ecological systems in a wide variety of ways. In riparian areas, invasion of non-native species is damaging to the proper functioning of the riparian areas and can disrupt pathways for nutrient cycling, habitat structures, and stream stability (Richardson et al., 2007). In uplands, ground cover that is struggling due to changing temperatures and moisture patterns are at risk of encroaching non-native populations that may out-compete native species. Some of the non-native species take advantage of a shortened life cycle and are able to use the spring moisture, blooming and reproducing earlier than native species. These species then dry out much earlier in the summer and become a surface fuel for fire spread, increasing wildfire hazards (CSU Extension, 2012; Fusco et al., 2019). Areas that are disturbed by fire are then at increased risk of non-native colonization due to exposed soil surfaces which can allow spread of any existing non-native species. Many non-native species also have seeds that can both survive fire and remain viable for much longer than native species (Fusco et al., 2019).

Managing for a changing climate requires a degree of adaptability in management strategies as the full scope of climate change is uncertain. Municipal water supplies are at risk from numerous stresses that will be exacerbated by a warming climate. Protection of watersheds from stresses will help limit these risks. Educational efforts will also be important to communicate to the public as well as leaders and decision makers about the risks and increased vulnerability of the watersheds as the climate changes.

RESILIENT CONDITIONS FOR VALUE A - RESILIENT UPLANDS

Forest Life Zones

Forests within a common life zone are likely to have similar biotic communities that vary with increases in altitude and increases in latitude. Different approaches to categorizing these zones have been used including focusing on the predominant vegetation of an area. In the Rocky Mountain region, elevation is often a major factor in determining the types of vegetation that occupy a given site in a particular Life Zone, with the vegetation types changing dramatically with altitude. In the Upper Poudre Watershed, Forest Life Zones are useful in providing a general description of the forests in the watershed as well as a base understanding of what kind of vegetation is likely to be found across the landscape. Studying these life or vegetation zones, along with variations in soils, aspect, local weather patterns, and disturbance history, gives insight into the types of vegetation that would be expected to be found in a resilient upland ecosystem.

Kaufmann et al. (2006) identified five major Life Zones in the Colorado Front Range that are approximately determined by elevation, ranging from the low elevation Plains/Grassland up to the high elevation Alpine. In the Upper Poudre Watershed, an analysis shows that most of the watershed is evenly divided between the Lower Montane, Upper Montane and Subalpine/Alpine Life Zones, each occupying close to one-third of the watershed (Figure 7). The remaining 5 percent of the watershed is a part of the Lower Ecotone Life Zone, most of which is within the boundaries of the City of Fort Collins.

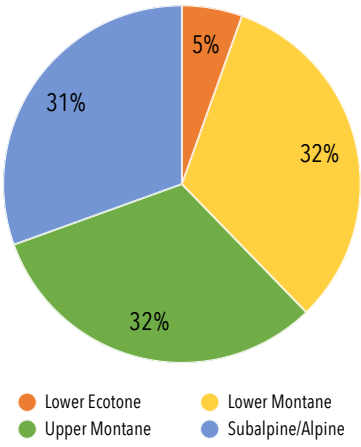


Figure 7. Forest Life Zones in the Upper Poudre Watershed

The dominant tree species vary as elevation increases from the Lower Montane up to the Subalpine/Alpine zones. In the Lower Montane, ponderosa pine is a dominant tree species, although Douglas-fir is also present in many locations. The Upper Montane Zone is a transition from the Montane to the Subalpine zone and vegetation patterns are more complex. Although ponderosa pine is still a substantial component of the landscape, other tree species are also common including Douglas-fir, lodgepole pine, limber pine, aspen and spruce. Topographic position, aspect and soils also influence the mix of vegetation creating a more complex vegetation mosaic. In the highest elevations of the watershed, in the Subalpine/Alpine Zone, lodgepole pine, aspen, spruce and true firs are the most common trees.

The patterns of vegetation across the landscape were shaped not only by Life Zones but also by disturbances that maintained the landscape in a condition that was not static but which could withstand events such as fire and insects and disease. Historic fire regimes of the area indicate that at any given elevation, xeric (dry) sites were more likely to support low density stands and low severity fires than were mesic (moist) sites (Kaufmann et al. 2006). Because of this variability, rather than a uniform historical landscape structure or fire behavior pattern across any specific vegetation zone, there was a mix of fire regimes and vegetative structure within each zone. However, across all vegetation zones, the proportion of the landscape that supported low density stands and low severity fires most likely decreased with increases in elevation, as the proportion of more mesic conditions increased. The more mesic conditions in the Upper Montane would have been characterized by a mixed severity fire regime, which would have created a heterogeneous vegetation structure.

Vegetation Types of the Upper Poudre Watershed

Defining resilient upland conditions requires specific classifications that link knowledge of vegetation to types of disturbance and expected historical landscape structure. Therefore, in order to further evaluate a resilient condition, further classification of vegetation types are needed. The Landfire vegetation data (LANDFIRE 2020) contains 94 different vegetation classifications. By grouping these vegetation types into broader classifications, it becomes possible to view and understand patterns on the landscape. These classifications can then be more specifically linked to historical landscape structure, disturbance patterns, and wildfire behavior.

The vegetation types that compose the Forest Life Zones of the Upper Poudre Watershed can be studied in conjunction with the expected disturbance regimes to analyze which vegetation patterns within each zone produce resilient conditions. This analysis gives insight into the range of conditions that would be considered resilient within current and future contexts.

Forest Type Resilience Descriptions

The resilient conditions were defined for each forest type using scientific research and stakeholder review and input. The detailed descriptions are provided in Appendix B and summarized in Tables 1 and 2.

Table 1. Resilient Forest Conditions Descriptions

Vegetation Type	Forest Life Zones	Historical Fire Regime	Vegetation Description	Stand Diversity
Xeric Ponderosa Pine	Lower Montane	Frequent, low intensity fires: open canopy conditions.	The historical montane forest was likely quite open with fewer trees, greater age diversity between stands, and larger openings than the area displays today. Variation in frequency and severity of fires created a varied vegetative pattern across the landscape.	Gambel oak/mountain mahogany. A more open forested condition than the mesic ponderosa areas with some clumps of dense trees.
Mesic Ponderosa Pine		Mixed severity fire regime: variety of stand structures and age classes.	The historical montane forest was likely quite open with fewer trees, greater age diversity between stands, and larger openings than the area displays today. Variation in frequency and severity of fires created a varied vegetative pattern across the landscape.	Relatively open forested conditions with larger clumps (both in overall size and number of trees present per clump) compared to the xeric systems.
Xeric Mixed Conifer		Mixed severity fire regime: mean 20yr return interval with range of 1-125 yrs.	Douglas-fir, lodgepole pine, aspen, ponderosa pine and some true firs. Mixed conifer areas vary substantially with aspect: warm–dry (xeric) types are found on south-facing aspects.	A mix of ages of seedlings, saplings, and mature trees, with less than 1/3 of the watershed in any one class.
Mesic Mixed Conifer	Upper Montane	Mixed severity fire regime: lower frequency than xeric mixed conifer.	Douglas-fir, lodgepole pine, aspen, ponderosa pine and some true firs. Mixed conifer areas vary substantially with aspect: cool–moist (mesic) types are found on north-facing aspects.	A mix of ages of seedlings, saplings, and mature trees, with less than 1/3 of the watershed in any one class.
Aspen		In general, large and severe fires would increase the extent of aspen and the lack of fires would allow the successional replacement of aspen by conifers. Disturbance regimes in aspen are generally similar to adjacent conifer stands.	Usually occur as closed canopy stands between 5,000 to 10,000 feet in elevation. They require adequate moisture and are usually found on north aspects or sites that are mesic. However, at higher elevations they are found on southern aspects because the northern aspects are too cold.	A mix of ages of sapling and mature trees, so that the mature class does not comprise more than 1/2 of the watershed. Conifer encroachment that is limited to older aspen stands.
Lodgepole Pine	Subalpine /Alpine	Natural fire frequency ranges from a few years to 200+ years. Low to moderate severity surface fires: mean ~30yr return interval. Stand-replacing fires are generally less frequent.	Grows on a wide range of sites, typically 7,500-10,000 ft in pure or mixed stands. Mostly shade intolerant and can exist as a climax species in some stands but is often a seral species that is eventually replaced by spruce and fir. Lodgepole pine is susceptible to bark beetles, mistletoe, blowdown and fire.	A mix of ages of seedlings, saplings, and mature trees, with less than 1/3 of the watershed in any one class.
Spruce-Fir		Not fire adapted, 300+yr fire return interval. Very likely to produce stand-replacing crown fires.	Typically composed of the slow-growing Engelmann spruce, with the smaller, narrow-crowned subalpine fir. The spruce-fir combination often reaches a climax-type forest at high elevations, despite the existence of many uneven-aged stands. Both species are shade tolerant and tend to quickly repopulate shaded gaps in the forest.	A mix of ages of seedlings, saplings, and mature, with less than 1/2 of the watershed in any one class.

Table 2. Resilient Forest Type Characteristics

Vegetation Type	Forest Life Zones	Openings	Canopy Cover Range	Average Canopy Cover	Aspect	Elevation	Aspect	Elevation	Aspect	Elevation	Aspect	Elevation
						Below 6,500 ft		6,500-7,500 ft		7,500-8,500 ft		8,500-9,500+ ft
Xeric Ponderosa Pine	Lower Montane	Up to 40 acres in size, 25% of total area	15-25%	20%	N E S W	Ponderosa	E S W	Ponderosa & Douglas-fir	S W Ridges	Ponderosa & Douglas-fir		
Mesic Ponderosa Pine	Lower Montane	Up to 20 acres in size, 20% of total area	20-35%	25%			N	Ponderosa	N E	Ponderosa	N E S W	Ponderosa
Xeric Mixed Conifer	Lower Montane	Up to 20 acres in size, 20% of total area	20-35%	25%			S W	Mixed Conifer	S W	Mixed Conifer		
Mesic Mixed Conifer	Upper Montane	Up to 20 acres in size, 10% of total area	35-50%	45%			N E	Mixed Conifer	N E	Mixed Conifer	N E	Douglas-fir
Aspen	Upper Montane				N E	Aspen, Mixed Conifer with Aspen	N E W	Aspen, Mixed Conifer with Aspen	E S W	Aspen, Mixed Conifer with Aspen	S W	Aspen, Mixed Conifer with Aspen
Lodgepole Pine	Subalpine /Alpine		50-90%	75%					N E S W	Lodgepole	N E S W	Lodgepole
Spruce-Fir	Subalpine /Alpine		50-90%	75%					N E S W	Spruce-fir	N E S W	Spruce-fir

RESILIENT CONDITIONS FOR VALUE B - RESILIENT WATERSHEDS & RIVER CORRIDOR

A resiliently functioning river corridor provides at a minimum the following ecosystem benefits and services:

- Structural characteristics that attenuate floodwaters,
- Healthy and diverse aquatic habitat,
- Water quality that supports diverse aquatic life and riparian habitats,
- Levels of bank erosion and sediment delivery that support aquatic and riparian habitats,
- Natural landscape aesthetics,
- Recreational values.

A resiliently functioning river corridor is at risk from natural and anthropogenic disturbances, particularly those that are out of the expected range of historical norms. These disturbances include:

- Large, catastrophic wildfire,
- Prolonged drought,
- Epidemic insect and disease outbreaks,
- Large catastrophic floods,
- Pollution,
- Anthropogenic disturbances in the floodplain (i.e., fill, bank hardening, vegetation loss or head cutting due to development),
- Upstream water diversions,
- Land use changes that alter runoff patterns, reduce vegetation cover, increase the intensity and/or frequency of wildfire, or that have other broad scale watershed impacts.

Stream Channel Equilibrium

The condition of a stream in terms of its channel integrity can be described by observing the reaction of the channel to changes in flow or sediment. Peak flows are the primary channel forming device and are often responsible for changes in stream structure. If peak flows and sediment increases exceed certain sustainable levels, the stream may react to these changes in a way that reduces its physical integrity. Each stream channel has its own "equilibrium" level and knowing this metric can provide some predictive criteria for how a given stream channel might respond to increased peak flows and increased sediment yield.

A channel that is in dynamic equilibrium responds to changes in stream flow or inputs of sediment, but does not lose physical integrity. Equilibrium does not imply a static condition in the stream channel; a stream in equilibrium will exhibit physical changes. However, the basic structure (pool frequency, pool depth, and pool:riffle ratio) will remain basically the same over time, even given average storm events and naturally fluctuating flow conditions.

Disequilibrium is a state in which the bed armoring has been destroyed by a high flow event and bedload movement is significant enough to alter channel structure (pools, riffles, etc.). As compared to a stream in

equilibrium, a stream out of equilibrium will often have fewer pools, longer riffles and the pools will often be filled with migrating sediments. A large percentage of what normally forms the stream bed would be loose and frequently transported and eventually deposited downstream.

Sediment Transport and Deposition

The movement of sediment in a stream system is controlled by channel morphology (channel shape, size, and slope) along with stream sinuosity. When sediment is introduced into the stream system it is moved (transported) as long as the sediment transport capacity of the stream exceeds the supply of sediment. Streams are classified by certain characteristics (morphology) that define their sediment transport capacity in general terms. There are three main types of reaches that are defined by their ability to move sediments: source, transport and response reaches.

Source reaches are generally located in steeper areas where there is a supply of sediment available for movement downstream (sediment source areas). Although these reaches are high gradient and fast moving, the amount of sediment available for transport usually exceeds the ability of the stream to move the sediments. These reaches are generally smaller tributaries or headwater areas where the streamflow is lower. Sediments are moved intermittently from the source reaches during peak flow or a disturbance event. Because of the high gradient and high velocities in these streams, peak flow events can move large amounts of sediment.

Stream reaches may have a greater capacity to transport sediments than the surrounding watershed and upper reaches supply. These reaches are considered “supply limited” and are higher streamflow than source reaches and higher velocity than response reaches. Most sediment that is delivered to the reach is transported downstream. These stream reaches are called transport reaches, a reflection of their ability to move sediment downstream.

Lower gradient stream reaches are generally not able to transport all the sediment that is delivered to them from upper stream reaches, tributaries or the surrounding watershed. These reaches are “transport limited” because their ability to transport sediment is exceeded by the amount of sediment supplied to them. Increased sediment delivery to these reaches is deposited in the reach rather than transported further downstream. Therefore, these stream reaches are called response reaches. Response reaches are typically pool-riffles or braided channels and, although they tend to have the highest streamflow in the system, are the slowest moving. Transport of sediments deposited in response reaches usually occurs during peak flows events (snowmelt runoff or summer rainstorms).

The relationship between different reaches determines where in the watershed there could be potential problems with sediment transport and deposition. The most sensitive stream segments are response reaches that have transport reaches entering them. These reaches have the highest potential for sediment deposition because the sediment transport capacity (in comparison to supply) of the upper reach is so much greater than the ability of the response reach to move the sediments.

Sediment deposition in response reaches is a natural process. The sediment will form bars or be stored in banks, etc. and the reach will retain its function. However, when sediment yield is increased beyond a level that formed its existing equilibrium state, or a catastrophic event occurs higher in the watershed, the amount of sediment delivered by a transport reach can overwhelm the response reach with sediment deposition. The reach may move outside of dynamic equilibrium and not function properly until peak flow events possibly restore the channel to a functioning condition (dynamic equilibrium) by transporting the excess sediment downstream.

Floodplain and Riparian Function

Riparian areas include the vegetation communities that are influenced by the geomorphic and hydrologic processes of the river. They occur in bank zones, overbank zones, and floodplain-upland transition zones of a floodplain. Riparian zones are among the most biologically diverse and ecologically important zones throughout the semi-arid west. They include important migratory routes between mountain and plain habitats, and provide support to migratory birds en route to winter and summer residences as far apart as Alaska and Argentina. Riparian areas also create cover for resident wildlife, and serve as the foundation for an entire food web of adjacent aquatic and upland systems. Throughout Colorado, the upper canopies of cottonwoods, aspen, blue spruce, and other mature trees commonly found in riparian areas provide important nesting habitat for bald eagles and other raptors. They also provide rookery habitat for great blue herons, and nesting habitats for owls and a variety of cavity nesting birds. Additionally, rare species such as the Preble's meadow jumping mouse, Colorado butterfly plant, and Ute ladies'-tresses orchid rely upon healthy riparian habitats for survival.

Healthy riparian areas reduce sedimentation of waterways by providing a filtration system from adjacent upland areas thereby reducing the rate of soil loss from banks and upland areas. Riparian areas also provide valuable benefits to streams such as shading, which reduces in-stream temperatures, and delivery of organic matter such as leaves and large woody debris, which serve as a food source for many aquatic macroinvertebrates. Healthy riparian areas enhance nutrient cycling, maintain higher base flows, dissipate flood energy, and provide significant aesthetic value to residents and tourists who experience thousands of miles of riverine systems while driving transportation corridors throughout Colorado. Due to the contribution of riparian corridors to the conservation and management of freshwater fish (Pusey & Arthington 2003) and big game, and given the millions of dollars of revenue generated by hunting and fishing in Colorado annually, the restoration and protection of riparian systems produces economic benefits for the state.

Riparian areas are commonly flooded and as long as that flooding is within the range of conditions that formed a stable system, the floodwaters function to maintain a healthy mosaic of plant community types that provide a great variety of resilience benefits. Healthy riparian areas improve and maintain resilience in the following ways, including:

- Roughness that reduces the rate of bank erosion,
- An ability to rebound quickly after most disturbances and under the majority of flood discharge frequencies, rebuilding its resilient functions,
- Floodplain roughness that helps reduce the risk of avulsions and floodplain scour during high magnitude events,
- Infiltration and/or water residence times in the floodplain that function to reduce the "flashiness" of a stream, thereby reducing downstream flooding.

Human uses and disturbances in watersheds often result in impacts common to riparian areas in the Upper Poudre Watershed including:

- Habitat destruction and/or alteration caused by road construction and maintenance activities,
- Grazing by domestic (horses, sheep, cattle), and in some instances native, animals that can dramatically alter the vegetation community,
- Conversion to agriculture,
- Damage due to human use through a variety of recreation impacts (boating, fishing, hiking),

- Changes in flood frequency, duration, and flow rates (both peak and low flow) due to upstream water use or structures, altering scour, water availability, and other geomorphic and hydrologic patterns necessary to maintain a healthy mosaic of riparian areas.

Aquatic Habitat

Aquatic habitat is that which supports a variety of vertebrates (i.e., fish, reptiles, and amphibians) and invertebrates (i.e., insects) whose reproductive cycles cannot be completed without water. Of all living things in a stream, insects are often reported as being a barometer for stream and watershed health. Similar to other biotic communities, stream insect communities increase in diversity with increases in physical and environmental diversity within their potential habitat. In Colorado streams, this diversity is provided by a variety of geomorphic features, such as overhanging banks, pools, riffles, glides, and steps. Within a reach, physical and environmental diversity is provided by in-stream structures such as large boulders and woody debris, and organic inputs such as leaves, pine needles, and small woody debris. These structures influence temperatures and other water quality parameters. Healthy streams provide resilient conditions for aquatic invertebrates, allowing them to rebound quickly following natural disturbances. Healthy aquatic insect communities in turn have cascading positive impacts for a variety of aquatic and terrestrial wildlife. Due to the profound impacts of riparian vegetation on stream health, including organic matter inputs and stream shading, there is an intimate relationship between riparian area health and the health of aquatic animals. The resilient condition of aquatic habitat is a condition that contains the structural diversity, water chemistry and biological diversity to maintain the expected aquatic life and to rebound back to that condition when affected by normal disturbances.

Roads

Roads can convert subsurface runoff to surface runoff and then route the surface runoff to stream channels in ditches, which can increase peak flows (Megan and Kidd 1972, Ice 1985, and Swanson et al. 1987). Therefore, watersheds with higher road densities have a higher sensitivity to increases in peak flows especially following disturbances such as wildfires.

Roads and railroads reduce the width of a riparian corridor by occupying part of the valley bottom. Greater access to the river can also cause increased disturbance of the stream bed and the banks by people and vehicles. Destruction of riparian vegetation and compaction of streambanks reduces infiltration, increases runoff and sediment input to the stream channel, and alters the shape and stability of the channel (Wohl 2005).

Road stream crossings are especially critical locations where roads interact with streams. These crossings are typically a steel culvert with road fill around the culvert. Many, if not most, of older stream road crossings are critically undersized. They are especially undersized if they experience post-fire or flood runoff. Undersized crossings can clog with debris and sediment which can lead to overtopping and road failure. Road crossing failures can cause large pulses of debris, sediment and streamflow downstream which can cause much more stream damage than if the crossing was not present.

RESILIENT CONDITIONS FOR VALUE C - RELIABLE WATER SUPPLY

A reliable and predictable water supply depends on clean water that is free of excess sediment or other pollutants. The Upper Poudre Watershed supplies hundreds of thousands of people with drinking water each year in the cities of Fort Collins and Greeley, as well as other smaller communities, and provides irrigation for thousands of acres of agricultural lands. It is critical that the water supply be relatively consistent and reliable, which depends on the overall health of the watershed. It must also be resilient and able to withstand disturbances in the watershed without putting the water supply at risk. The water supply is at risk from large-scale disturbances such as wildfires, flooding, drought, and insect and disease epidemics. In addition to large-scale disturbances, the water supply is at risk from land uses that impact water quality including development and grazing.

Effects of Historical Land Use and Human Impacts on the Watershed

Beaver Trapping

Beaver dams create longitudinal steps along river channels. Water is ponded upstream from the dam, slowing the passage of flood waves, storing sediment and nutrients, and creating germination sites for aquatic and riparian vegetation. Beaver dams increase the habitat diversity and stability of streams and valley bottoms (Naiman et al. 1986). During the early 19th century beavers were trapped along all the rivers of the Front Range (Wohl 2001). There is no documentation of the effects of early 19th century beaver removal in these rivers but it is reasonable to assume that flood peaks became at least slightly shorter in duration, groundwater recharge was reduced, bed and bank erosion and sediment mobility increased, and stability and diversity of rivers decreased (Naiman et al. 1986; Wohl 2005). Contemporary studies of modern analogs indicate that flow downstream from beaver ponds contain 50-70 percent fewer suspended solids than that of equivalent stream reaches without these ponds (Wohl 2005).

Timber Harvest and Railroad Tie Drives

The construction of railroads from the 1860s to the 1890s placed a heavy demand on timber resources, mostly from the mountains and rivers. The Cache la Poudre River provided a convenient transportation route to collection points such as Fort Collins or Greeley. More than 200,000 railroad ties floated down the Cache la Poudre River annually between 1868-1870. The mountain channels were altered to facilitate conveyance of logs, naturally occurring wood and large boulders were removed, overbank areas and marshes were separated from the main channel by dikes, and meanders were artificially straightened with cutoffs (Wohl 2005). Today, the affected rivers have less diverse and less mature riparian vegetation, as well as wider, shallower channels with less pool volume and less naturally occurring wood (Wohl 2005).

Grazing

Historically, livestock grazing has damaged streams and riparian ecosystems in arid regions of the western United States (US Department of the Interior 1994). Within the Upper Poudre Watershed, there are an estimated 85,000 acres of land is in need of restoration to provide adequate recovery opportunity between grazing events and proper stocking of animals (USDA NRCS Rapid Watershed Assessment).

Livestock grazing can alter forest dynamics by (1) reducing the biomass and density of understory grasses and sedges, which otherwise outcompete conifer seedlings and prevent dense tree recruitment, and (2) reducing the abundance of fine fuels, which formerly carried low-intensity fires through forests. In addition, exclosure studies

have shown that livestock can alter ecosystem processes by reducing the cover of herbaceous plants and litter, disturbing and compacting soils, reducing water infiltration rates, and increasing soil erosion (Belsky and Blumenthal 1997).

Grazing has a magnified effect on riparian areas because livestock tend to avoid hot, dry environments and congregate in wet areas for water and forage. They are also attracted to the shade and lower temperatures near streams. Cattle spend 5-30 times as much time in cool, productive zones than would be predicted from surface area alone (Belsky et al. 1999; Roath and Kreuger 1982). However, appropriate livestock grazing techniques, including access and timing of grazing in riparian areas, can substantially reduce the impacts of livestock grazing on streams, riparian areas and uplands.

Effects of Current Land Use and Human Impacts on the Watershed

Grazing

The North Fork of the CLP has a significantly greater percentage of rangeland and grassland than the main stem, while the main stem has a greater percentage of forested land and natural landscape. This difference contributes to differences in water quality between the two 5th level watersheds. The North Fork is 52.3% agricultural use and grassland but is 44.1% forest, while the Main Stem is only 18.3% agricultural use and grassland but is 71.5% forest (Billica et al. 2008; Heath and Thorp 2023). The North Fork monitoring sites generally have higher nutrient concentrations and conductance and consistently higher total organic carbon (TOC) concentrations than do main stem sites (Billica et al. 2008). However, the most recent water quality trends report from the Upper Cache la Poudre Watershed Collaborative Water Quality Monitoring Program indicates a long-term decreasing trend in TOC concentrations at all but the highest North Fork monitoring site and both short and long term significant increasing trends in specific conductivity at all but the highest and lowest mainstem CLP sites (Heath and Thorp 2023). The highest counts of total coliform across the basin are at the City of Greeley's diversion, which is likely related to total coliform contributions from the North Fork CLP River (Heath and Thorp 2023).

Development and Population Increase

The City of Fort Collins had a population of 169,810 residents at the time of the April 2020 census, which grew by 17.9 percent since April 2010. The city of Greeley had a population of 108,795 with an increase of 17.1 percent from April 2010 to April 2020. The growth rates over the last decade in both Fort Collins and Greeley outpaced the state's overall growth (14.8%) and were slightly less than Larimer County's growth rate (19.8%; U.S. Census Bureau).

The Cache la Poudre Canyon, upstream of the confluence of the North Fork with the main stem Cache la Poudre River, is sparsely populated compared to the municipal and agricultural demand downstream. However, as population increases in the larger cities downstream, people are expanding into the upper elevations of the watershed as well. The river is also becoming more and more popular for recreation activities such as whitewater rafting, camping, canoeing, hiking, and fishing.

Potential sources of contamination within the Upper Poudre Watershed include active and abandoned mines, animal grazing and other agricultural activities, automobile accidents along the river, underground and above ground fuel storage tanks, residential areas, road de-icing chemicals, erosion, recreational users, gas stations, and leaky septic tanks or improperly functioning leach fields from the various communities throughout the watershed. The larger communities within the watershed include the Colorado State University Mountain Campus, Poudre Park, Rustic, Livermore, and Red Feather Lakes (Billica et al. 2008).

There are noticeable increases in *Escherichia coli* (E. coli) and total coliform as one moves downstream, associated with greater development and human impact in the lower part of the canyon (Billica et al. 2008). E. coli is a type of bacteria that lives in the intestines of both people and animals and is commonly found in human and animal feces. This bacteria is considered an indicator organism to identify fecal contamination in freshwater. The presence of E. coli indicates the possible presence of disease-causing bacteria and viruses. High numbers of E. coli and other bacteria in water can cause cloudiness, unpleasant odors, and increased oxygen demand, which may also reduce levels of dissolved oxygen in the water. The bacteria tend to be found where there are particles in the water, and may be linked with other parameters such as high total suspended solids and turbidity. It can also be linked with high phosphorus, nitrate, and biological oxygen demand concentrations.

Sources of E. coli from humans include wastewater treatment plant effluent, broken or leaky sewer pipes, and failing or poorly sited septic systems. From animals, E. coli can reach surface waters through runoff from feedlots, manure storage areas, livestock that are allowed to get into or near streams, or wildlife in the area of surface water bodies. The most recent water quality trends report from the City of Fort Collins Water Quality Monitoring Program indicates the highest E. coli counts were measured in the mainstem CLP River below the South Fork. In fact, a significantly increasing trend in E. coli counts was detected in the Poudre below Rustic (Heath and Thorp 2023).

Wildfire

Impacts to water quality from post-wildfire runoff, including both snowmelt runoff and larger isolated storm events can be dramatic (Heath and Thorp, 2023). Likely impacts to water quality from wildfire include:

1. Turbidity and suspended sediment: rapid increase, especially due to storm events and snowmelt runoff.
2. Alkalinity, hardness, and total dissolved solids: higher background concentrations (non-storm event).
3. Nutrients: higher background concentrations (non-storm event).
4. Turbidity, total organic carbon, nutrients, and metals: higher concentrations (dissolved and total) during snowmelt.
5. Temperature: higher background temperatures (non-storm event) due to reduction in riparian vegetation and function, as well as increased heat absorption due to suspended sediment.

Reservoirs and Diversions

There are 13 reservoirs in the Upper Poudre Watershed (Table 3) and 14 diversions in the main stem of the Cache la Poudre River. The high mountain reservoirs are operated by the City of Fort Collins, City of Greeley, North Poudre Irrigation Company (NPIC), and Water Supply and Storage Company. On the North Fork, Halligan and Seaman Reservoirs are owned by the City of Fort Collins and the City of Greeley, respectively, and are both under consideration for possible expansion. The Northern Colorado Water Conservancy District has proposed a new off-channel reservoir, Glade Reservoir, which will take water from the CLP downstream of the North Fork confluence and will be filled during wet years. The City of Fort Collins, the Tri-Districts, and the City of Greeley all have senior water rights which secure water availability for municipal use.

Table 3. Reservoirs within Upper Cache la Poudre River Basin[4]

Reservoir Name	7th Level Watershed	Stream	Approximate Storage (acre-ft)	Owner/Operator
Panhandle Reservoir (Crystal Lake)	Lower Panhandle Creek	Lower Panhandle Creek		Crystal Lakes Water & Sewer Association
Halligan Reservoir	Halligan Reservoir	North Fork Poudre	6,400 (proposed expansion up to 19,500)	NPIC and City of Fort Collins
Eaton Reservoir	Eaton Reservoir	Sheep Creek	3,880	Larimer and Weld
Milton Seaman Reservoir	Milton Seaman Reservoir	North Fork Poudre River	5,000 (proposed expansion up to 53,000)	City of Greeley
Horsetooth Reservoir	Horsetooth Reservoir	Spring Creek	156,735	Northern Water
Comanche Reservoir	Comanche Reservoir	Beaver Creek	2,600	City of Greeley
Long Draw Reservoir	Long Draw Reservoir	Grand River Ditch & La Poudre Pass Creek	10,520	Water Supply and Storage Company
Joe Wright Reservoir	Upper Joe Wright Creek	Joe Wright Creek	7,200	City of Fort Collins
Chambers Lake	Middle Joe Wright Creek	Joe Wright Creek	8,820	Water Supply and Storage Company
Barnes Meadow Reservoir	Barnes Meadow Reservoir	UT to Joe Wright Creek	2,350	City of Greeley
Peterson Lake	Peterson Lake	UT to main stem Poudre	1, 250	City of Greeley
Hourglass Reservoir	Hourglass Reservoir	Beaver Creek	1,700	City of Greeley
Twin Lake	Twin Lake Reservoir	UT to South Fork	300	City of Greeley

Sediment Deposition and Water Supply Diversions

The movement of sediment in a stream system is controlled by channel morphology. When sediment is introduced into the stream system it is moved (transported) as long as the sediment transport capacity of the stream exceeds the supply of sediment. Sediment deposition occurs when the transport capacity upstream exceeds that of a downstream reach. When sediment yield is increased or a catastrophic event occurs higher in the watershed, the amount of sediment delivered by a transport reach can overwhelm the response reach with sediment deposition.

In the Poudre River Watershed, when there are increased sediment and debris flows due to natural disturbance, such as wildfire, this sediment is transported directly from the steeper tributaries to the main stem of the Cache la Poudre River, a response reach. At times of reservoir releases or large rain events within the watershed, when the mainstem flow increases, the excess sediment and debris gets transported directly to the important water supply diversions located on the main stem of the Cache la Poudre River. Following the Cameron Peak Fire (2020), the cities of Fort Collins and Greeley both had to turn off their diversions from the Poudre River for extended periods in 2021 and 2022, due to the increases in turbidity of the water and loss of function at the diversions.

[4] Billica et al. 2008

High Elevation Reservoirs

The high elevation reservoirs in the Upper Poudre Watershed store water in the upper watershed to be released when the demand is high, causing changes to peak flows in the watershed. Impacts of water quality changes in high mountain reservoirs are dispersed downstream when reservoirs release water to the mainstem CLP.

Rising air temperatures, lower vapor pressure deficits, and increasing solar radiation due to climate change may lead to long-term changes in the water temperatures of reservoirs. Water may evaporate from reservoirs at an increasing rate and temperatures in the high elevation reservoirs could increase, leading to downstream impacts on water temperature in the CLP mainstem. At lower elevations, increasing water temperatures in both Halligan and Seaman Reservoirs are already being observed, leading to a significantly increasing trend in the water temperature of two long-term monitoring sites on the North Fork Poudre River, below Halligan and Seaman Reservoirs (Heath and Thorp 2023).

The combination of higher temperatures and elevated nutrient concentrations in the high elevation reservoirs may lead to algal blooms in the reservoirs which can also spread downstream into the mainstem CLP. Post-wildfire concentrations of nutrients are especially high; reservoirs that receive runoff and erosion from burned hillslopes are more susceptible to the associated water quality impacts. As nutrient sinks, these reservoirs may store nutrients over long periods of time, which can lead to concerning water quality impacts over the long term.

3. RESILIENCE ANALYSIS

The Upper Poudre Watershed Resilience Plan considers three values that are used in evaluating resilient watershed conditions: Resilient Uplands, Resilient Watersheds and River Corridor, and Reliable Water Supply. This section of the plan presents the watershed assessment analysis that prioritizes the 7th Level watersheds by five hazard categories, for the factors within each value. It presents the technical approach for each component and the process used to assemble the watershed ranking.

RANKING/CATEGORIZATION APPROACH

The methodology allows for all the 7th Level watersheds to be compared to and ranked against each other for each of the hazard components. The results of each hazard component analysis are scaled to fall within categories ranging from lowest hazard to highest hazard based upon the comparison to other watersheds in the total project area. This provides a ranking of watersheds by hazard. The calculation of the watershed ranks was completed as follows.

The results of the analysis for each component are categorized by 7th Level watershed and then compared to other watersheds within the watershed analysis area.

1. Calculate the hazard based on the percentage or average value of each watershed (or other metrics, depending on hazard component).
2. Scale the numerical results so that they fall within five hazard rank categories, with a reasonable distribution that spans the range of hazards.
3. Round the scaled result to the nearest whole number, between 1 and 5. (Retain the original number for Composite Hazard Ranking calculations).
4. Create a map of the results using the following scheme:

Category 1	Lowest Rank
Category 2	Low Rank
Category 3	Moderate Rank
Category 4	High Rank
Category 5	Highest Rank

VALUE A: RESILIENT UPLAND CONDITIONS ANALYSIS

Resilient uplands maintain key ecological characteristics such as historical disturbance regimes, appropriate forest canopy and age structure, wildlife habitat, soil health, native vegetation, and healthy & diverse soil characteristics to maximize precipitation infiltration and moderate runoff. These habitats provide the following ecosystem benefits and services: biodiversity, carbon sequestration, natural resource extraction (timber), recreation, healthy soils, wildlife habitat & migration corridors, protection against invasive species, and reduced sediment delivery to receiving waters. The Resilient uplands are at risk from wildfire, drought, insects and disease, high density canopy conditions, and landscape segmentation.

The analysis of Value A - Resilient Uplands is based upon the following three factors that are described below:

- Wildfire Hazard
- Ecosystem Sensitivity
- Adaptive Capacity

Wildfire Hazard

The Interagency Fuel Treatment Decision Support System (IFTDSS), an online implementation of the FlamMap fire mapping and analysis system (Finney 2006, Stratton 2006), was used to assess wildfire hazard. The FlamMap analysis describes potential fire behavior for constant environmental conditions (weather and fuel moisture). It does not calculate fire spread across a landscape. FlamMap outputs and comparisons can be used to identify combinations of hazardous fuel and topography, aiding in prioritizing fuel treatments. FlamMap is widely used by the U.S. Forest Service, National Park Service, and other federal and state land management agencies in support of fire management activities. Landfire 2.2.0 is the source for the basic data used in the wildfire modeling (LANDFIRE 2020). Landfire is also the source of data for vegetation, topographic and some other GIS analyses. The benefit of Landfire is that it covers all ownerships and is updated frequently. The latest update for Landfire data was completed in June 2021 and includes updates through 2020.

The FlamMap model produces several fire model outputs. Flame length and crown fire activity are the two outputs are used as the basis for this wildfire hazard analysis. The selection process involves reviewing comparisons to past modeling efforts and consultation with local experts. For these assessments the post-fire hydrologic changes are of most concern, therefore it is focused on fire intensity and severity and not fire behavior. Crown fire activity is being used as a surrogate for burn severity by researchers (Gannon et al. 2020). Flame length is also a good indication of relative fire intensity. Flame length and crown fire activity have been used in many similar watershed/wildfire assessments in Colorado and were determined to be the most appropriate components for the analysis of wildfire hazard. The FlamMap modeling results in all watersheds burning in extreme conditions. Wildfires are driven by weather and moisture/fuel conditions during the fire, so the actual burn severity may differ from the model results.

The Colorado Forest Restoration Institute produced a wildfire model for the Northern Colorado Fireshed Collaborative Quantitative Wildfire Risk Assessment (QWRA) in 2022 (Rhea et al., 2022). The 97th percentile (Extreme) burn scenario from this modeling was utilized for this analysis. For details on the model run weather scenarios, see Rhea et al (2022), Table 1.

Flame Length

Flame length is the distance measured from the flame tip to the middle of the flaming zone at the base of the fire. It is measured on a slant when the flames are tilted due to effects of wind and slope. Flame length is an indicator of fire intensity. A combination of many factors are used in the modeling to determine flame length including slope, aspect, wind speed and direction, fuel model, surface fuels, canopy fuels, canopy base height, vegetation types, and more. The flame length results were divided into six categories of wildfire hazard ranging from lowest (Category 0) to highest (Category 5). The flame length categories that were used are:

Flame Length Category 0: 0 feet

Flame Length Category 1: 1 to 4 feet

Flame Length Category 2: >4 to 8 feet

Flame Length Category 3: >8 to 12 feet

Flame Length Category 4: >12 to 25 feet

Flame Length Category 5: >25 feet

Tables 4 and 5 are provided as tools for interpreting the implications of the flame length analysis. Ground crews with simple hand tools are not effective against fires with flame lengths over three to four feet. Spotting beyond the immediate vicinity of the fire causes safety concerns and can also result in several, if not numerous, independent fires downwind from the original blaze. Multiple spot fires can compromise firefighter and resident safety by cutting off escape routes to safety zones.

Table 4. Fire Suppression Implications of Flame Length

Flame Length (feet)	Interpretation
0-4	Persons using hand tools can generally attack fires at the head or the flanks. Handlines should hold the fire.
4-8	Fires are too intense at the head for direct attack by persons using hand tools. Handlines can't be relied upon to hold the fire. Equipment such as dozers, engines and retardant aircraft can often be effective on fires with these flame lengths.
8-11	Fires with these flame lengths may present serious control problems such as torching, crowning, and spotting. Control efforts at the head of the fire using dozers and engines will probably be ineffective. Attack using retardant aircraft may still be effective.
11+	Crowning, spotting, and major fire runs are common. Control efforts at the head of the fire, even with retardant aircraft, are usually ineffective.

Table 5. Rate of Spread Based on Flame Length[5]

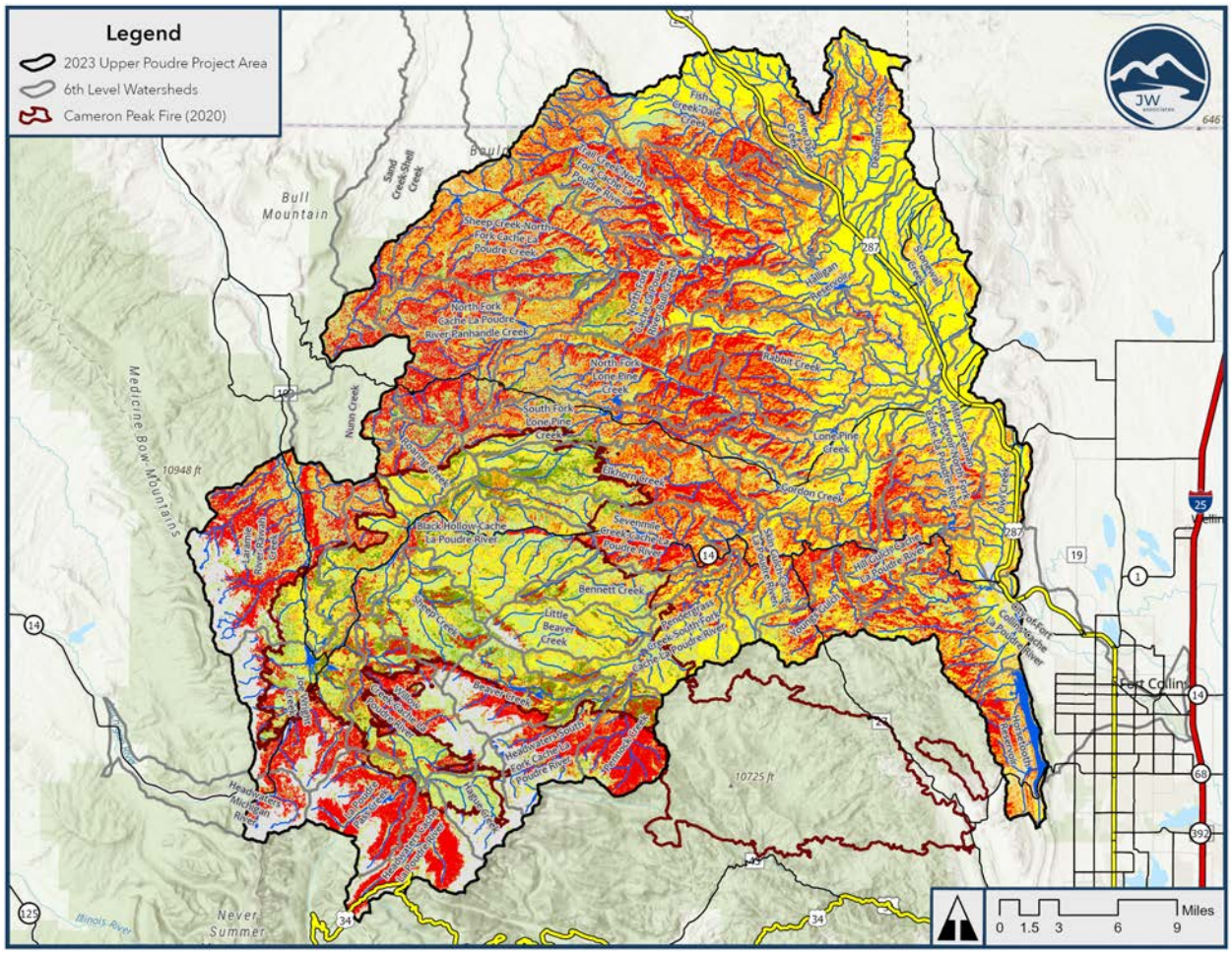
Flame Length (feet)	Rate of Spread (Chains/Hour)
0 – 1	0 – 2
1 – 4	2 – 5
4 – 8	5 – 20
8 – 11	20 – 50
12 – 25	50 – 150
> 25	> 150

Flame length categories were mapped throughout the project area and are shown on Map 2. Within each 7th Level watershed, the areas in Flame Length Categories 3, 4 and 5 were weighted by severity to determine an overall score as follows (where WA = Watershed Area):

Flame Length Metric = [WA in Category 3 + 2*(WA in Category 4) + 3*(WA in Category 5)]/WA

All 7th Level watersheds were then ranked by the Flame Length Metric.

[5] One chain equals 66 feet



Map 2. Upper Poudre Flame Length Modeling Results

Crown Fire Activity

Crown fire is when the canopy of a tree burns. For this analysis crown fire is modeled as either passive or active. These are defined by the National Wildfire Coordinating Group as:

> **Passive Crown Fire** occurs where surface fire intensity is sufficient to ignite tree crowns, individually or in groups, but winds are not sufficient to support propagation from tree to tree.
>
> **Active Crown Fire** occurs where surface and crown fire energy are linked. Surface intensity is sufficient to ignite tree crowns, and fire spread and intensity in the tree crowns encourages fire spread and intensity.

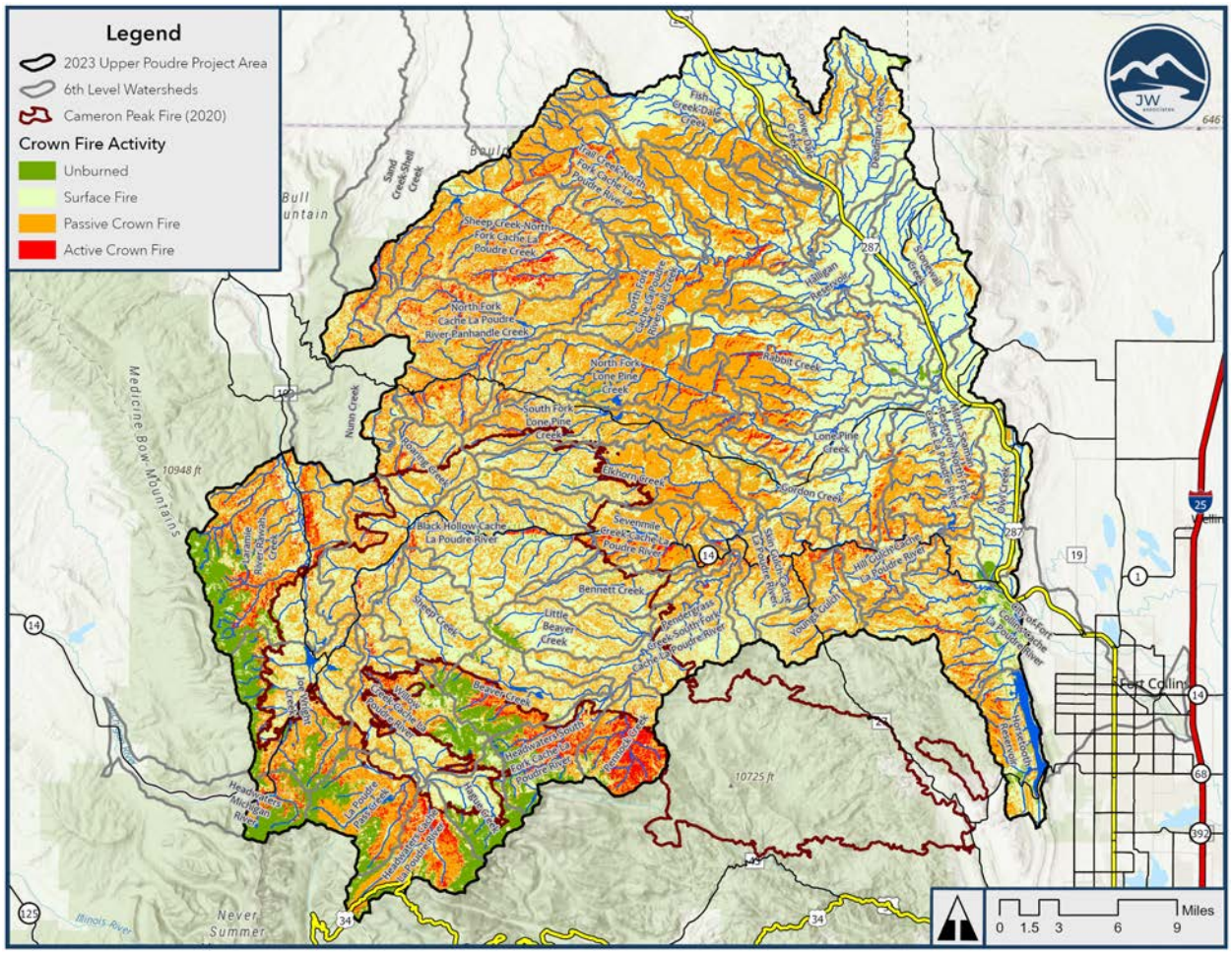
A combination of many factors are used in the modeling to determine crown fire activity including slope, aspect, wind speed and direction, fuel model, surface fuels, canopy fuels, canopy base height, vegetation types, and more. The crown fire activity modeling output presents results in the following four classifications:

> **Non-burnable:** Category 0
>
> **Surface Fire:** Category 1
>
> **Passive Crown Fire:** Category 2
>
> **Active Crown Fire:** Category 3

The crown fire activity categories were mapped throughout the project area and are shown on Map 3. As was done for the flame length metric, within each 7th Level watershed, the areas in Category 2 (Passive Crown Fire) and Category 3 (Active Crown Fire) were weighted by severity to determine an overall score as follows (where WA = Watershed Area):

Crown Fire Activity Metric = [WA in Category 2 + 2*(WA in Category 3)]/WA

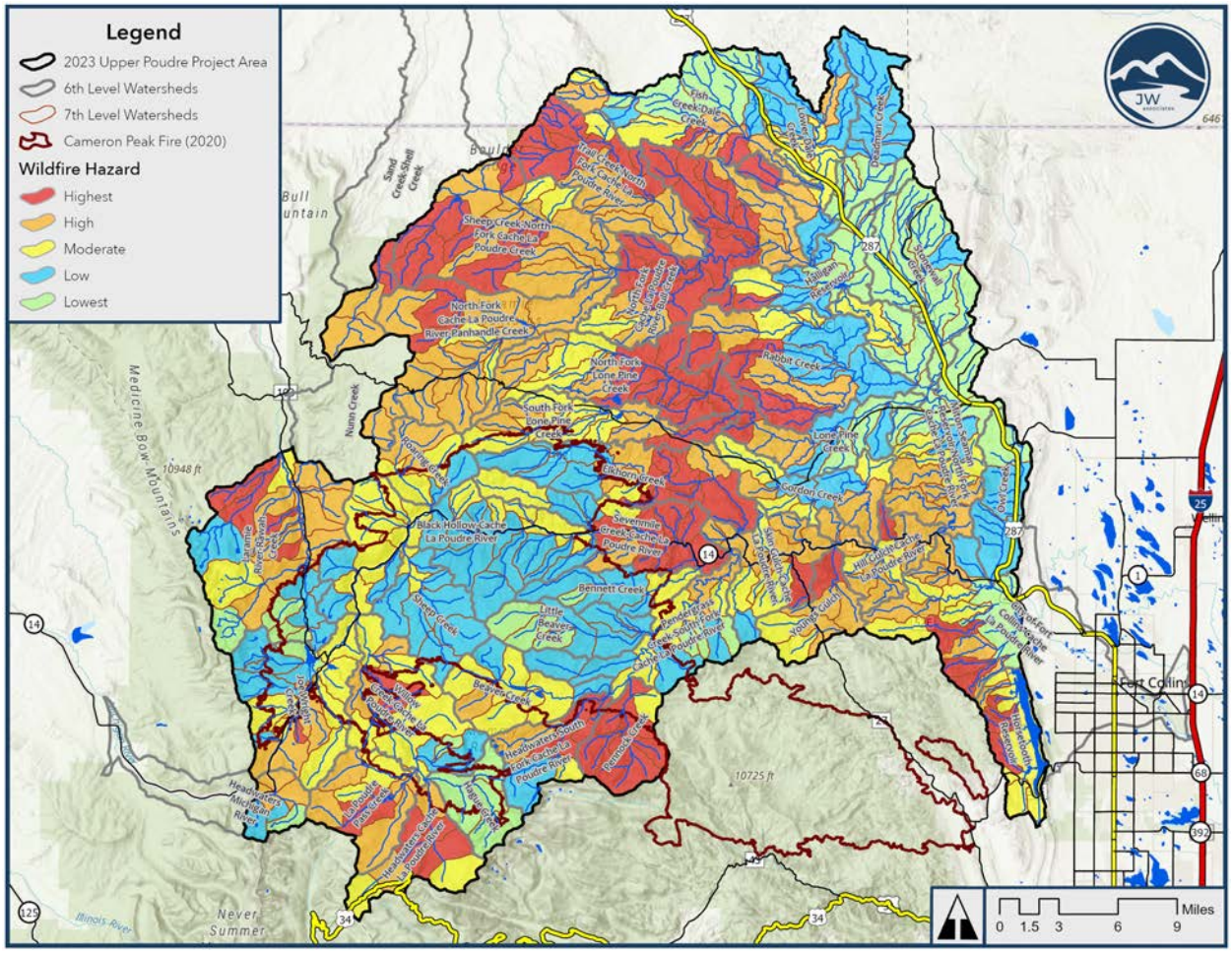
All 7th Level watersheds were then comparatively ranked by the crown fire activity metric.



Map 3. Upper Poudre Crown Fire Activity Modeling Results

Wildfire Hazard Ranking

Once the watersheds were ranked by flame length and crown fire activity, the two ranks were combined. Using the combined score, watersheds were ranked into five roughly equal categories from 1 (lowest overall wildfire hazard) to 5 (highest overall wildfire hazard). Map 4 presents the result of this analysis for all 7th Level watersheds. The complete categorization listing can be found in Appendix C.



Map 4. Upper Poudre Wildfire Hazard Ranking

Ecosystem Sensitivity Hazard

Ecosystem sensitivity includes both intrinsic or natural factors that can place stress on an ecosystem, as well as human alterations to ecosystem function. The impact on natural processes from these stressors may intensify in the presence of climate change. Examples of these types of stressors include landscape fragmentation, invasive species, fire regimes across the landscape, and insects and disease. Landscape fragmentation can inhibit or prevent the migration of flora or fauna in the face of a rapid change in climatic conditions, increasing the vulnerability of communities within the landscape. The introduction of non-native species can intensify competition for increasingly limited niches or habitats as well as altering fire regimes or increasing the landscape's vulnerability to fire. Historic human fire suppression, fragmentation and wildland-urban interface zones, which

have already altered historical fire patterns, can exacerbate the effects of increasing temperature and periods of drought. Insects and disease, endemic to forests ecosystems, may increase as a disruptive factor in the face of changing conditions that increase stress on vegetation. With a changing climate, different types of insects and diseases, adapted for warmer areas, may also move into forests that have not previously developed resilience. All these factors interact with each other and can describe the sensitivity to climate change for a specified area such as a watershed.

Landscape Condition (Alteration)

The amount of existing and potential fragmentation and human-induced stress within a landscape is reflected by the road network that has been established. As discussed by Riitters and Wickham (2003) the ecological impacts of roads extend tens to hundreds of meters from the road itself and include disrupting wildlife movements, modifying habitats, altering water drainage patterns, contributing to debris flow risk during flooding, and introducing non-native species. Roads also follow economic constraints and are designed to create connections, movement and development including further expansion of the road network. They often cross natural boundaries so their influence is not limited by natural constraints.

Roads effectively break up a landscape which reduces mobility of species, as well as changes the routing of water and other hydrological and ecosystem functions.

For this analysis, the NatureServe Landscape Condition Model was used to assess the landscape condition of each watershed (Hak and Comer, 2017). This model is a spatially-based 90 meter resolution assessment of the relative ecological effects of human land uses such as built transportation or urban and industrial infrastructure, including mining, and land cover changes such as for agriculture. The model also uses a decay parameter to account for the effect of each land use as it diminishes with distance away from the site. Each pixel value is scored from 1-100 on this relative landscape condition scale. The watershed mean landscape condition value was used in the ranking for this assessment.

Vegetation Departure from Resilient Conditions

Forested watersheds that are resilient would have a diverse forest canopy and age structure. Forest types can be classified into groups that can be assigned disturbance regimes and therefore, ranges of conditions that would be resilient within the current and future conditions. The forest types used in this analysis include: xeric ponderosa pine, mesic ponderosa pine, xeric mixed conifer, and mesic mixed conifer, lodgepole pine, and spruce-fir.

The 2020 Landfire vegetation types and canopy closure data was used for this analysis which reflects conditions following the Cameron Peak Fire (2020).

Montane Forest Ranking

The following forest types are part of the Montane Forest analysis: xeric ponderosa pine, mesic ponderosa pine, xeric mixed conifer, and mesic mixed conifer. Determination of resilient and non-resilient areas used the resilient definitions presented above in Forest Vegetation Type Resilience Descriptions, compared to the existing canopy closure. Table 6 shows the resilient canopy closure for each vegetation type, based upon the documented historic conditions and expected changes due to climate change (See Forest Vegetation Type Resilience Descriptions). In this analysis, the area with a canopy closure value above the average of the resilient canopy closure for that forest

type was considered non-resilient forested area. The non-resilient area within each 7th Level watershed was then divided by the total area of the watershed to determine the Montane Forest Rank Metric, using the following formula:

$$\textbf{Montane Forest Rank Metric} = \frac{(\text{Area Xeric PP} > 20\%\ \text{CC} + \text{Area Mesic PP} > 30\%\ \text{CC} + \text{Area Xeric MC} > 30\%\ \text{CC} + \text{Area Mesic MC} > 40\%\ \text{CC})}{\text{Watershed Area}}$$

Table 6. Resilient Canopy Closure for each Montane Forest Type

Forest Type	Resilient Canopy Closure (%)
Xeric Ponderosa Pine	15-25
Mesic Ponderosa Pine	20-35
Xeric Mixed Conifer	20-35
Mesic Mixed Conifer	35-50

Subalpine/Alpine (Spruce-Fir and Lodgepole Pine) Forest Ranking

Spruce, true firs and lodgepole pine are the dominant tree species in the Subalpine/Alpine Zone, with aspen stands on mostly northern aspects and more mesic sites. The canopy cover for the Subalpine/Alpine forest type is generally much higher than the montane forest, with an average of 75 percent (see Forest Vegetation Type Resilience Descriptions). Spruce-fir and lodgepole pine are both shade tolerant and therefore populate much denser stands than are common in the montane forest type. Therefore, it is not reasonable to predict resilience based on canopy closure alone. Because the canopy closure is typically high in these high elevation forest types, landscape-level diversity is important to maintaining a more resilient condition in this forest type.

For this analysis, the resilience in subalpine/alpine forests was predicted using a canopy closure diversity index. For the spruce-fir and lodgepole pine forest types, Simpson's Diversity Index (Simpson 1949) was calculated for canopy closure, providing the density diversity for forest type in each watershed.

Simpson's Diversity Index is a measure that characterizes species diversity in a community. Here it was used to characterize density diversity within forest types. The two main factors taken into account to measure diversity are richness (the number of different canopy cover values present in a particular area, here a 7th level watershed) and evenness (the similarity of the areas of each of the canopy cover values present). The equation used for the diversity index is the following:

$$\mathbf{D} = \frac{\sum \mathbf{n(n-1)}}{\mathbf{N(N-1)}};$$

where, n = total area within one canopy closure value and N = total area within all canopy closure values.

Using this index, a D of 0 represents infinite diversity and 1 represents no diversity. A D value was calculated for each 7th level watershed. The total non-resilient area for each spruce-fir and lodgepole pine was found by multiplying D x the total acres of that vegetation type in the watershed.

Composite Vegetation Departure from Resilient Conditions Ranking

In order to give equal weight to the montane forested areas and the subalpine/alpine forested areas, a single non-resilient ranking was calculated for both spruce-fir and lodgepole pine combined, the lodgepole & spruce-fir rank

metric. In order to do this, the total area of non-resilient forest, including both spruce-fir and lodgepole pine, was summed and divided by the total watershed area to give the metric for categorization. Using this metric, each 7th Level watershed was ranked using the assessment categorization scheme.

The composite ranking was calculated by adding the Montane Ranking to the Lodgepole & Spruce-fir Ranking for a new Composite Metric, which was then re-categorized using the assessment categorization scheme. The final rankings were categorized from 1 (high resilience) to 5 (low resilience). The categorized Vegetation Departure from Resilient Conditions by small watershed are displayed in Appendix C.

Forest Insect and Disease Risk

Climate change and human disturbance can affect the risk of damage and stress from insects and disease in multiple ways. Human disturbance can introduce non-native species to the ecosystem. Increasingly mild winters augment the overwintering survival rate of both native and introduced insect species. Drought and temperatures out of the range of normal can stress vegetation that is adapted to a cooler and wetter climate. These compounding factors may increase the impact of insects and disease as a disturbance agent, affecting forest health and ultimately stand structure and vegetative composition. Higher mortality rates from insects and disease over historical conditions may increase fuel loadings and further intensify wildfires.

In the last two decades, Colorado has experienced epidemics of mountain pine beetles and spruce beetles. These epidemics have caused high tree mortality across large swaths of forested landscapes. Colorado has also experienced many small to very large wildfires that have burned areas of those beetle-killed forests. Early research on the impacts of beetle mortality to wildfire behavior proposed that once trees lose their needles, fire behavior would be less intense compared to green trees. However, Hoffman et al. (2013) argued that the reduction in canopy biomass can result in greater wind penetration into the canopy which can increase wildfire rate of spread. The consensus of the firefighting community and technical post-fire restoration experts is that wildfires in beetle-killed forests have shown much more extreme wildfire behavior and resulted in some very large fires that have areas of high burn severity within areas of past beetle mortality.

Current Mortality

The insect mortality area and severity mapping created by Rodman et al. (2021) was used to calculate the average insect mortality in each 7th Level watershed. This research utilized Landsat time series products, as well as field data and Random Forest models to develop 30-m resolution maps of the presence and severity (cumulative percent basal area mortality) of beetle-caused tree mortality between 1997-2019 in subalpine forests across the Southern Rocky Mountains. For each 7th Level watershed, the mean pixel severity from 0-100 was calculated to create an insect mortality metric, accounting for both presence and severity across the entire watershed.

The current insect mortality severity was mapped throughout the project area. All 7th Level watersheds were then comparatively ranked by the insect mortality metric.

Effects of Mountain Pine Beetle mortality seen within a forest stand in northwest CO.

Future Mortality

The National Insect and Disease Risk Map defines forest areas where, "the expectation that, without remediation, at least 25% of standing live basal area greater than one inches in diameter will die over a 15-year timeframe (2013–2027) due to insects and diseases" (Krist et al. 2013). The mapping was updated in 2018 to account for reductions in hazard due to previous and ongoing tree mortality.

For the Upper Poudre watershed assessment area, the insects that apply to forested areas include:

- Mountain pine beetle
- Douglas-fir beetle
- Spruce beetle
- Western balsam bark beetle
- Western spruce budworm
- Aspen and cottonwood decline
- White pine blister rust
- Dwarf mistletoe

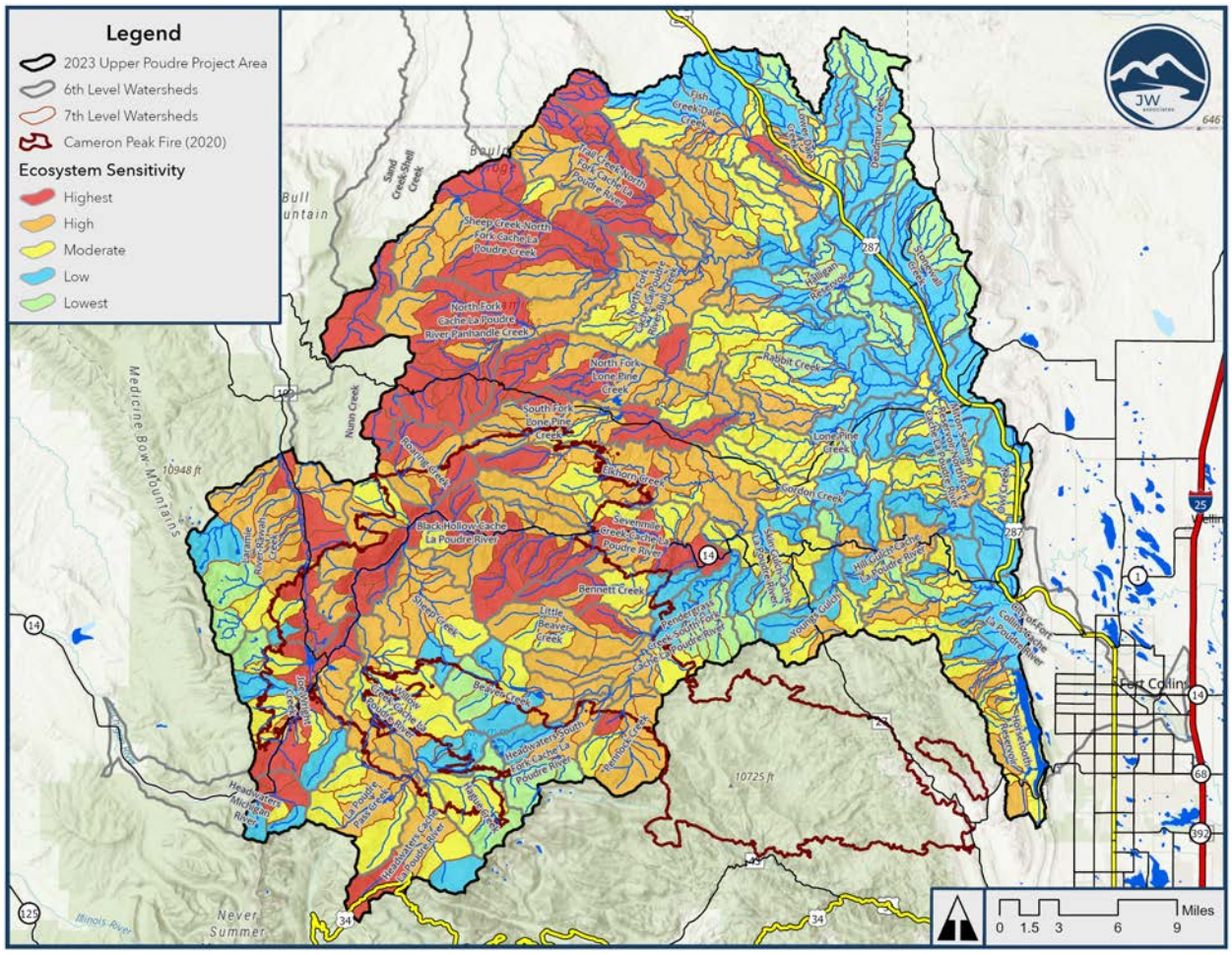
The *2018 National Insect and Disease Risk Map Update* is a 240-meter resolution map that represents areas of remaining risk for predicted future biomass loss. The area of remaining risk for each watershed was divided by the total watershed area. These scores produce an estimated hazard of predicted biomass loss in each 7th Level watershed. Watersheds are then ranked to indicate the relative risk of loss due to insects and disease within the wider study area.

Combined Forest Insect and Disease Ranking

The current canopy mortality ranking was combined with the future risk of insect and disease rank. All watersheds were then comparatively ranked by the overall insect mortality metric. The categorized Forest Insect and Disease Hazard by small watershed are displayed in Appendix C.

Ecosystem Sensitivity Hazard Ranking

The Ecosystem Sensitivity Hazard Rank was calculated by summing the Landscape Condition, Vegetation Departure from Resilient Conditions, and Forest Insect and Disease Risk ranks. The results of this calculation were ranked from 1 (lowest Ecosystem Sensitivity Hazard) to 5 (highest Ecosystem Sensitivity Hazard) to create the Ecosystem Sensitivity Hazard Ranking. The categorized Ecosystem Sensitivity Hazard Rank by watershed are displayed in Appendix C and Map 5.



Map 5. Upper Poudre Ecosystem Sensitivity Hazard Ranking

Adaptive Capacity Hazard

Adaptive Capacity is the ability of an ecosystem to respond to external stressors such as the effects of climate change. Landscapes that are more diverse provide more opportunities for organisms to find climate refuge than those that are relatively homogeneous (Comer et al., 2019). Conversely, an ecosystem that has little variability in microclimates or elevational change lacks buffers for species to move into new areas as the climate shifts. Therefore an indication of a landscape's or watershed's Adaptive Capacity can be found in the relative diversity of topography and microclimates. The adaptive capacity of an ecosystem is also dependent on the diversity of the species within it and their sensitivity to shifts in climate or ability to migrate within the landscape to new areas with

suitable microclimates (Rice et al., 2017). Therefore, there are several useful measures of the ability of an ecosystem to absorb climate change. Comer et al. (2019) defines three factors, which in combination provide an indicator of the potential for a given landscape to successfully buffer the effects of climate change.

Vegetation Type Diversity

Since individual species respond differently to disturbances, the more diverse the taxonomy of a landscape, the more likely it is that a function can be performed by more than one species should individual species be lost as the climate changes. Simpson's Diversity Index (Simpson, 1949) was used as an indicator for the vegetation diversity within watersheds.[6] This index is a well-established method to quantify the diversity of plant and/or animal species as well as the abundance of each species. Accounting for diversity in terms of both richness and evenness is important because although two communities may have the same number of species (richness), the community dominated by just one or two of those species is considered less diverse than the one in which many different species have a similar abundance (evenness). Simpson's Index (D) is calculated with the following formula:

$$D = \sum (n/N)^2;$$

where n = total acres of a particular species, and N = total acres of all species.

This index produces a scale from 0 (high diversity) to 1 (low diversity). The value of D was calculated for each watershed and the watersheds were then ranked from 1 (high diversity, low hazard) to 5 (low diversity, high hazard).

Topo-Climatic Variability

The distribution of a natural community is determined by both regional and micro-climatic factors of temperature and precipitation. For example, limited topographical relief may provide a wide area of distribution but only gradual change over distance, while rugged canyons and mountain ranges offer numerous microclimates that provide opportunities for rapid change in vegetation types over short distances. The idea of climate change "velocity" has been proposed as a measure of climate change exposure and the concept reflects the interaction of changing climate with topography (Loarie et al. 2009). Areas with rugged topography and significant elevational gradients (low velocity) will support a greater diversity of microclimates as compared with areas of flat topography (high velocity). Given the same degree of climate change over the same time period, a species in a rugged topographic environment would be required to migrate a shorter distance than a species in an expansive and flat landscape (Comer et al. 2019).

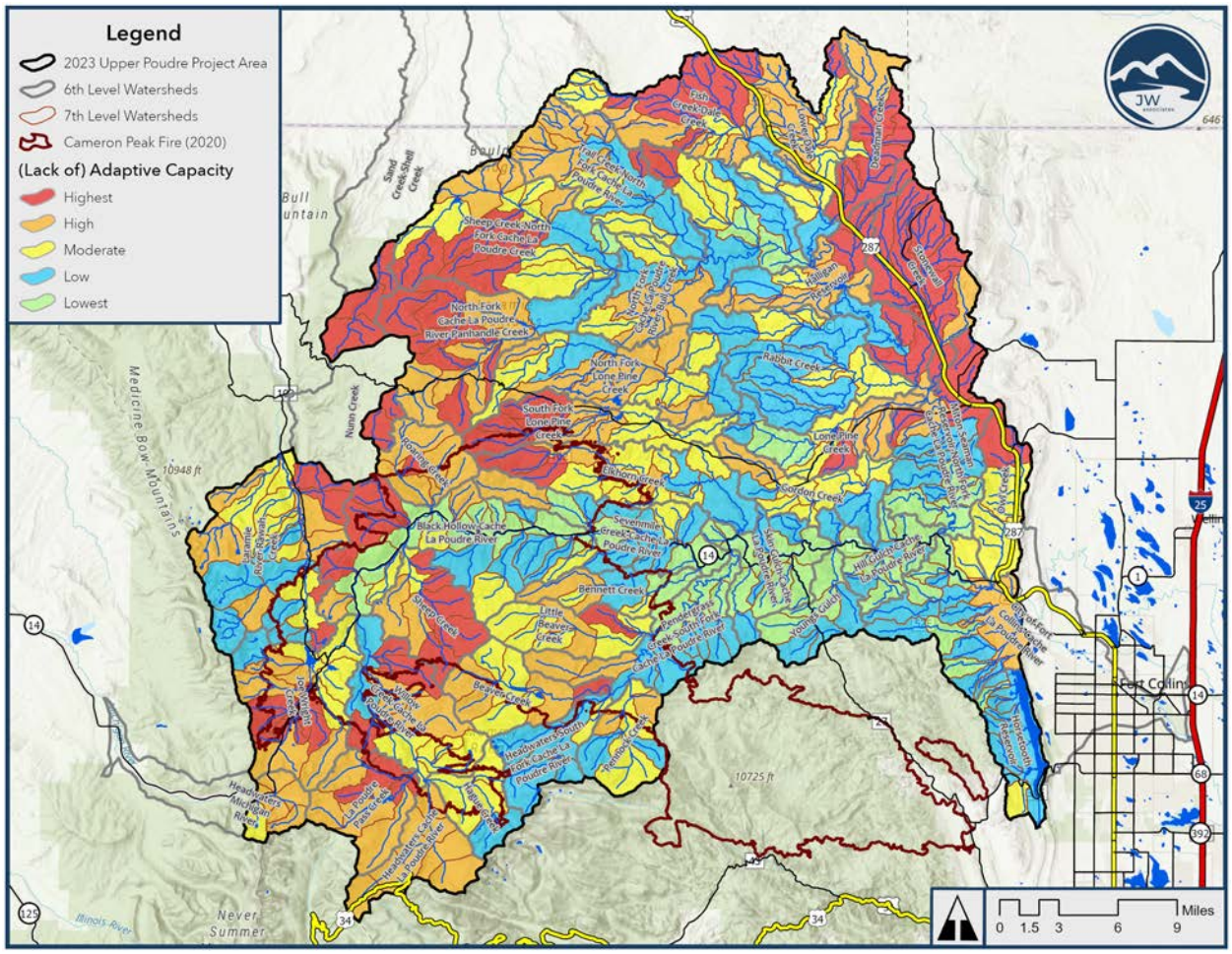
Example of a landscape with a range of micro-climates within variable topography.

[6] Comer et al. (2019) uses a diversity component called Functional Species Groups (FSGs). Ecosystems or communities with FSGs that have rich internal diversity tend to be more resilient to external stressors (Folke et al. 2004, Walker et al. 2004, Nyström et al. 2008). However, the data on the FSGs for the area of study are incomplete and the relative difference between the known FSGs in the study area are too small to create a useful ranking scheme. Therefore, Simpson's Diversity Index was used instead.

Maps of terrain ruggedness express the influence of topography on microclimate variability (Comer et al. 2018). Riley et al. (1999) provided a terrain ruggedness index (TRI) that an be used to arrive at a measure of this influence. This analysis was completed and then an average TRI calculated for each watershed.

Adaptive Capacity Hazard Ranking

The Adaptive Capacity Hazard Rank was calculated by summing the Simpson's Diversity and Topo-Climatic Variability ranks[7]. The results of this calculation were ranked from 1 (lowest Adaptive Capacity Hazard or highest Adaptive Capacity) to 5 (highest Adaptive Capacity Hazard or lowest Adaptive Capacity) to create the Adaptive Capacity Hazard Ranking. The categorized Adaptive Capacity Hazard Rank by watershed are displayed in Appendix C and on Map 6.

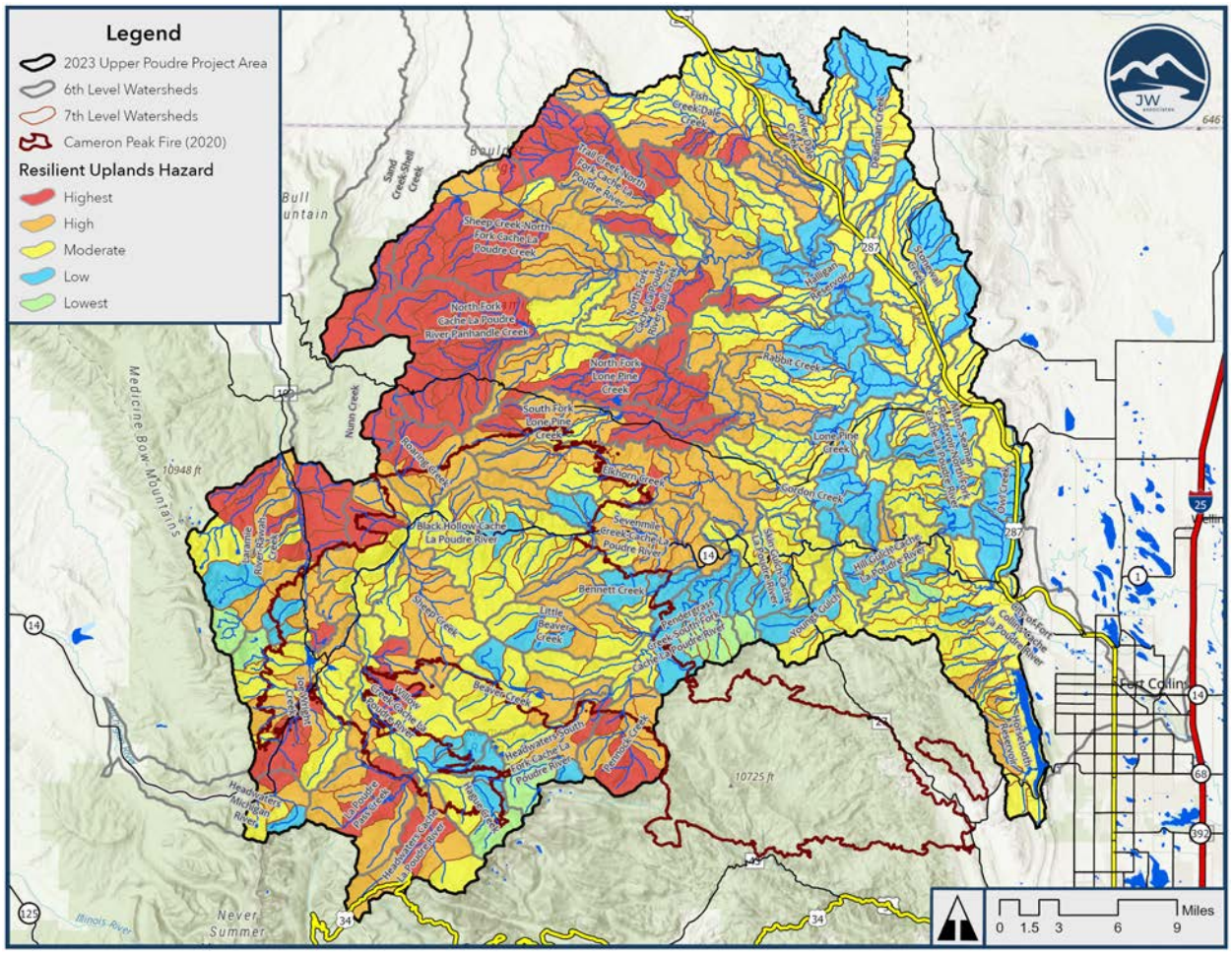


Map 6. Upper Poudre Adaptive Capacity Hazard Ranking

[7] Adaptive Capacity may also be affected by the vulnerability to climate change for individual species who provide "keystone" functions for the ecosystem. Within the Big Thompson Forest Health Assessment area, the only keystone species is aspen which is identified within two of the forest types (Comer et al. 2018). Because of the very limited number of keystone species this component of the analysis was not used.

Resilient Uplands Ranking

The Value A - Resilient Uplands Ranking was calculated by summing the Wildfire Hazard, Ecosystem Sensitivity, and Adaptive Capacity Hazard ranks. The results of this calculation were ranked from 1 (least Resilient Uplands) to 5 (most Resilient Uplands). The categorized Resilient Uplands Rank by watershed are displayed in Appendix C and on Map 7.



Map 7. Upper Poudre Resilient Uplands Hazard Ranking

VALUE B: RESILIENT WATERSHEDS AND RIVER CORRIDOR

The Cache la Poudre River and its aquatic ecosystems should maintain key ecological and hydrological functions, including connection to the floodplain and diverse aquatic habitats. A resilient, functioning river corridor would provide the following ecosystem benefits and services: biodiversity, downstream flood and erosion protection, fish habitat, reduced sediment delivery, and recreation. Forested watersheds are at risk from wildfire, drought and insects and disease, which can all lead to erosion and increase the likelihood of debris flows that impact downstream river corridors. Human impacts such as constructing and maintaining roads within these watersheds can also pose a risk to the health and resilience of watershed function, floodplain connection, and aquatic ecosystems.

The analysis of Value B - Resilient Watersheds and River Corridor is based upon the following four factors that are described below:

- Roads
- Debris Flow
- Hillslope Erosion
- Sediment Transport

Roads Hazard

Roads pose a potential hazard to healthy watershed function and can amplify post-fire or flooding impacts. Roads can convert subsurface runoff to surface runoff and then route the surface runoff in a ditch or on the road surface to stream channels, increasing both peak flows and suspended sediment in the stream (Megan and Kidd 1972, Ice 1985, and Swanson et al. 1987). Often culverts on forest roads are not adequately sized for the conditions that may occur during peak flows, especially post-fire. This can lead to over-topping of the road, increasing erosion of the road fill, and the risk of debris flows stemming from road failure. Even if culverts are adequately sized, road erosion and the subsequent transport of sediments during high flow events can be a significant contributor to in-stream sediments. Forest roads are usually the largest source of long-term sediment in forested watersheds (Elliott 2000, MacDonald and Stednick 2003).

Road Blowout in Cabin Creek in the East Troublesome Fire Area 2022

The potential hazard posed by roads in these watersheds was evaluated by considering the density of different road features that pose risks for flooding and possible contributions to debris flows in vulnerable watersheds.

The roads that are of interest in this analysis are those roads that would increase the risk of flooding or debris flows following wildfires. Within all watersheds, the roads data was overlaid onto digital images and vegetation mapping. The roads data used on National Forest System (NFS) lands was the U.S. Forest Service roads data, which is the most accurate data for those roads. On all other lands county and Colorado Department of Transportation roads data were used. The roads layer was checked visually against digital imagery data.

Road Densities

Total Road Density

Watersheds with higher road densities have a higher sensitivity to increases in peak flows, and therefore flooding, following wildfires. Road density in miles of road per square mile of watershed area was used as an indicator of flooding hazard.

The total length of each road type in each 7th Level watershed was divided by the watershed area. The watersheds were then ranked from lowest to highest overall road density.

Roads Close to Streams

Roads close to streams can become major sources of sediment during flooding or higher post-fire peak flows. In order to quantify this effect, the density of roads near streams was determined by calculating the length of roads located within a 100-meter stream buffer.

The total length of roads within the 100-meter stream buffer in each 7th Level watershed was divided by the watershed area. The watersheds were then ranked from lowest to highest density of roads close to streams.

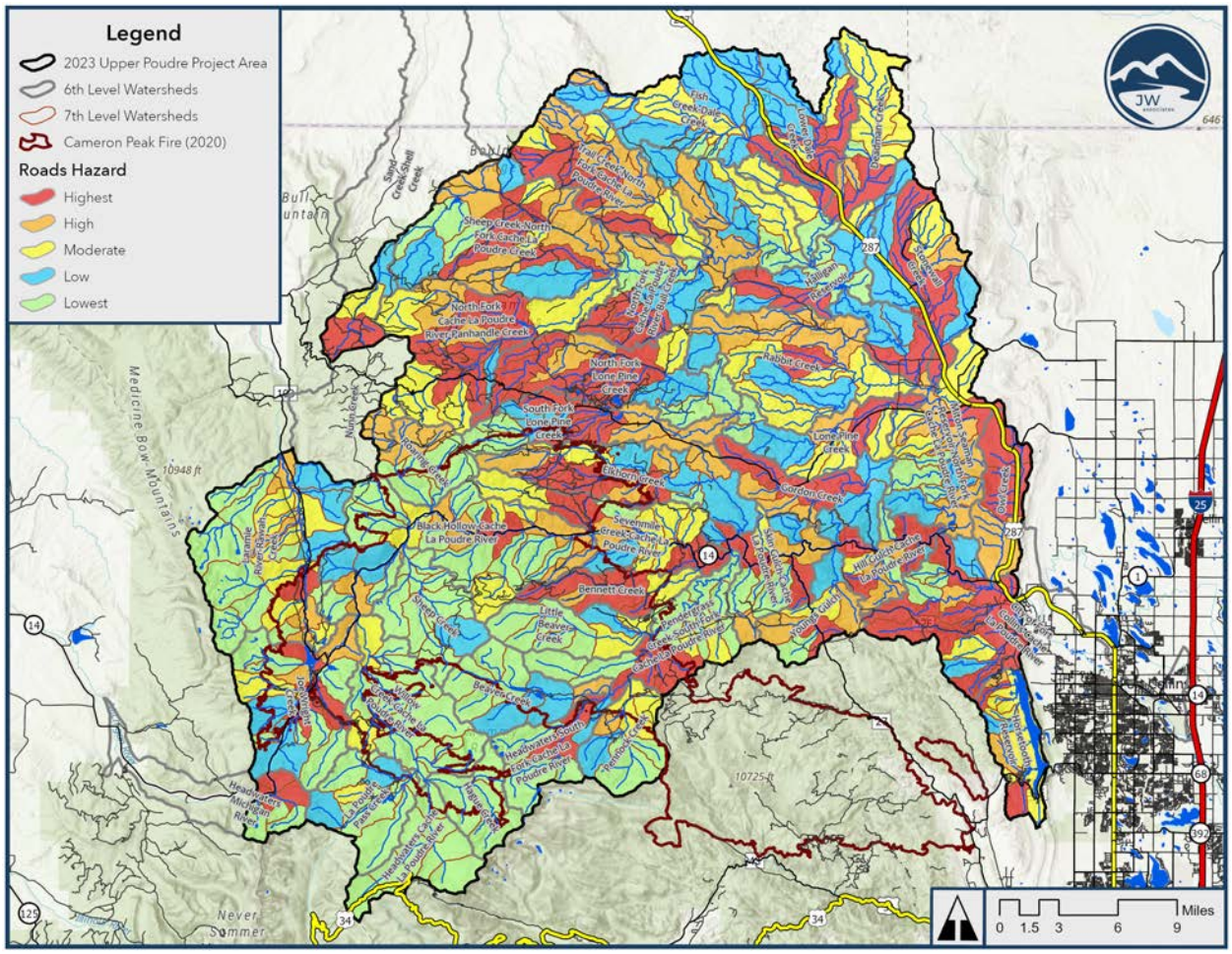
Road/Stream Crossings

Road/stream crossings are locations where overtopping of roads, clogging of culverts and subsequent erosion and possible blow-out can occur. The number of road/stream crossings were manually acquired using the road and stream layers in combination with aerial imagery verification. Note that this analysis does not evaluate the design adequacy of these road/stream crossings.

The total number of crossings in each 7th Level watershed was divided by the watershed area. The watersheds were then ranked from lowest to highest density of road/stream crossings.

Roads Hazard Ranking

The results for all three road density ranks were combined and the results were grouped into roughly equal categories ranked from 1 (lowest) to 5 (highest) to create the Roads Hazard Rank. Map 8 and Appendix D present the results of this categorization.



Map 8. Upper Poudre Roads Hazard Ranking

Debris Flow Hazard

Rapid runoff from burned areas can result in high peak flows that may overwhelm the stream bank armoring. These events can result in rapid destabilization of the stream channel which can initiate a debris flow. Debris flows contain water but can also carry sediment, rocks, boulders, woody debris and whole trees. A recent example of a destructive and tragic debris flow is the Black Hollow debris flow that occurred in 2021 after the Cameron Peak Fire. In addition to taking out six homes and killing four people, this debris flow had major water quality impacts on the Cache La Poudre River, killed fish for miles downstream, and impacted the stream channel itself (Blumhardt, 2022). The unstable stream channels that produce debris flows generally are sources of increased stream bank sediment yield for years following the event. The 2022 water quality report from the City of Fort Collins describes this debris flow event, its impact on the Poudre River and the water treatment processes:

> "The initial surge of debris and sediment resulted in extremely high turbidity levels in the CLP river (several thousand NTU), which required water treatment facilities to shut down their intakes on the CLP river and treat alternate water supplies. Turbidity remained elevated and highly variable for several weeks following the event, which continued to pose treatment challenges. The extreme amount of sediment from this event eventually settled on the banks and bottom of the river channel providing an additional source of sediment during subsequent flood events in August and snowmelt runoff in 2022. The

> sediment and ash that were stored on the bottom and banks of the Poudre River in 2021 were mobilized during snowmelt runoff in 2022, leading to elevated turbidity and suspended sediment. Turbidity levels in 2022 were much higher and more variable than pre-fire conditions and required water treatment plants to shut down their intakes on the CLP river on several occasions to avoid the polluted water."
>
> -Heath and Thorp (2023)

The rapid movement of water, sediments and debris from flooding and debris flows can overwhelm or damage water supply infrastructure in the short term. The material deposited in-stream during the debris flow event can also cause longer term problems as the sediments and larger materials may continue to move downstream for months to years after the event occurs. Debris flow likelihood is influenced predominantly by the steepness or ruggedness of the watershed and the rainfall intensity of a storm event, combined with the amount of moderate or high burn severity following wildfire.

Black Hollow Debris Flow 2021 - Cameron Peak Fire

Ruggedness

Watershed steepness or ruggedness is an indicator of the relative sensitivity to debris flows following wildfires (Cannon and Reneau 2000). The more rugged the watershed, the higher its sensitivity to generating debris flows following wildfire (Melton 1957). The Melton ruggedness factor is basically a slope index of upslope catchment height and the catchment area. Numerous studies have shown that the Melton ruggedness number is a valuable evaluation tool to discriminate between basins with debris flow potential and those where sediment transport processes are more dominated by bedload (Marchi and Fontana, 2005). Melton (1957) defines ruggedness, R, as

$$R = H_b A_b^{-0.5};$$

where A_b is basin area and H_b is basin height measured from the point of highest elevation along the watershed divide to the outlet.

The Ruggedness Number (R) in some watersheds was adjusted because the value did not accurately reflect the steepness of some of the contributing tributaries. This most commonly occurs in composite watersheds that are disconnected from their headwaters. These watersheds can have a higher hazard for debris flows than is indicated by the ruggedness calculation because they contain a main stem of a creek or river which does not reflect the steepness of the first order streams that enter the main stem as tributaries. In those situations, the ruggedness calculation was adjusted up by reducing the watershed area.

Once Ruggedness was calculated for all 7th Level watersheds, the watersheds were grouped into roughly equal categories from lowest to highest ruggedness.

Post-Wildfire Debris Flow Hazard

The United States Geological Survey (USGS) created a method for estimating the post-fire debris flow hazards for watersheds before wildfire occurs (Staley et. al., 2018). This is a prediction technique that combines wildfire modeling with other debris-flow indicators including slope and soil erodibility in order to predict the post-fire debris flow hazards in response to a triggering rainfall event.

The variables included in the model are described below. The model was run for a triggering rainfall event intensity that is selected based on the 2-year return interval storm. This is nearly a 1-year storm across the entire watershed analysis area. The likelihood (probability) of this type of rain event causing a debris flow was calculated for each 7th Level watershed. The watersheds were then grouped into roughly equal categories from lowest to highest hazard. The following discussion describes the variables used in the debris flow estimation model.

Soil Burn Severity and Slope

IFTDSS crown fire activity modeling output described above. Results are presented in the following four classifications:

Non-burnable - Unburned
Surface Fire - Low Burn Severity
Passive Crown Fire - Moderate Burn Severity
Active Crown Fire - High Burn Severity

Slope is calculated in degrees from a 10-meter digital elevation model (DEM). The proportion of watershed area burned at high or moderate burn severity with gradient in excess of 23 degrees is used in the model equation.

difference Normalized Burn Ratio (dNBR)

The USGS completes an Emergency Assessment of Post-Fire Debris-Flow Hazards following western US wildfires. This assessment uses the difference Normalized Burn Ratio (dNBR) image from remote sensing and field validated soil burn severity. The Normalized Burn Ratio (NBR) is an index designed to highlight burned areas in large fire zones by calculating a ratio from two different infrared satellite images. The difference between the pre-fire and post-fire NBR obtained from the images is used to calculate the dNBR, which then can be used to estimate the burn severity.

In lieu of this data for pre-fire estimation of post-fire debris flow hazard, the USGS defined a range of potential fire severities for a given area based on the historical statistical distribution of burn severity metrics in each vegetation class. Therefore, using the Landfire vegetation type, dNBR values can be estimated and then used in the debris-flow hazard model.

Actual burn severity depends on a number of variables in addition to vegetation type, including soil moisture deficit, fuels, wind direction, etc. In order to narrow the range of possible dNBR values calculated, a simple scaling variable (Pdsim, between 0-1) is used to control the severity of the fire simulated (Staley et al., 2018). In our modeling, we use a value of Pdsim = 0.75. The severity of a wildfire can be quite variable depending on conditions, but the intensity and severity of wildfires across the western United States have been increasing since the mid-1980's (Westerling, 2016). A value of 75% on the intensity spectrum produces dNBR values that predict a fire on the more severe end of the spectrum, while maintaining a burn character across the entire area that is similar to what Colorado has experienced in recent years. After simulating dNBR values for the 2020 fires in

Colorado, and comparing the values to the actual post-fire remote sensing images, this value for Pdsim produced a dNBR image in line with those large fires.

Soil Erodibility

The inherent susceptibility of soil to erosion for just the fine fraction of soils (KF-factor), from the STATSGO and SSURGO databases (see description below with the Soil Erodibility Hazard Ranking).

15-min rainfall intensity in mm/hr

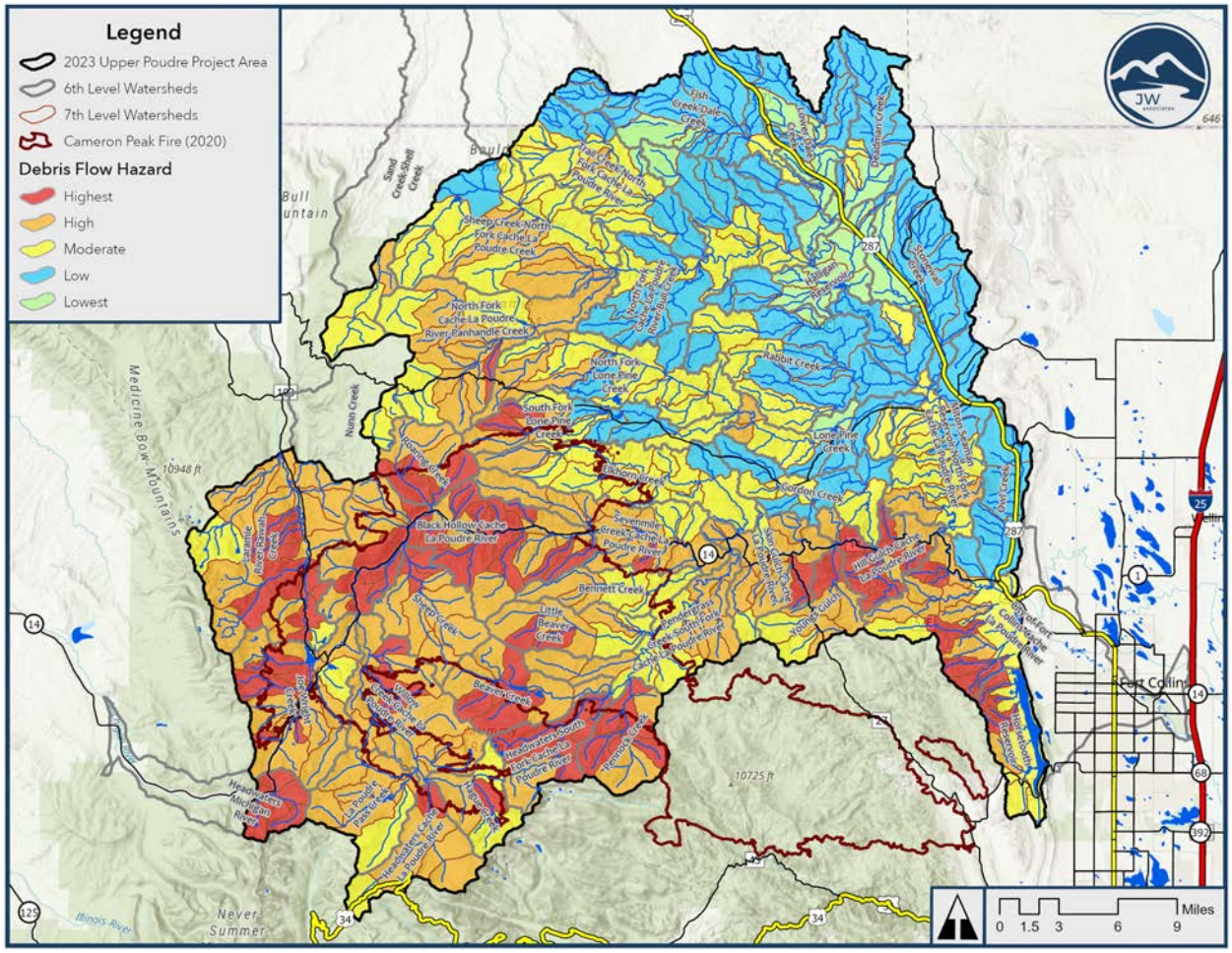
The National Oceanic and Atmospheric Administration (NOAA) produces point precipitation frequency estimates across the country. These estimates are then used to produce a spatially interpolated GIS grid for precipitation frequency estimates using the Parameter-elevation Regressions on Independent Slopes Model (PRISM) at a 30 arc-seconds resolution (OHD-HDSC- NOAA). These estimates are determined for both a duration (5-min to 60 day) and storm return interval (1 year to 1,000 years).

A design storm is needed as input for the USGS post-fire debris flow model. The 15-min storm duration at a 2-year return interval, partial duration series, is used for the design storm. In a post-fire situation, a storm with a return interval greater than 2 years will cause most watersheds to produce a debris flow in the model; therefore, in order to attain distinctions between watersheds for this ranking method, the 2-year storm is used. Even though it may not seem like a very large event, this storm has a 50% chance of happening every year and in a post- fire situation is likely to produce debris flows.

The mean of all pixels in the watershed for the partial duration series 15-min duration, 2-year return interval storm was calculated from the NOAA precipitation frequency grid data. The mean storm amount in mm/hr was used as the design storm input in the USGS post-fire debris flow model.

Debris Flow Hazard Ranking

The Debris Flow Composite Hazard combines the Ruggedness and Post-Wildfire Debris Flow Hazards. This rank was calculated for all 7th Level watersheds, and the watersheds were grouped into five roughly equal categories from lowest to highest Debris Flow Composite Hazard. Map 9 and Appendix D present the results of this categorization.



Map 9. Upper Poudre Debris Flow Hazard Ranking

Hillslope Erosion Hazard

High severity fires may affect critical watershed function, dramatically altering runoff and erosion processes in watersheds, particularly if followed by high-intensity rainfall events. Sediment yields from hillslopes that have been burned at a moderate to high severity tend to be an order of magnitude higher than those burned at low severity (Johansen et al. 2001, Gannon et al. 2017) High severity fires consume more of the forest floor than low severity fires, exposing forest soils and thereby increasing both sediment and water yields (Wells et al. 1979, Robichaud and Waldrop 1994, Soto et al. 1994, Neary et al. 2005, and Moody et al. 2008). Hyrdophobic soil layers are also a byproduct of high severity fires. These layers are formed by the heat- and fire-induced volatilization of organics,

which results in a waxy, water repellent layer. These hydrophobic layers reduce infiltration rates and exacerbate runoff (Hungerford et al. 1991).

The delivery of hillslope sediments to surface waters has numerous ramifications for water supply infrastructure, including both the physical effects of sediment deposition in surface waters as well as chemical changes to water quality. An increase in sediments delivered to the streams or reservoirs can alter and/or increase treatment requirements. Sediments that are deposited in surface waters bring nutrients that may promote the growth of algae, affecting water taste and odor. Dissolved organic carbons can form potentially carcinogenic by-products during disinfection. An increase in sediments can also mean an increase in metals delivered to water treatment facilities. Increases in any of these types of factors will lead to a subsequent increase in treatment costs (Writer and Murphy 2012). Additionally, drinking water treatment processes are most efficient when source water quality remains constant. The effects of wildfire vary spatially and temporally, and when combined with the high variability of precipitation events, can result in unequal system loading and the need for site specific treatment plans (Writer and Murphy 2012). Additionally, the magnitude and duration of post-fire water quality effects is difficult to predict making it complicated for water providers to evaluate risks and develop management strategies (Writer and Murphy 2012, Bladon et al. 2014, Martin 2016).

Soil movement initiates high in the watershed and forms rills or gullies below that channel erosion. Photo: signs of this process occurring, following the Cameron Peak Fire.

Soil Erodibility

Colorado Forest Restoration Institute (CFRI) completed a detailed hillslope erosion analysis for the Northern Colorado Fireshed Quantitative Wildfire Risk Assessment (Rhea et al., 2022). The results of that analysis were used here to quantify post-fire erosion hazards. The mean pixel value for the magnitude of hillslope erosion was calculated for each watershed and the hillslope erosion was ranked for all small watersheds. The Soil Erodibility Metric was calculated for each watershed. The watersheds were then grouped by this metric into five roughly equal categories and ranked from 1 (lowest soil erodibility) to 5 (highest soil erodibility) to create the Soil Erodibility Ranking.

Granitic geology creates highly erosive soils, which are especially hazardous in post-fire situations where ground cover is quite minimal.

Granitic Geology

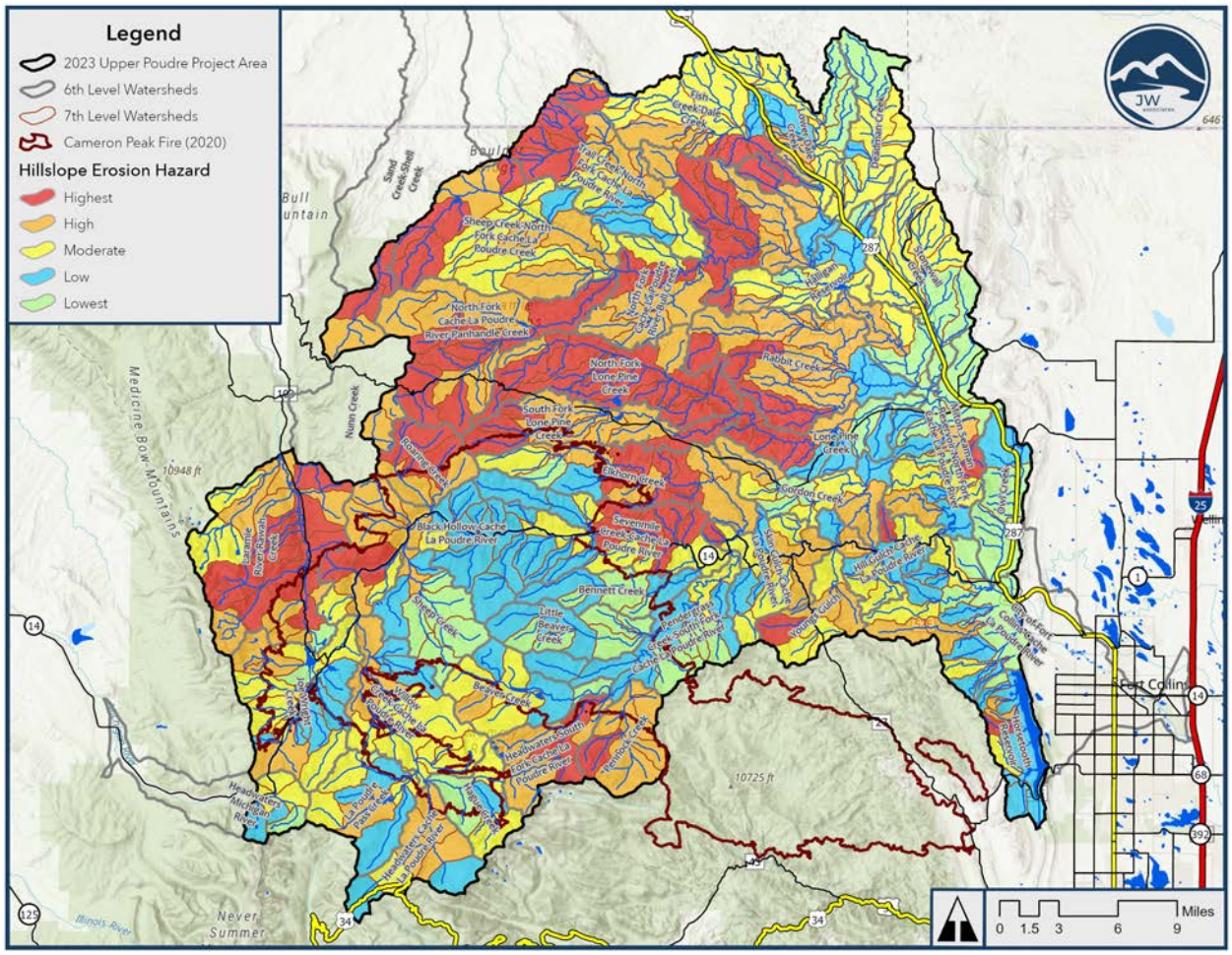
The presence of granitic parent material and granitic soils in the watershed increases potential soil erosion. Slope failures, landslides, debris flows, and rockfall avalanches are all characteristic failures in areas with granitic parent material (Durgin, 1977). Soil scientists have observed that the K-factor alone does not adequately identify soil erodibility on granitic soils. Therefore, the erodibility rating was

augmented for those watersheds where substantial areas of granitic parent material or granitic soils exist.

The Colorado state and the Wyoming state geology layers were used to identify areas of granitic and phaneritic (coarse grained) plutonic geology. The 7th Level watersheds were then ranked by percent area of granitic parent material or granitic soil, using the assessment categorization scheme.

Hillslope Erosion Hazard Ranking

The results for both the soil erodibility and granitic geology ranks were combined and the results were grouped into roughly equal categories ranked from 1 (lowest soil erodibility) to 5 (highest soil erodibility) to create the Soil Erodibility Ranking. These results are presented in Appendix D and on Map 10.



Map 10. Upper Poudre Hillslope Erosion Hazard Ranking

Sediment Transport

Understanding sediment generation and movement in watersheds and stream systems can provide valuable information on the hazards that disturbances might present to streams, water quality, and water supply infrastructure. Sediment transport and deposition is a complicated process in natural stream systems. A simplified analysis was used in order to characterize sediment transport and deposition across many watersheds and provide a tool for use in targeting pre- and post-fire watershed protection activities.

This analysis used geomorphic indicators to evaluate where, and to what extent, in-stream sedimentation would occur after disturbance events. These indicators were used to rank the sensitivity of stream junctions to accumulating large deposits of sediment and debris, as well as channel changes in response to increased loads of sediment.

Although they interact, sediment transport and deposition are two distinct processes. For the Upper Poudre Watershed analysis, sediment transport is separated from sediment deposition. It was determined that sediment transport more directly affects Value B - Resilient Watersheds and River Corridor, and sediment deposition more directly affects Value C - Reliable Water Supply. The descriptions of each may relate to each other, much like the processes themselves, but the analyses remain discrete.

Rosgen Stream Types

The streams of the assessment area were classified according to the Level 1 Rosgen classification method (Rosgen 1994). A Level 1 assessment characterizes streams based upon morphological characteristics. This characterization integrates the landform and fluvial features of the valley morphology with channel relief, pattern, shape and dimension. The longitudinal profiles inferred from topographical map layers and aerial imagery serve as the basis for breaking the stream reaches into slope categories that reflect profile morphology (Rosgen 1994). The characteristics of seven channel types are displayed in Table 7. The gradients and sinuosity measurements for each stream reach were determined using GIS. The sinuosity estimates using the existing stream line layers were determined to be relatively imprecise for stream classifications. Therefore, channel slope and inferred valley confinement were used as the main factors in classifying streams.

In general, stream channel positions in the drainage network and sediment transport characteristics of stream reach-level morphologies define source, transport, and response reaches (Montgomery and Buffington 1997). In steep areas, source reaches are transport limited and sediment storage sites are subject to intermittent debris flow scour (colluvial). Transport reaches are morphologically resilient, high-gradient, supply limited channels (bedrock, cascade, and step-pool) that rapidly convey increased sediment inputs. Response reaches are low-gradient, transport limited channels (plane-bed, pool-riffle, braided) in which significant morphologic adjustment occurs in response to increased sediment supply (Montgomery and Buffington 1997).

Table 7. Summary of Rosgen Criteria for Broad-Level Characterization[8]

Stream Type	General Description	Entrench-ment Ratio	Width/ Depth Ratio	Sinuosity	Slope	Landform/ soils/features
Aa+	Very steep, deeply entrenched, debris transport streams	< 1.4	< 12	1.0 to 1.1	> 0.10	Very high relief. Erosional, bedrock or depositional features; debris flow potential. Deeply entrenched streams. Vertical steps with/ deep scour pools; waterfalls
A	Steep, entrenched, cascading, step/pool streams. High energy/ debris transport associated with depositional soils. Very stable if bedrock or boulder dominated channel	< 1.4	< 12	1.0 to 1.2	0.04 to 0.10	High relief. Erosional or depositional and bedrock forms. Entrenched and confined streams with cascading reaches. Frequently spaced, deep pools in associated step-pool bed morphology
B	Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks	1.4 to 2.2	> 12	> 1.2	0.02 to 0.039	Moderate relief, colluvial deposition and/or residual soils. Moderate entrenchment and W/ D ratio. Narrow, gently sloping valleys. Rapids predominate with occasional pools
C	Low gradient, meandering, point bar, riffle/pool, alluvial channels with broad, well defined floodplains	> 2.2	> 12	> 1.4	< 0.02	Broad valleys with terraces, in association with floodplains, alluvial soils. Slightly entrenched with well-defined meandering channel. Riffle-pool bed morphology.
D	Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.	n/a	> 40	n/a	< 0.04	Broad valleys with alluvial and colluvial fans, Glacial debris and depositional features. Active lateral adjustment, with abundance of sediment supply.
DA	multiple channels, narrow and deep with expansive well vegetated floodplain and associated wetlands. Very gentle relief with highly variable sinuoisties. Stable streambanks.	> 4.0	< 40	variable	< 0.005	Broad low gradient valleys with fine alluvium and/or lacustrine soils. Anastomosed (multiple channel) geologic control creating fine deposition with well vegetated bars that are laterally stable with broad wetland floodplains.
E	Low gradient, meandering riffle/ pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.	> 2.2	< 12	> 1.5	< 0.02	Broad valley/meadows. Alluvial materials with floodplain. Highly sinuous with stable, well vegetated banks. Riffle-pool morphology with very low width/depth ratio.
F	Entrenched meandering riffle/ pool channel on low gradients with high width/ depth ratio	< 1.4	> 12	> 1.4	< 0.02	Entrenched in highly weathered material. Gentle gradients, with a high W/D ratio. Meandering, laterally unstable with high bank erosion rates. Riffle-pool morphology
G	Entrenched "gully" step/ pool and low width/depth ratio on moderate gradients	< 1.4	< 12	> 1.2	0.02 to 0.039	Gully, step-pool morphology with moderate slopes and low W/D ratio. Narrow valleys, or deeply incised in alluvial or colluvial materials; i.e., fans or deltas. Unstable, with grade control problems and high bank erosion rates

[8] Rosgen 1994

Source reaches are generally located in steeper areas where there is a supply of sediment available for movement downstream (sediment source areas). Although these reaches are high gradient and fast moving, the amount of sediment available for transport usually exceeds the ability of the stream to move the sediments. These reaches are generally smaller tributaries or headwater areas where the streamflow is limited. Sediments are moved intermittently from the source reaches during peakflow or following a disturbance event such as a high severity wildfire followed by a storm. Because of high gradients and velocities in these streams, peak flows can move large amounts of sediment.

Some reaches may have a greater capacity to transport sediments than the surrounding watershed and upper reaches can supply. These reaches are considered "supply limited" and have higher streamflows than source reaches and higher velocities than response reaches. Most sediment that is delivered to the reach is transported downstream. These stream reaches are called transport reaches, a reflection of their ability to move sediment downstream.

Lower gradient stream reaches are generally not able to transport all the sediment that is delivered to them from upper stream reaches, tributaries or the surrounding watershed. These reaches are "transport limited" because their ability to transport sediment is exceeded by the amount of sediment supplied to them. Increased sediment delivery to these reaches is deposited in the reach rather than transported further downstream. Therefore, these stream reaches are called response reaches. Response reaches are typically pool-riffles or braided channels and although they tend to have the highest streamflow in the system because of the higher water volume lower in the watershed, they are the slowest moving. Transport of sediments deposited in response reaches usually occurs during peak flow events (snowmelt runoff or summer rainstorms).

Sediment deposition in response reaches is a natural process. The sediment will form bars or be stored in banks, floodplains, etc. and the reach will retain its function. However, when sediment yield is increased or a catastrophic event occurs higher in the watershed, the amount of sediment delivered by a transport or source reach can overwhelm the response reach with sediment deposition and debris. The reach may move outside of dynamic equilibrium and not function properly until peak flow events possibly restore the channel to a functioning condition (dynamic equilibrium) by transporting the excess sediment downstream.

Stream segments were systematically identified as either "source," "transport," or "response" based on their Rosgen channel type (Table 8). The spatial distribution of source, transport, and response reaches governs the distribution of potential impacts and recovery times for the system.

Table 8. Relationship Between Sediment Transport Characteristics[9] and Rosgen Channel Type

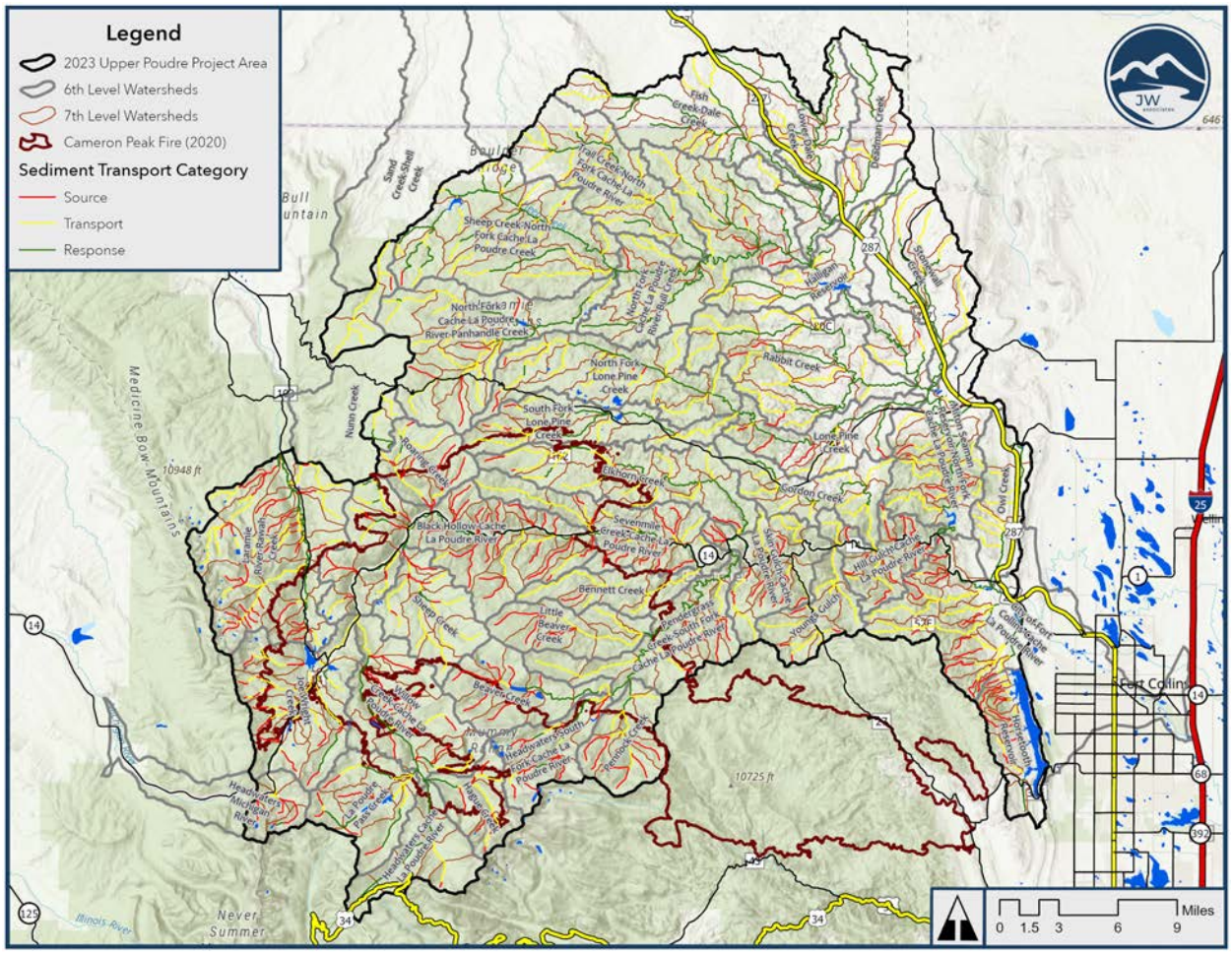
Sediment Transport Characteristics	Rosgen Channel Type	Gradient
Source	Aa+	> 0.10
Transport	A	0.04 to 0.10
	B	0.03 to 0.039
	G	0.03 to 0.039
Response	B	0.02 to 0.03
	G	0.02 to 0.03
	C	< 0.02
	E	< 0.02

Sediment Transport Hazard Ranking

Using the USGS 30-meter DEM, the gradient of each stream reach was calculated to identify streams that are source, transport, and response reaches. Map 11 shows the classified streams in the Upper Poudre Watershed. The miles of source and transport streams were calculated for each 7th Level watershed and divided by the watershed area to give an indicator for the relative sediment transport, or Transport Hazard Metric for each watershed (see following formula). The source streams were weighted by a factor of 2. The response streams were not considered in this metric because they are unlikely to deliver sediment downstream.

$$\textbf{Transport Hazard Metric} = \frac{(\text{Miles of transport stream} + 2 \times \text{miles of source stream})}{\text{Watershed Area}}$$

[9] Montgomery and Buffington 1997



Map 11. Upper Poudre Sediment Transport Rosgen Stream Classification

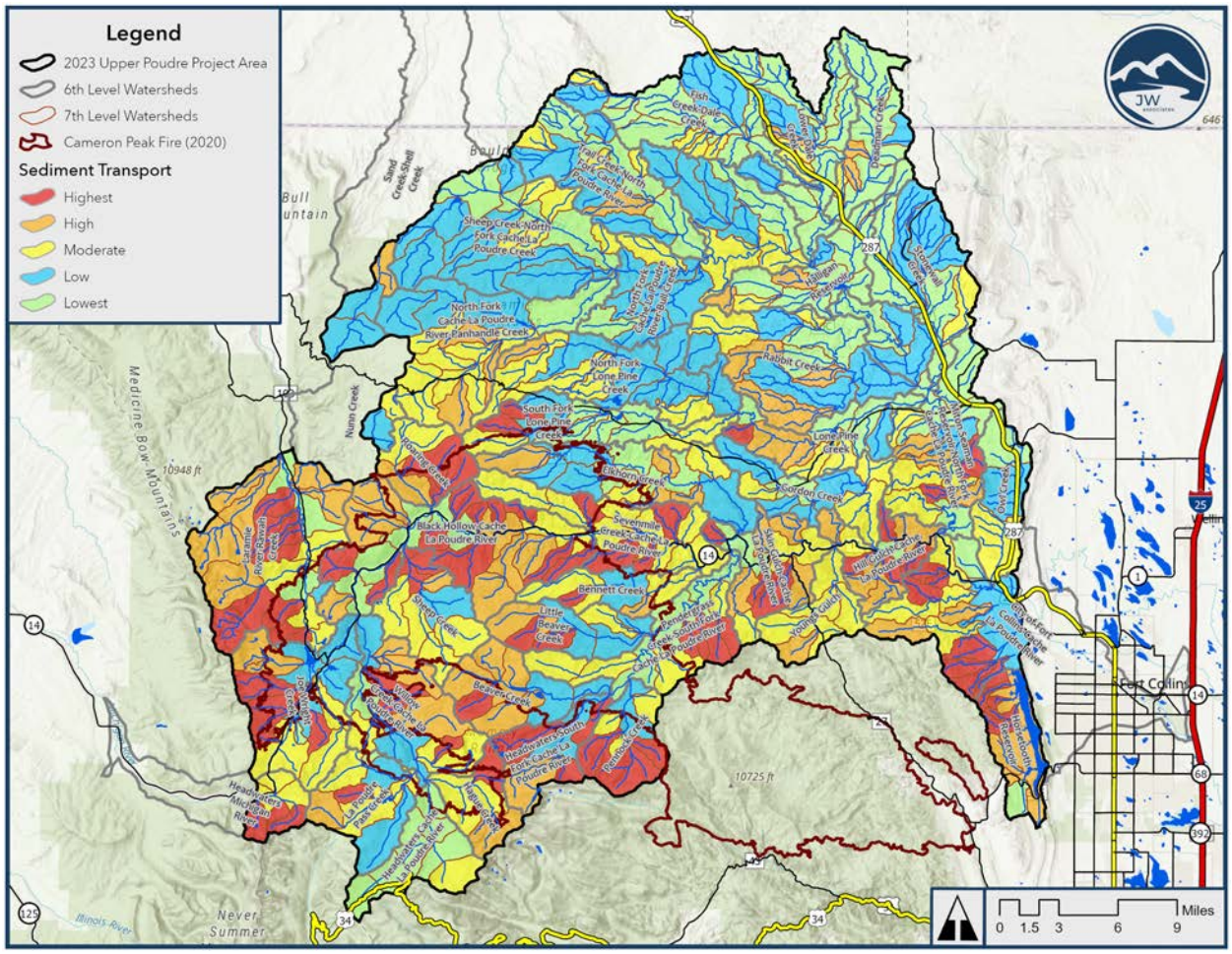
Using this metric, the 7th Level watersheds were ranked into the 5 categories using the assessment categorization scheme.

In addition to the transport hazard, based on a broader stream categorization, the streams in each watershed were further categorized by the average gradient of the stream. Because the streams within each type (source, transport, response) might be anywhere within a range of gradient values, it was deemed necessary to weight the rankings by the actual average gradient of the streams in the watershed. In doing so, a transport reach that has a 9% gradient, for example, is ranked higher in sediment transport than a transport reach with a 4% gradient. In order to do this, the average gradient for all streams within each watershed was calculated, and those were ranked, according to the assessment categorization scheme.

The Sediment Transport Rank was then determined with a re-categorization based on the Sediment Transport Metric (see following formula), using the assessment categorization scheme.

Sediment Transport Metric = Transport Hazard Rank + Gradient Rank

Map 12 shows the Upper Poudre Watershed Sediment Transport Rankings and complete tabular results for Sediment Transport are presented in Appendix D.

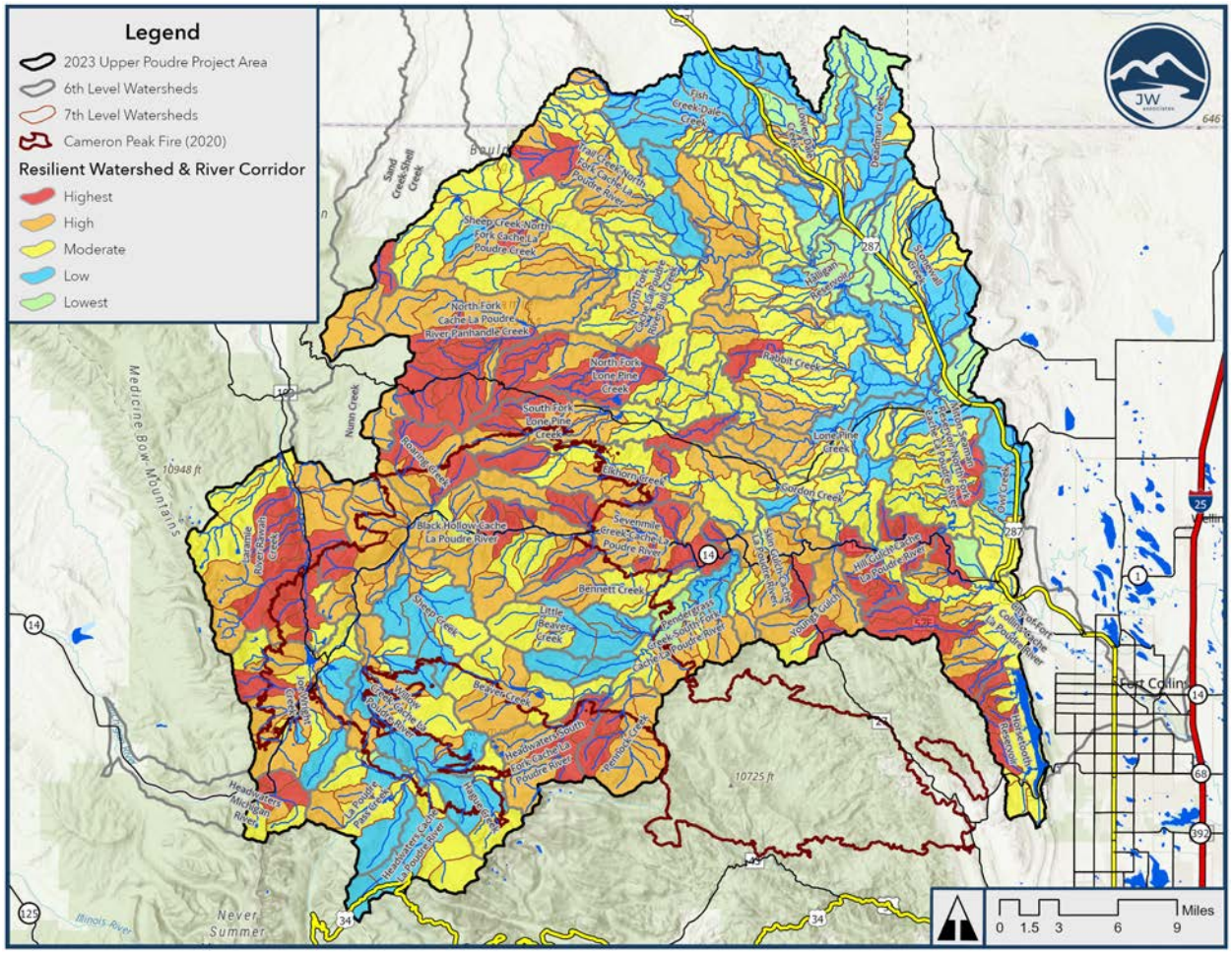


Map 12. Upper Poudre Sediment Transport Hazard Ranking

Resilient Watersheds and River Corridor Ranking

The Value B - Resilient Watersheds and River Corridor Ranking was created by combining the rankings for the four factors for each 7th Level watershed. The watersheds are re-categorized based on the sum of these four factors. The Composite Ranking map is useful in comparing relative watershed hazards based solely on factors within Value B.

Map 13 shows the Value B - Resilient Watersheds and River Corridor Hazard Ranking for the Upper Poudre Watershed. The tabular results that display this ranking as well as the individual rankings for Roads, Debris Flow, Hillslope Erosion and Sediment Transport, are presented in Appendix D.



Map 13. Upper Poudre Resilient Watersheds and River Corridor Hazard Ranking

VALUE C: RELIABLE WATER SUPPLY

A reliable water supply depends on clean water that is free of excess sediment or other pollutants, appropriate water quality conditions (physical, chemical, biological), and functional riparian areas. Water quality impacts are an indicator of natural disturbances or human influences across the landscape. It is important to identify watersheds with possible sources of contamination or land use that could impact water supply, in order to identify actions to protect and maintain a reliable and high quality water supply.

The analysis of Value C - Reliable Water Supply is based upon the following four factors that are described below:

- Land Use Impacts
- Existing Water Quality Impairment
- Source Water Supply Areas
- Sediment Deposition

Land Use Impacts on Water Quality

Land uses which impact water quality may include development of infrastructure, roads, and trails, grazing, agriculture, and pastures. The EPA Watershed Index Online (WSIO, U.S. EPA 2022) is a library of watershed indicators, summarized at the 6th Level watershed scale. This data crosses all ownerships and is the most current dataset available for this type of information. The metadata in this data library was used as guidance for calculating these influence factors for each 7th Level watershed.

The EPA WSIO defines the riparian zone (RZ) as the corridor of land adjacent to surface waters. The RZ is delineated for the United States in a geospatial grid dataset depicting surface water features and adjacent buffer areas. The RZ grid was generated by creating an approximately 100 meter buffer around surface waters in the Water Mask dataset. The Water Mask is a geospatial grid dataset depicting the location of surface waters in the United States. The Water Mask combines surface water features in the NHDPlus2 with areas classified as open water or wetlands in the National Land Cover Database (NLCD; Dewitz 2021). The spatial resolution of both the Water Mask and the RZ grid is 30 meters.

Development

Medium and high intensity development from the Landfire Vegetation Data was used. The percent medium and high intensity development within the RZ buffer was considered as having the potential to directly impact water sources. This was calculated for each 7th Level watershed. The 7th Level watersheds were then ranked with the assessment categorization scheme from 1 (low potential impacts) to 5 (high potential impacts).

Population

Source data for population density was the EPA EnviroAtlas 'Dasymetric Population for the Conterminous United States' raster. The dasymetric population raster is derived from 2010 US Census Bureau census block populations using a geospatial technique called dasymetric mapping. Dasymetric mapping uses information on land cover and slope to distribute populations to grid pixels within each census block. The population density within the RZ buffer was considered as having the potential to directly impact water sources. Human population density in the

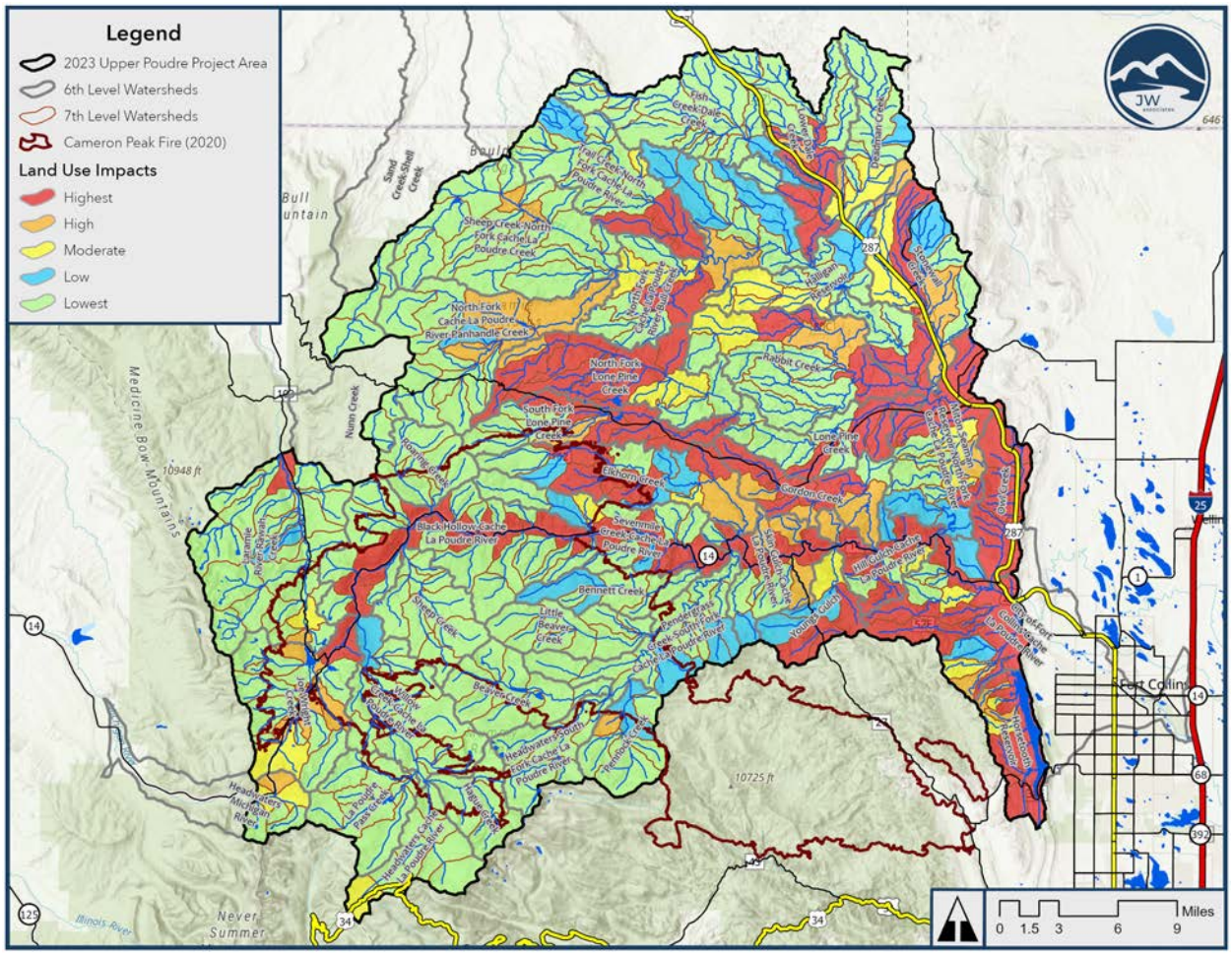
RZ was calculated for each 7th Level watershed. The 7th Level watersheds were then ranked with the assessment categorization scheme from 1 (low potential impacts) to 5 (high potential impacts).

Grazing

Pasture and Hay vegetation types from the Landfire Vegetation Data was used as a surrogate for grazing. The percent pasture and hay within the RZ buffer was considered as having the potential to directly impact water sources. This was calculated for each 7th Level watershed. The 7th Level watersheds were then ranked with the assessment categorization scheme from 1 (low grazing impacts) to 5 (high grazing impacts).

Land Use Impacts Hazard

Finally, a Land Use Hazard Ranking between 1 and 5 was calculated by summing the Development, Population, and Grazing Rankings and re-categorizing with the assessment categorization scheme. The Land Use Impacts Rankings are shown in Map 14 and the tabular results are presented in Appendix E.



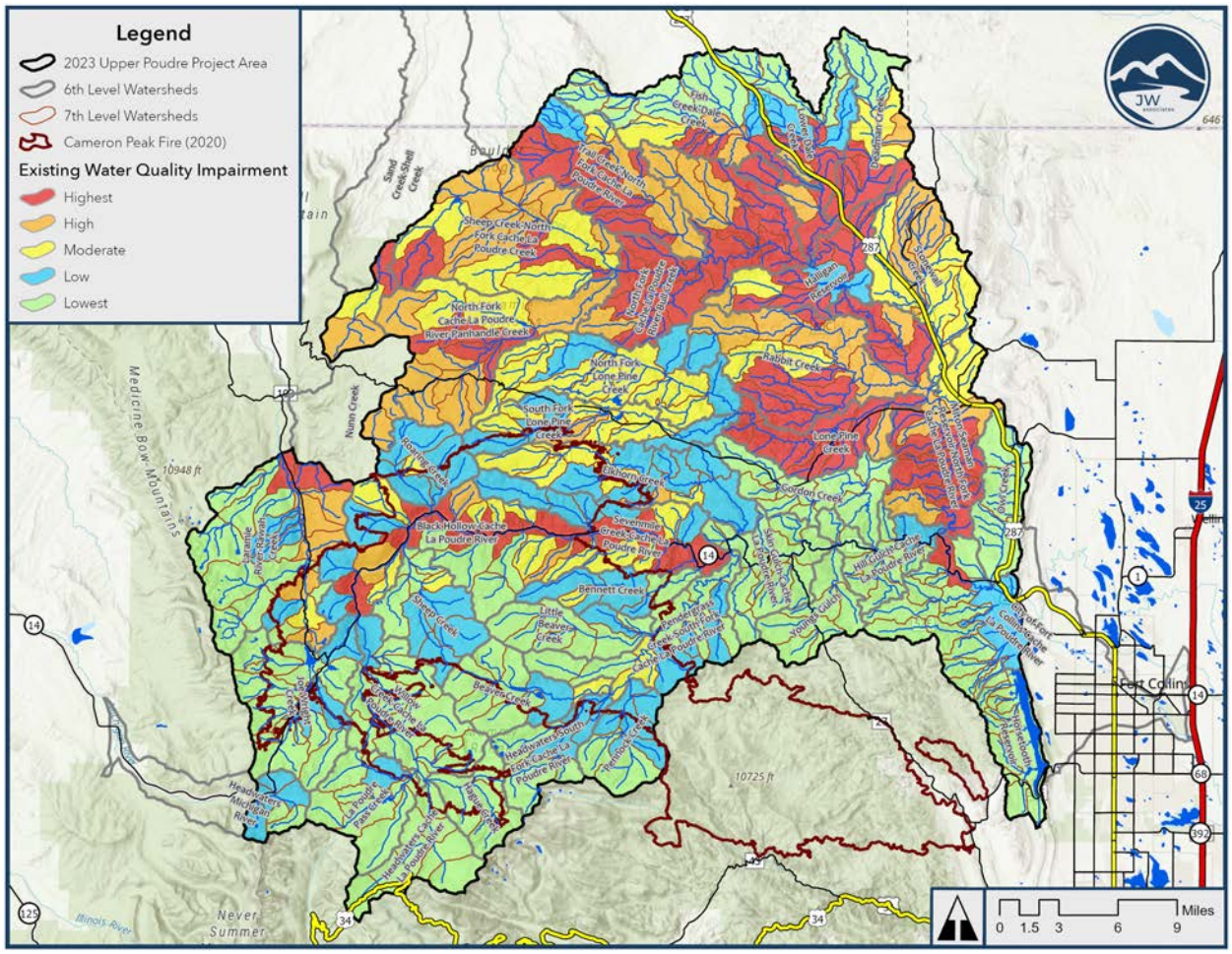
Map 14. Upper Poudre Land Use Impacts Hazard Ranking

Existing Water Quality Impairment

The federal Clean Water Act requires that states submit a comprehensive water quality report to the Environmental Protection Agency (EPA) every two years. Water quality standards are set by each state, for all state waters, to protect the uses that are designated for each waterbody. States are required, through Section 303(d), to create a list of waterbodies that do not meet water quality standards. This is called the "303(d) List of Impaired Waters" or the "303(d) List". The Monitoring and Evaluation List (M&E List) is an additional list of waters where there is reason to suspect water quality problems, but a comprehensive enough suite of data does not yet exist to qualify it as listable on the 303(d) List. Through a public hearing process, both of these lists are then adopted by the Colorado Water Quality Control Commission as Regulation 93.

To evaluate the existing water quality impairment in each 7th Level watershed, the streams listed on either the 303(d) List or the M&E List were identified and quantified as a total length of stream in miles, multiplied by the number of listed analytes. The 7th Level watersheds were ranked based on the total length of impaired stream divided by the total area of the watershed, using the assessment categorization scheme. Category 1 is the lowest impairment, up to Category 5 for the highest impaired.

Map 15 shows Existing Water Quality Impairment Rankings, and the tabular results are presented in Appendix E.

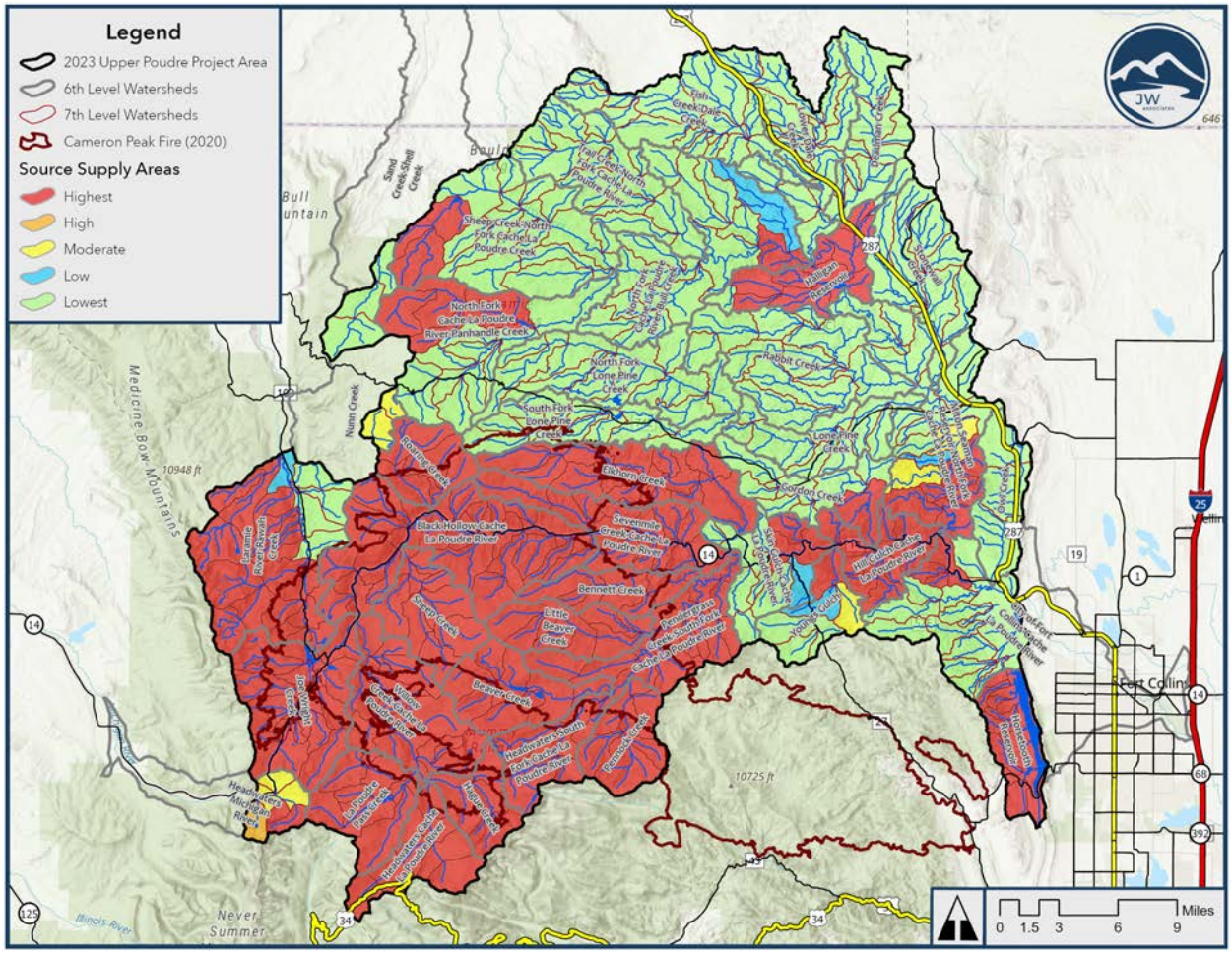


Map 15. Upper Poudre Existing Water Quality Impairment Hazard Ranking

Source Supply Areas

Surface water intakes, diversions, conveyance structures, storage reservoirs, and streams are all susceptible to the effects of wildfires. Using the methodology from the Cache La Poudre Wildfire/Watershed Assessment (JW Associates 2010), source supply areas or Zones of Concern (ZOC) for water supplies were identified. The area (in acres) of water source supply in each 7th Level watershed, divided by the total watershed area, provided a source value percentage metric. This source value was then ranked from 1 (low water supply value) to 5 (high water supply value), using the assessment categorization scheme.

Map 16 shows the Source Supply Hazard Rankings and the tabular data is also presented in Appendix E.



Map 16. Upper Poudre Source Supply Areas Hazard Ranking

Sediment Deposition

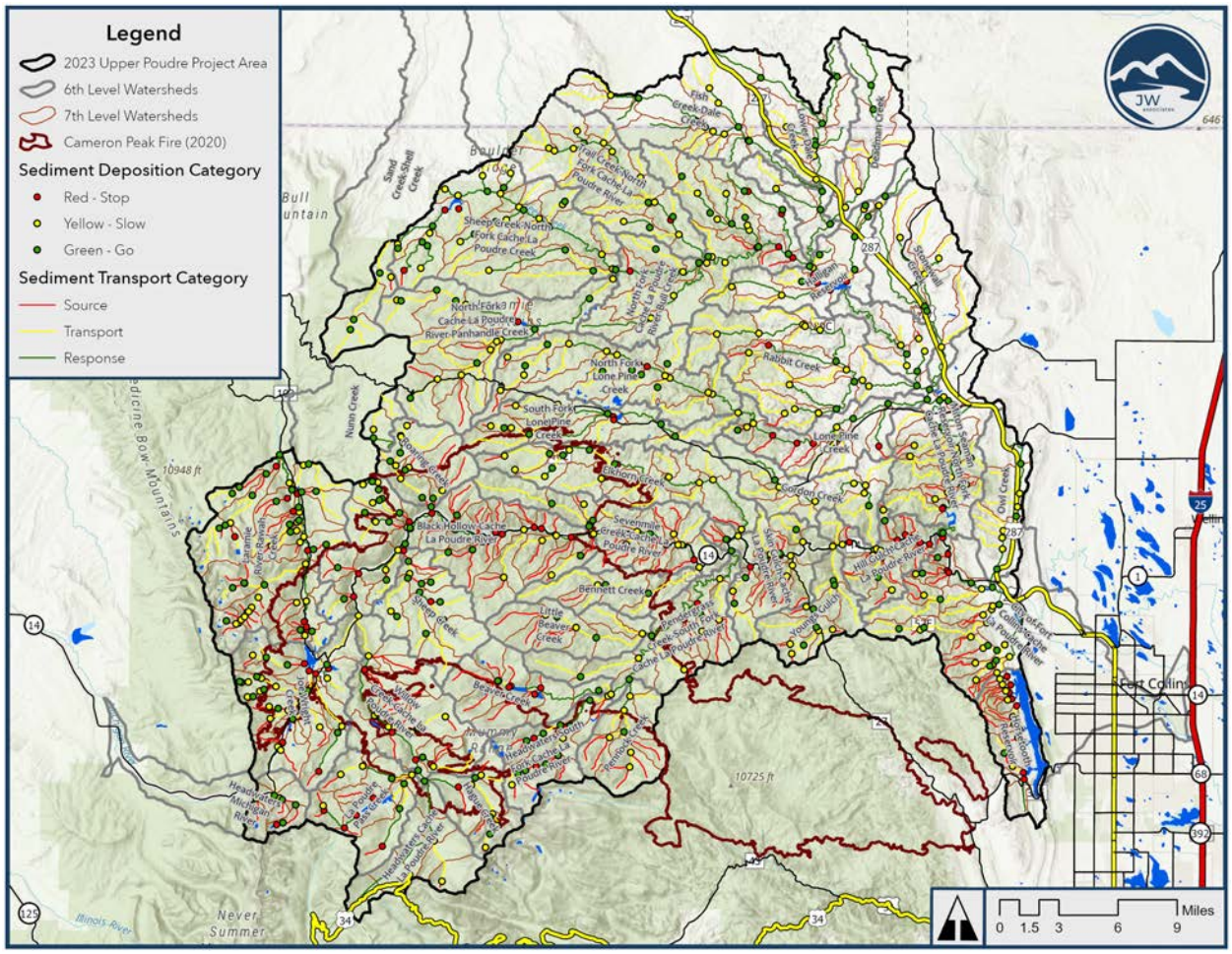
Sediment deposition occurs in places were sediment transport capacity decreases. Stream junctions or changes in gradient can be evaluated to determine where in the watershed potential problems with sediment deposition would occur. The most sensitive junctions in the watershed tend to be at the junction of other reaches with response reaches, where the velocity of the water is typically slower. When a transport reach encounters a response reach, there is a high potential for sediment deposition because the sediment transport capacity (in comparison to supply) of the upper transport reach is greater than the ability of the response reach to move sediment. A more sensitive stream junction is the point where a source reach enters a response reach. Source reaches can deliver sediment at higher flows, and in some cases debris flows, directly to response reaches, overwhelming the ability of the slower water in the response reach to move the sediment and debris.

Once the streams in each 7th Level watershed were characterized by their sediment transport characteristics, the junctions of the different channel types were evaluated. Table 9 presents the guidelines used to classify junctions. Green tagged junctions are areas where problematic deposition is unlikely to occur because sediment transport capacity does not change, or increases. Some of the green junctions are unlikely to occur in the watershed, such as transport to source junctions. Yellow tagged junctions may experience impacts from increased sediment deposition that are pronounced and persistent. The transport to response junctions are discussed above and are areas of concern for increased sediment deposition. The source to transport junctions are also areas of concern, because source reaches can generate debris flows following wildfires and the gradient changes. Red tagged junctions are source to response junctions. These junctions were tagged red because source reaches can deliver debris flows in addition to increased sediment. The tagging of stream junctions allows a graphical presentation of sediment deposition in the watersheds and allows a simplified interpretation of potential problem areas.

Table 9. Stream Junction Sediment Transport Tagging Guidelines

Upstream Stream Reach	Downstream Stream Reach	Junction Tag
Source	Source	Green
Transport	Source	Green
Source	Transport	Yellow
Transport	Transport	Green
Response	Transport	Green
Source	Response	Red
Transport	Response	Yellow
Response	Response	Green

The red and yellow tags can be viewed as sediment stops in the system, or areas of concern, and the green tags as places where sediment continues to move downstream. However, sediment deposition at red and yellow tags is available to be transported downstream under floods or other high streamflows.

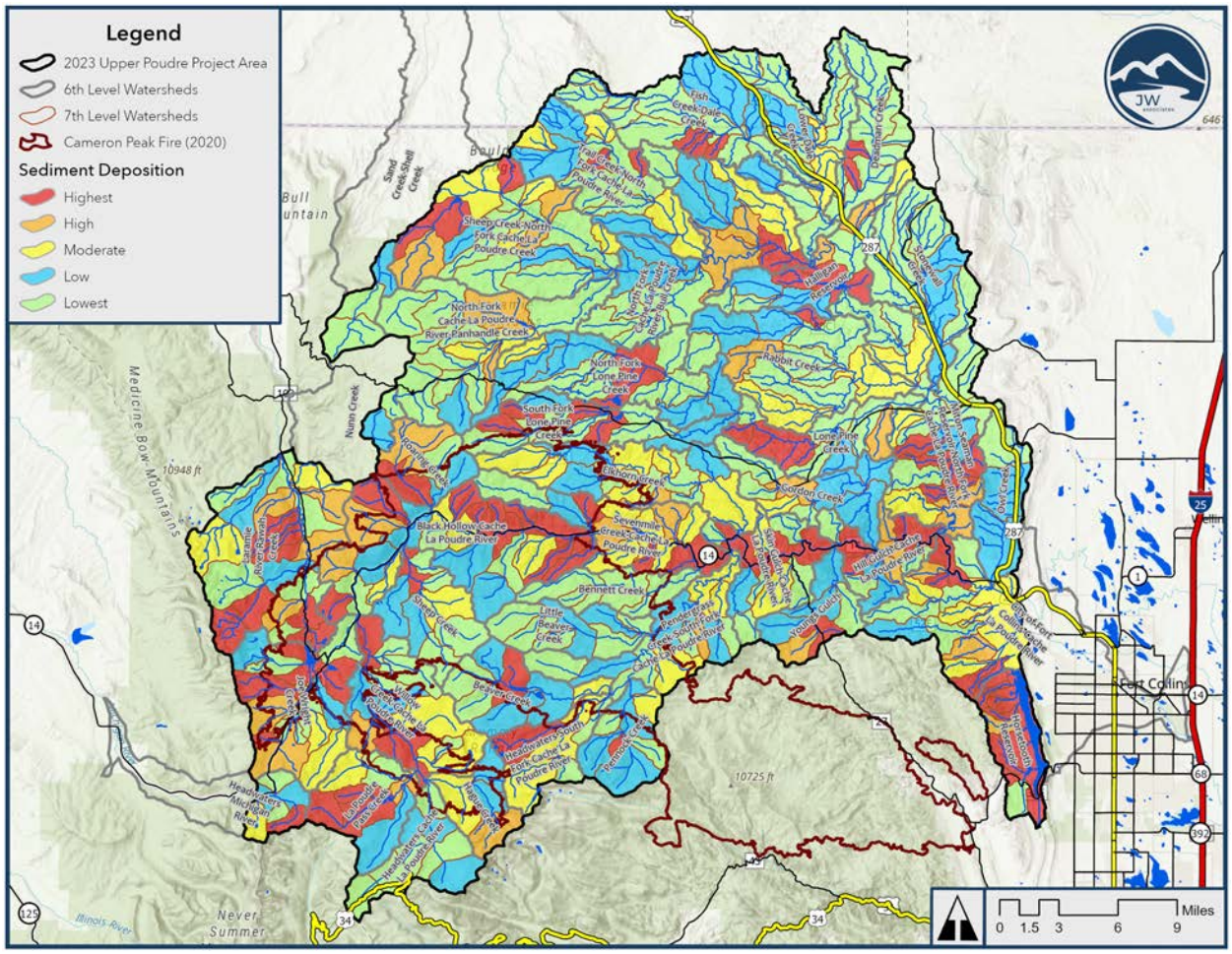


Map 17. Upper Poudre Sediment Deposition Junction Dot Tagging

For the sediment deposition analysis, the red and yellow junctions (sediment stops) were compiled for each 7th Level watershed. The red junctions were given a weight of two and the weighted junctions summed for each 7th Level watershed, characterizing the total amount of possible sediment deposition in each watershed. A metric for sediment deposition was calculated using the following formula:

$$\textbf{Sediment Deposition Metric} = \frac{(\#\text{ of yellow junctions} + 2 \times \#\text{ of red junctions})}{\text{Watershed Area}}$$

Using this metric, the 7th Level watersheds were categorized into 5 sediment deposition hazard categories from 1 (low hazard) to 5 (high hazard) with the assessment categorization scheme. Figure 16 shows the red, yellow, and green stream junction tags. Map 18 shows the Sediment Deposition Rankings for the Upper Poudre Watershed and tabular data is presented in Appendix E.

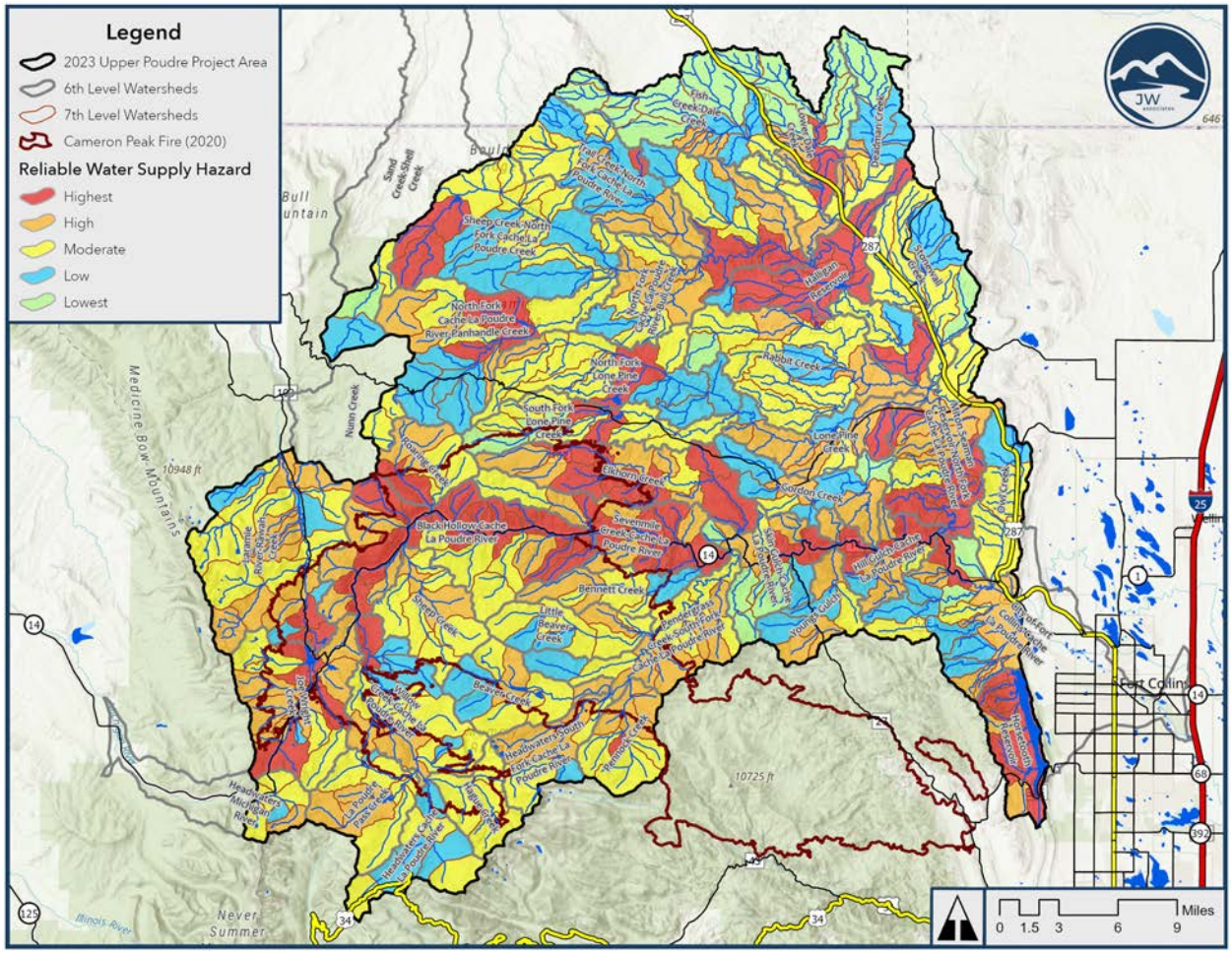


Map 18. Upper Poudre Sediment Deposition Hazard Ranking

Reliable Water Supply Ranking

The Value C - Reliable Water Supply Ranking was created by combining the final rankings for the four factors for each 7th Level watershed. The watersheds are then re-categorized based on the sum of these four factors. The Composite Ranking map is useful in comparing relative watershed hazards based solely on factors within Value C - Reliable Water Supply.

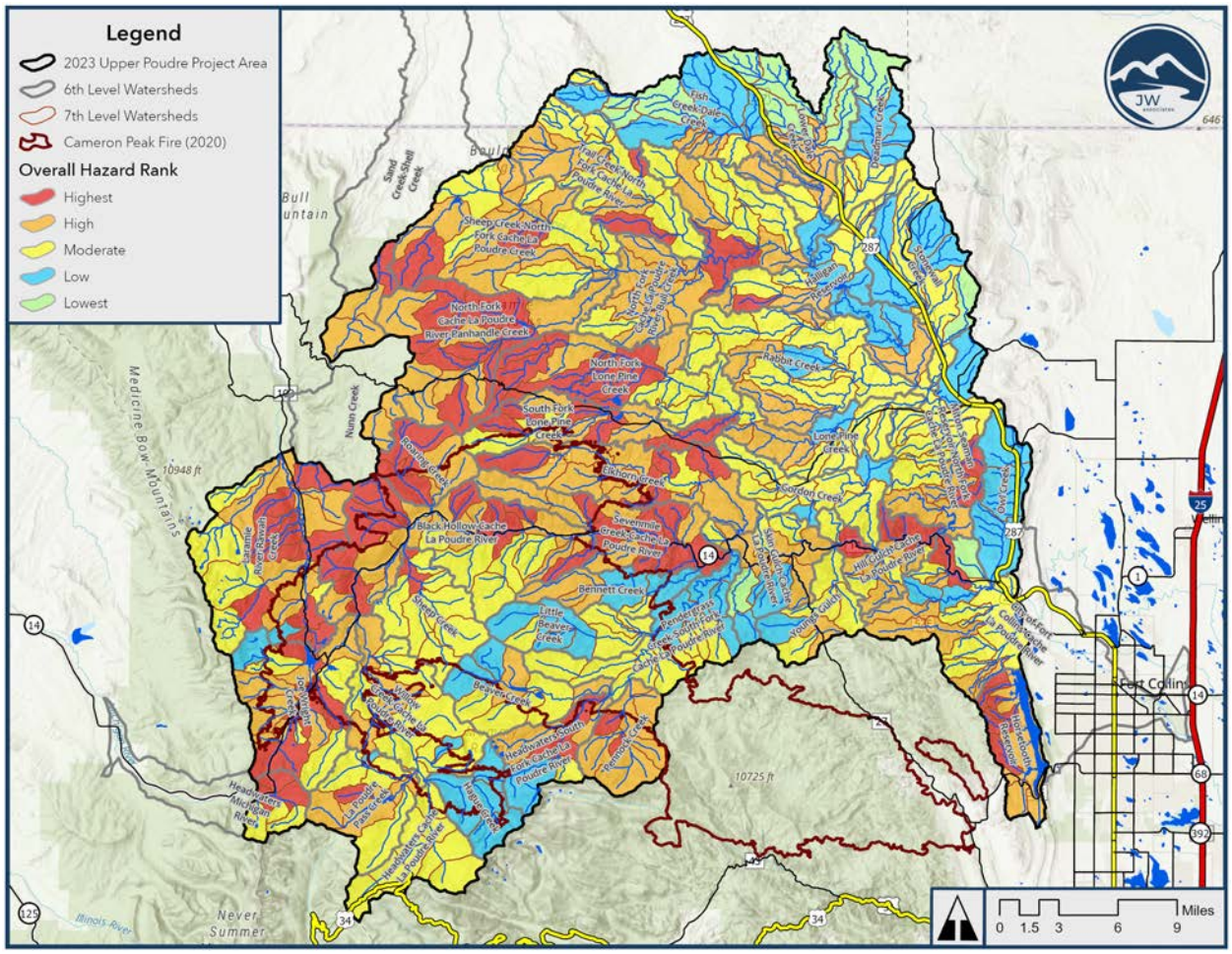
Map 19 shows the Value C - Reliable Water Supply Ranking for the Upper Poudre Watershed. The tabular results that display this ranking as well as the individual rankings for Land Use Impacts on Water Quality, Existing Water Quality Impairment, Source Supply Areas, and Sediment Deposition are presented in Appendix E.



Map 19. Upper Poudre Reliable Water Supply Hazard Ranking

OVERALL WATERSHED PRIORITY ANALYSIS

The overall rank for each 7th Level watershed was calculated by adding the composite rank of all three values (A, B, and C) and re-categorizing with the assessment categorization scheme. Map 20 shows the Overall Priority Rankings and the tabular results for this combined analysis are presented in Appendix F.



Map 20. Upper Poudre Overall Watershed Priority Ranking

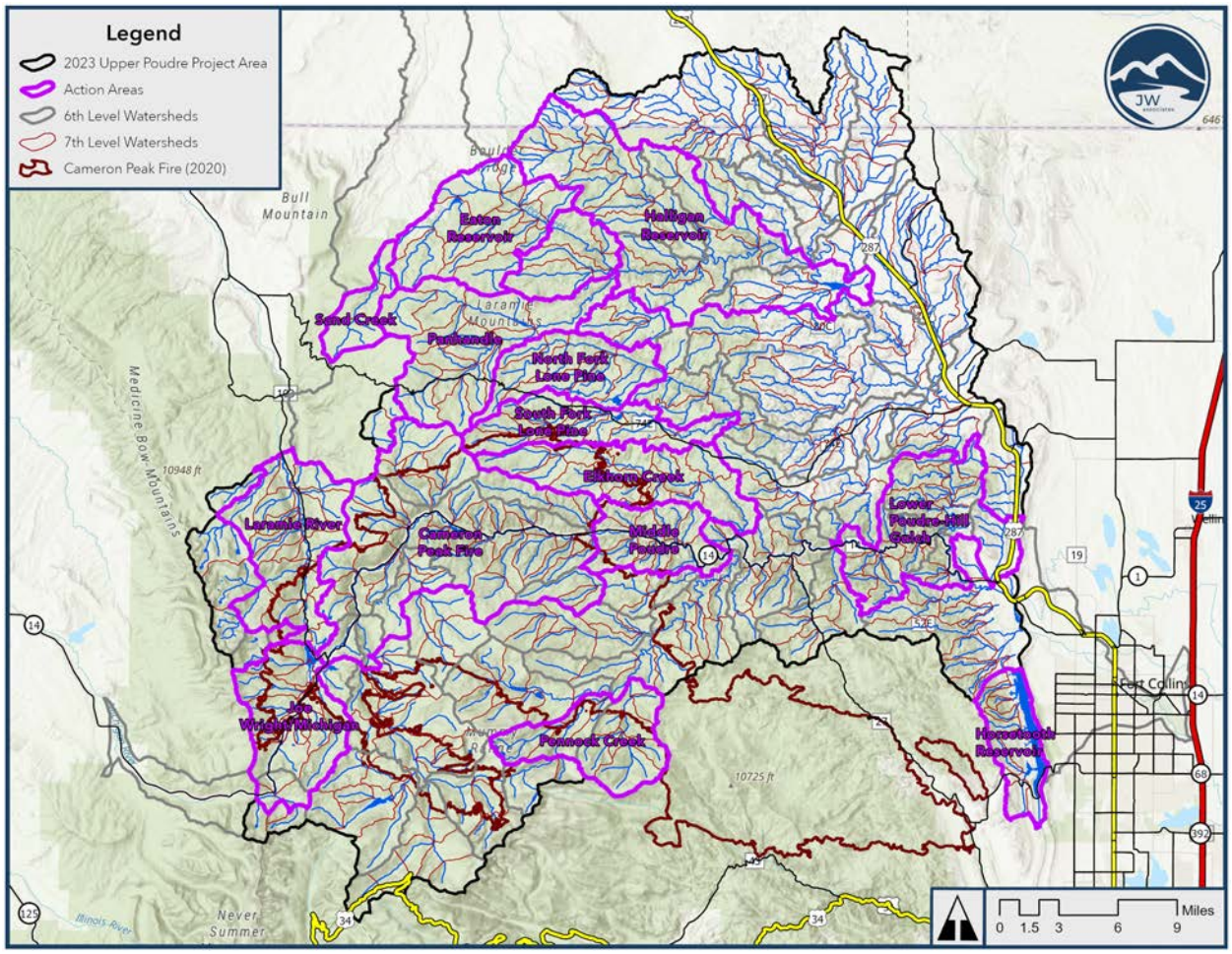
4. ACTION AREAS

In order to focus the analysis for the Upper Poudre Watershed, Action Areas were developed. Fourteen Action Areas have been identified (Table 10 and Map 21). The Action Areas were developed by looking for groups of red and orange ranked watersheds based on the final priority ranking. Then Action Areas were determined by grouping 7th Level watersheds that have similar characteristics and hazards. These areas were then reviewed by CPRW and the stakeholder group and revised. The resulting areas are broader than just the red and orange ranked watersheds and include some lower ranked watersheds.

Summary documents of each Action Area are available to help groups focus on these specific locations.

Table 10. Upper Poudre Action Areas

Action Area Name	Area (acres)	# of 7th Level Watersheds
Cameron Peak Fire	66,143	38
Eaton Reservoir	24,852	12
Elkhorn Creek	22,259	14
Halligan Reservoir	54,926	25
Horsetooth Reservoir	10,992	8
Joe Wright/Michigan Ditch	21,316	15
Laramie River	25,408	19
Lower Poudre-Hill Gulch	28,338	22
Middle Poudre	13,094	8
North Fork Lone Pine	15,887	6
Panhandle	29,787	12
Pennock Creek	17,766	10
Sand Creek	6,386	3
South Fork Lone Pine	16,306	9
Total	**353,459**	**201**



Map 21. Upper Poudre Action Areas

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14 code HUC	7th Level Watershed Name	Watershed Area (acres)	6th Level Watershed Name	Waterbody Area (acres)	Watershed Area wo Lakes (acres)
10180001050301	Snow Lake	1,010	Headwaters Michigan River	16	994
10180001050302	Nokhu Crags	506	Headwaters Michigan River	0	506
10180001050303	Diamond Peak	908	Headwaters Michigan River	0	908
10180001050304	Lake Agnes	1,311	Headwaters Michigan River	23	1,288
10180001050305	Headwaters Michigan River	1,676	Headwaters Michigan River	0	1,676
10180010010101	Headwaters Laramie River-Rawah Creek	434	Laramie River-Rawah Creek	0	434
10180010010102	Laramie Lake	864	Laramie River-Rawah Creek	58	806
10180010010103	UT1 to Laramie River-Rawah Creek	698	Laramie River-Rawah Creek	0	698
10180010010104	Two and One Half Creek	1,384	Laramie River-Rawah Creek	0	1,384
10180010010105	Upper Laramie River-Rawah Creek	1,141	Laramie River-Rawah Creek	0	1,141
10180010010106	UT2 to Laramie River-Rawah Creek	439	Laramie River-Rawah Creek	0	439
10180010010107	Middle Laramie River-Rawah Creek	1,361	Laramie River-Rawah Creek	0	1,361
10180010010108	Upper West Branch Laramie River-Rawah Creek	2,041	Laramie River-Rawah Creek	48	1,993
10180010010109	Middle West Branch Laramie River-Rawah Creek	1,793	Laramie River-Rawah Creek	0	1,793
10180010010110	North Fork West Branch Laramie River-Rawah Creek	3,551	Laramie River-Rawah Creek	37	3,514
10180010010111	Lower West Branch Laramie River-Rawah Creek	1,999	Laramie River-Rawah Creek	0	1,999
10180010010112	Half Mile Creek	1,756	Laramie River-Rawah Creek	0	1,756
10180010010113	Mill Creek-Lower Supply Canal	575	Laramie River-Rawah Creek	0	575
10180010010114	Fall Creek-Lower Supply Canal	1,173	Laramie River-Rawah Creek	0	1,173
10180010010115	Rapid Creek-Lower Supply Canal	1,012	Laramie River-Rawah Creek	0	1,012
10180010010116	Springer Creek-Lower Supply Canal	718	Laramie River-Rawah Creek	0	718
10180010010117	Brinker Creek	1,609	Laramie River-Rawah Creek	0	1,609
10180010010118	Jimmy Creek-Lower Supply Canal	1,623	Laramie River-Rawah Creek	0	1,623
10180010010119	Lower Laramie River-Rawah Creek	1,837	Laramie River-Rawah Creek	0	1,837
10180010010120	Porter Creek	1,830	Laramie River-Rawah Creek	6	1,825
10180010010121	Upper Rawah Creek	3,729	Laramie River-Rawah Creek	137	3,592
10180010010122	North Fork Rawah Creek	1,543	Laramie River-Rawah Creek	11	1,533
10180010010123	Lower Rawah Creek	2,717	Laramie River-Rawah Creek	0	2,717
10180010010124	Outlet Laramie River-Rawah Creek	1,148	Laramie River-Rawah Creek	0	1,148
10180010010301	Columbine Ditch	818	Nunn Creek	0	818
10180010010302	Bob Creek Ditch	1,590	Nunn Creek	0	1,590
10180010030301	Upper Sand Creek-Wilson Ditch	3,060	Sand Creek-Shell Creek	0	3,060
10180010030302	Middle Sand Creek-Wilson Ditch	1,904	Sand Creek-Shell Creek	0	1,904
10180010030303	Lower Sand Creek-Wilson Ditch	1,422	Sand Creek-Shell Creek	0	1,422
10190007010101	Upper Beaver Creek	2,225	Beaver Creek	0	2,225
10190007010102	Comanche Lake	1,688	Beaver Creek	7	1,681
10190007010103	Browns Lake	1,486	Beaver Creek	21	1,465
10190007010104	Comanche Reservoir	2,167	Beaver Creek	111	2,056
10190007010105	Hourglass Reservoir	2,765	Beaver Creek	66	2,699
10190007010106	Middle Beaver Creek	2,812	Beaver Creek	0	2,812
10190007010107	Lower Beaver Creek	993	Beaver Creek	0	993
10190007010201	Upper Head South Fork CLP	3,440	Headwaters South Fork Cache La Poudre River	46	3,394
10190007010202	UT to Head South Fork CLP	957	Headwaters South Fork Cache La Poudre River	0	957
10190007010203	Fall Creek-Headwaters South Fork CLP	2,735	Headwaters South Fork Cache La Poudre River	83	2,652
10190007010204	Twin Lake Reservoir	992	Headwaters South Fork Cache La Poudre River	17	974
10190007010205	Lower Head South Fork CLP	2,971	Headwaters South Fork Cache La Poudre River	0	2,971
10190007010301	Upper Pennock Creek	3,396	Pennock Creek	0	3,396
10190007010302	UT1 to Pennock Creek	1,149	Pennock Creek	0	1,149
10190007010303	Middle Pennock Creek	380	Pennock Creek	0	380
10190007010304	UT2 to Pennock Creek	1,937	Pennock Creek	0	1,937
10190007010305	UT3 to Pennock Creek	796	Pennock Creek	0	796
10190007010306	UT4 to Pennock Creek	1,134	Pennock Creek	0	1,134
10190007010307	Lower Pennock Creek	2,277	Pennock Creek	0	2,277
10190007010401	UT to Upper Little Beaver Creek	1,150	Little Beaver Creek	0	1,150
10190007010402	Upper Little Beaver Creek	2,773	Little Beaver Creek	0	2,773
10190007010403	UT to Little Beaver Creek	1,093	Little Beaver Creek	0	1,093
10190007010404	Middle Little Beaver Creek	2,444	Little Beaver Creek	0	2,444
10190007010405	Jacks Gulch	1,465	Little Beaver Creek	0	1,465
10190007010406	Lower Little Beaver Creek	2,637	Little Beaver Creek	0	2,637
10190007010501	Upper Fish Creek-Pendergrass	2,398	Pendergrass Creek-South Fork Cache La Poudre River	0	2,398
10190007010502	Lower Fish Creek-Pendergrass	1,840	Pendergrass Creek-South Fork Cache La Poudre River	0	1,840
10190007010503	Ratville	2,612	Pendergrass Creek-South Fork Cache La Poudre River	0	2,612
10190007010504	Upper South Fork CLP River	2,210	Pendergrass Creek-South Fork Cache La Poudre River	0	2,210
10190007010505	White Rock Creek	839	Pendergrass Creek-South Fork Cache La Poudre River	0	839
10190007010506	Middle South Fork CLP River	2,694	Pendergrass Creek-South Fork Cache La Poudre River	0	2,694
10190007010507	UT to South Fork CLP River	820	Pendergrass Creek-South Fork Cache La Poudre River	0	820
10190007010508	Upper Pendergrass Creek	1,343	Pendergrass Creek-South Fork Cache La Poudre River	0	1,343
10190007010509	UT to Pendergrass Creek	845	Pendergrass Creek-South Fork Cache La Poudre River	0	845
10190007010510	Lower Pendergrass Creek	1,040	Pendergrass Creek-South Fork Cache La Poudre River	0	1,040
10190007010511	Lower South Fork CLP River	1,998	Pendergrass Creek-South Fork Cache La Poudre River	0	1,998
10190007020101	Headwaters Hague Creek	2,510	Hague Creek	8	2,502
10190007020102	Mummy Pass Creek	1,605	Hague Creek	2	1,604
10190007020103	Upper Hague Creek	1,483	Hague Creek	0	1,483
10190007020104	Lower Hague Creek	3,086	Hague Creek	4	3,082
10190007020201	Upper Upper Headwaters CLP	1,767	Headwaters Cache La Poudre River	13	1,753
10190007020202	Middle Upper Headwaters CLP	1,786	Headwaters Cache La Poudre River	0	1,786
10190007020203	Lower Upper Headwaters CLP	1,432	Headwaters Cache La Poudre River	0	1,432
10190007020204	Upper Chapin Creek	2,292	Headwaters Cache La Poudre River	0	2,292

14 code HUC	7th Level Watershed Name	Watershed Area (acres)	6th Level Watershed Name	Waterbody Area (acres)	Watershed Area wo Lakes (acres)
10190007020205	Lower Chapin Creek	2,129	Headwaters Cache La Poudre River	0	2,129
10190007020206	Middle Headwaters CLP	1,926	Headwaters Cache La Poudre River	0	1,926
10190007020207	Lower Headwaters CLP	1,378	Headwaters Cache La Poudre River	0	1,378
10190007020301	Neota Creek	1,832	La Poudre Pass Creek	0	1,832
10190007020302	UT to Long Draw Reservoir	947	La Poudre Pass Creek	0	947
10190007020303	Long Draw Reservoir	2,695	La Poudre Pass Creek	240	2,455
10190007020304	Willow Creek-La Poudre Pass Creek	3,754	La Poudre Pass Creek	0	3,754
10190007020305	Upper Corral Creek	2,103	La Poudre Pass Creek	4	2,099
10190007020306	UT to Corral Creek	287	La Poudre Pass Creek	0	287
10190007020307	Lower Corral Creek	1,664	La Poudre Pass Creek	0	1,664
10190007020308	La Poudre Pass Creek	823	La Poudre Pass Creek	0	823
10190007020401	Upper Joe Wright Creek	2,876	Joe Wright Creek	26	2,850
10190007020402	Montgomery Creek	479	Joe Wright Creek	0	479
10190007020403	Joe Wright Reservoir	473	Joe Wright Creek	23	451
10190007020404	UT1 to Joe Wright Creek	309	Joe Wright Creek	0	309
10190007020405	Bald Mountain	1,123	Joe Wright Creek	0	1,123
10190007020406	North Fork Joe Wright Creek	2,253	Joe Wright Creek	0	2,253
10190007020407	Sawmill Creek	2,251	Joe Wright Creek	0	2,251
10190007020408	Middle Joe Wright Creek	1,363	Joe Wright Creek	0	1,363
10190007020409	Upper Trap Creek	2,492	Joe Wright Creek	0	2,492
10190007020410	Lower Trap Creek	1,591	Joe Wright Creek	11	1,580
10190007020411	Upper Fall Creek	1,728	Joe Wright Creek	25	1,703
10190007020412	Lower Fall Creek	1,503	Joe Wright Creek	0	1,503
10190007020413	Upper Chambers Lake	867	Joe Wright Creek	57	811
10190007020414	Barnes Meadow Reservoir	1,931	Joe Wright Creek	66	1,865
10190007020415	Lower Joe Wright Creek	2,077	Joe Wright Creek	0	2,077
10190007020416	Lower Chambers Lake	1,152	Joe Wright Creek	181	971
10190007020501	UT to Cascade Creek	627	Willow Creek-Cache La Poudre River	0	627
10190007020502	Cascade Creek	3,144	Willow Creek-Cache La Poudre River	19	3,125
10190007020503	Willow Creek-CLP River	3,900	Willow Creek-Cache La Poudre River	0	3,900
10190007020504	Upper Willow Creek CLP	2,863	Willow Creek-Cache La Poudre River	0	2,863
10190007020505	Peterson Lake	1,683	Willow Creek-Cache La Poudre River	39	1,644
10190007020506	UT to Willow Creek CLP	1,362	Willow Creek-Cache La Poudre River	0	1,362
10190007020507	Middle Willow Creek CLP	1,956	Willow Creek-Cache La Poudre River	0	1,956
10190007020508	Grass Lake Creek	1,117	Willow Creek-Cache La Poudre River	4	1,113
10190007020509	Upper May Creek	2,213	Willow Creek-Cache La Poudre River	0	2,213
10190007020510	Lower May Creek	1,128	Willow Creek-Cache La Poudre River	0	1,128
10190007020511	Lower Willow Creek CLP	1,903	Willow Creek-Cache La Poudre River	0	1,903
10190007020601	Upper West Fork Sheep Creek	1,853	Sheep Creek	0	1,853
10190007020602	Lower West Fork Sheep Creek	1,772	Sheep Creek	0	1,772
10190007020603	Upper East Fork Sheep Creek	2,625	Sheep Creek	0	2,625
10190007020604	Lower East Fork Sheep Creek	2,584	Sheep Creek	7	2,577
10190007020605	UT1 to Sheep Creek	717	Sheep Creek	0	717
10190007020606	UT2 to Sheep Creek	2,473	Sheep Creek	24	2,449
10190007020607	UT3 to Sheep Creek	847	Sheep Creek	0	847
10190007020608	Sheep Creek	1,095	Sheep Creek	0	1,095
10190007020701	Upper Roaring Creek	3,103	Roaring Creek	0	3,103
10190007020702	UT to Roaring Creek	745	Roaring Creek	0	745
10190007020703	UT to East Fork Roaring Creek	1,769	Roaring Creek	0	1,769
10190007020704	East Fork Roaring Creek	2,028	Roaring Creek	0	2,028
10190007020705	Lower Roaring Creek	2,294	Roaring Creek	0	2,294
10190007020801	Twin Lakes	1,346	Black Hollow-Cache La Poudre River	38	1,308
10190007020802	Headwaters BH-Cache La Poudre	1,671	Black Hollow-Cache La Poudre River	0	1,671
10190007020803	Tunnel Creek	1,775	Black Hollow-Cache La Poudre River	0	1,775
10190007020804	Upper Upper BH-Cache La Poudre	2,055	Black Hollow-Cache La Poudre River	0	2,055
10190007020805	UT1 to BH-Cache La Poudre	1,142	Black Hollow-Cache La Poudre River	4	1,138
10190007020806	Boston Peak Creek	2,866	Black Hollow-Cache La Poudre River	0	2,866
10190007020807	Williams Gulch	2,445	Black Hollow-Cache La Poudre River	0	2,445
10190007020808	Lower Upper BH-Cache La Poudre	2,088	Black Hollow-Cache La Poudre River	0	2,088
10190007020809	UT2 to BH-Cache La Poudre	1,036	Black Hollow-Cache La Poudre River	0	1,036
10190007020810	Peterson Creek	1,316	Black Hollow-Cache La Poudre River	0	1,316
10190007020811	Upper Middle BH-Cache La Poudre	2,171	Black Hollow-Cache La Poudre River	10	2,160
10190007020812	UT3 to BH-Cache La Poudre	621	Black Hollow-Cache La Poudre River	0	621
10190007020813	UT4 to BH-Cache La Poudre	2,997	Black Hollow-Cache La Poudre River	0	2,997
10190007020814	Washout Gulch	692	Black Hollow-Cache La Poudre River	0	692
10190007020815	Upper Black Hollow Creek	2,544	Black Hollow-Cache La Poudre River	0	2,544
10190007020816	Lower Black Hollow Creek	1,723	Black Hollow-Cache La Poudre River	0	1,723
10190007020817	Lower Middle BH-Cache La Poudre	1,794	Black Hollow-Cache La Poudre River	0	1,794
10190007020818	Dry Creek	712	Black Hollow-Cache La Poudre River	0	712
10190007020819	Sheep Creek-Black Hollow	1,955	Black Hollow-Cache La Poudre River	0	1,955
10190007020820	Crown Point Gulch	1,030	Black Hollow-Cache La Poudre River	0	1,030
10190007020821	Mineral Springs Gulch	1,363	Black Hollow-Cache La Poudre River	0	1,363
10190007020822	Lower BH-Cache La Poudre	2,398	Black Hollow-Cache La Poudre River	0	2,398
10190007020901	UT to Bennett Creek	717	Bennet Creek	0	717
10190007020902	Upper Bennett Creek	3,088	Bennet Creek	0	3,088
10190007020903	Middle Bennett Creek	2,696	Bennet Creek	0	2,696
10190007020904	Kyle Gulch	753	Bennet Creek	0	753
10190007020905	Lower Bennett Creek	1,956	Bennet Creek	0	1,956

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10190007021001	Upper Sevenmile Creek	3,088	Sevenmile Creek-Cache La Poudre River	0	3,088
10190007021002	UT to Sevenmile	953	Sevenmile Creek-Cache La Poudre River	0	953
10190007021003	Lower Sevenmile Creek	1,505	Sevenmile Creek-Cache La Poudre River	0	1,505
10190007021004	Upper Upper CLP River	1,531	Sevenmile Creek-Cache La Poudre River	0	1,531
10190007021005	Dadd Gulch	1,894	Sevenmile Creek-Cache La Poudre River	0	1,894
10190007021006	UT1 to Upper CLP River	1,254	Sevenmile Creek-Cache La Poudre River	0	1,254
10190007021007	UT2 to Upper CLP River	652	Sevenmile Creek-Cache La Poudre River	0	652
10190007021008	Middle Upper CLP River	2,283	Sevenmile Creek-Cache La Poudre River	0	2,283
10190007021009	UT3 to Upper CLP River	1,540	Sevenmile Creek-Cache La Poudre River	0	1,540
10190007021010	Eggers Gulch	1,243	Sevenmile Creek-Cache La Poudre River	0	1,243
10190007021011	Lower Upper CLP River	2,696	Sevenmile Creek-Cache La Poudre River	0	2,696
10190007030101	Headwaters Elkhorn Creek	2,486	Elkhorn Creek	0	2,486
10190007030102	Swamp Creek	1,328	Elkhorn Creek	0	1,328
10190007030103	Upper Elkhorn Creek	1,972	Elkhorn Creek	0	1,972
10190007030104	Upper Manhattan Creek	2,097	Elkhorn Creek	0	2,097
10190007030105	Lower Manhattan Creek	1,260	Elkhorn Creek	0	1,260
10190007030106	Upper Middle Elkhorn Creek	1,804	Elkhorn Creek	0	1,804
10190007030107	UT1 to Elkhorn Creek	1,119	Elkhorn Creek	0	1,119
10190007030108	UT2 to Elkhorn Creek	837	Elkhorn Creek	0	837
10190007030109	Lower Middle Elkhorn Creek	638	Elkhorn Creek	0	638
10190007030110	UT3 to Elkhorn Creek	909	Elkhorn Creek	0	909
10190007030111	UT4 to Elkhorn Creek	688	Elkhorn Creek	0	688
10190007030112	Lower Elkhorn Creek	1,486	Elkhorn Creek	0	1,486
10190007030113	UT5 to Elkhorn Creek	1,786	Elkhorn Creek	0	1,786
10190007030114	Outlet Elkhorn Creek	3,848	Elkhorn Creek	0	3,848
10190007030201	Harlan Gulch	1,409	Youngs Gulch	0	1,409
10190007030202	UT to Stove Prairie Gulch	1,915	Youngs Gulch	0	1,915
10190007030203	Upper Stove Prairie Gulch	1,309	Youngs Gulch	0	1,309
10190007030204	Lower Stove Prairie Gulch	1,659	Youngs Gulch	0	1,659
10190007030205	Upper Youngs Gulch	1,703	Youngs Gulch	0	1,703
10190007030206	Lower Youngs Gulch	1,828	Youngs Gulch	0	1,828
10190007030301	UT to Middle CLP River	661	Skin Gulch-Cache La Poudre River	0	661
10190007030302	Upper Poverty Gulch	1,138	Skin Gulch-Cache La Poudre River	0	1,138
10190007030303	Lower Poverty Gulch	1,621	Skin Gulch-Cache La Poudre River	0	1,621
10190007030304	Buck Gulch	495	Skin Gulch-Cache La Poudre River	0	495
10190007030305	Upper Middle CLP River	2,107	Skin Gulch-Cache La Poudre River	0	2,107
10190007030306	Stevens Gulch	1,126	Skin Gulch-Cache La Poudre River	0	1,126
10190007030307	Upper Skin Gulch	2,232	Skin Gulch-Cache La Poudre River	0	2,232
10190007030308	Lower Skin Gulch	1,616	Skin Gulch-Cache La Poudre River	0	1,616
10190007030309	Cedar Gulch	1,288	Skin Gulch-Cache La Poudre River	0	1,288
10190007030310	Lower Middle CLP River	2,636	Skin Gulch-Cache La Poudre River	0	2,636
10190007030401	Upper Gordon Creek	2,717	Gordon Creek	0	2,717
10190007030402	UT1 to Gordon Creek	1,123	Gordon Creek	0	1,123
10190007030403	UT2 to Gordon Creek	941	Gordon Creek	0	941
10190007030404	UT3 to Gordon Creek	705	Gordon Creek	0	705
10190007030405	Middle Gordon Creek	1,463	Gordon Creek	3	1,461
10190007030406	UT4 to Gordon Creek	1,442	Gordon Creek	0	1,442
10190007030407	Lower Gordon Creek	2,342	Gordon Creek	0	2,342
10190007030408	Hewlett Gulch	3,174	Gordon Creek	0	3,174
10190007030501	UT1 to Upper Lower CLP River	1,114	Hill Gulch-Cache La Poudre River	0	1,114
10190007030502	Falls Gulch	849	Hill Gulch-Cache La Poudre River	0	849
10190007030503	Upper Lower CLP River	1,232	Hill Gulch-Cache La Poudre River	0	1,232
10190007030504	UT to Hill Gulch	893	Hill Gulch-Cache La Poudre River	0	893
10190007030505	Watha Gulch	717	Hill Gulch-Cache La Poudre River	0	717
10190007030506	Hill Gulch	1,923	Hill Gulch-Cache La Poudre River	0	1,923
10190007030507	UT1 to Middle Lower CLP River	829	Hill Gulch-Cache La Poudre River	0	829
10190007030508	Middle Lower CLP River	676	Hill Gulch-Cache La Poudre River	0	676
10190007030509	Boyd Gulch	777	Hill Gulch-Cache La Poudre River	0	777
10190007030510	UT1 to Lower Lower CLP River	180	Hill Gulch-Cache La Poudre River	0	180
10190007030511	Lower Lower CLP River	1,971	Hill Gulch-Cache La Poudre River	0	1,971
10190007040101	Headwaters North Fork-Panhandle Creek	3,616	North Fork Cache La Poudre River-Panhandle Creek	0	3,616
10190007040102	Killpecker Creek	1,922	North Fork Cache La Poudre River-Panhandle Creek	0	1,922
10190007040103	UT1 to North Fork-Panhandle Creek	1,364	North Fork Cache La Poudre River-Panhandle Creek	0	1,364
10190007040104	Upper North Fork-Panhandle Creek	2,511	North Fork Cache La Poudre River-Panhandle Creek	0	2,511
10190007040105	Pearl Creek	1,285	North Fork Cache La Poudre River-Panhandle Creek	0	1,285
10190007040106	UT2 to North Fork-Panhandle Creek	841	North Fork Cache La Poudre River-Panhandle Creek	0	841
10190007040107	Middle North Fork-Panhandle Creek	2,279	North Fork Cache La Poudre River-Panhandle Creek	0	2,279
10190007040108	Upper Panhandle Creek	3,156	North Fork Cache La Poudre River-Panhandle Creek	0	3,156

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10190007040109	Middle Panhandle Creek	3,004	North Fork Cache La Poudre River-Panhandle Creek	0	3,004
10190007040110	South Fork Panhandle Creek	1,639	North Fork Cache La Poudre River-Panhandle Creek	0	1,639
10190007040111	Lower Panhandle Creek	3,709	North Fork Cache La Poudre River-Panhandle Creek	54	3,654
10190007040112	Lower North Fork-Panhandle Creek	4,462	North Fork Cache La Poudre River-Panhandle Creek	14	4,448
10190007040201	Cow Creek	3,361	Sheep Creek-North Fork Cache La Poudre Creek	0	3,361
10190007040202	Eaton Reservoir	3,365	Sheep Creek-North Fork Cache La Poudre Creek	110	3,255
10190007040203	Upper Sheep Creek-North Fork	3,707	Sheep Creek-North Fork Cache La Poudre Creek	0	3,707
10190007040204	Trout Creek	1,212	Sheep Creek-North Fork Cache La Poudre Creek	0	1,212
10190007040205	UT1 to Sheep Creek-North Fork	956	Sheep Creek-North Fork Cache La Poudre Creek	0	956
10190007040206	West Fork Beaver Creek-North Fork	1,598	Sheep Creek-North Fork Cache La Poudre Creek	0	1,598
10190007040207	Beaver Creek-North Fork	2,763	Sheep Creek-North Fork Cache La Poudre Creek	0	2,763
10190007040208	Acme Creek	1,105	Sheep Creek-North Fork Cache La Poudre Creek	0	1,105
10190007040209	UT2 to Sheep Creek-North Fork	1,463	Sheep Creek-North Fork Cache La Poudre Creek	0	1,463
10190007040210	Middle Sheep Creek-North Fork	1,530	Sheep Creek-North Fork Cache La Poudre Creek	0	1,530
10190007040211	UT3 to Sheep Creek-North Fork	805	Sheep Creek-North Fork Cache La Poudre Creek	0	805
10190007040212	UT4 to Sheep Creek-North Fork	911	Sheep Creek-North Fork Cache La Poudre Creek	0	911
10190007040213	Upper George Creek	2,987	Sheep Creek-North Fork Cache La Poudre Creek	0	2,987
10190007040214	Cornelius Creek	4,106	Sheep Creek-North Fork Cache La Poudre Creek	0	4,106
10190007040215	Lower George Creek	2,154	Sheep Creek-North Fork Cache La Poudre Creek	0	2,154
10190007040216	Lower Sheep Creek-North Fork	3,563	Sheep Creek-North Fork Cache La Poudre Creek	0	3,563
10190007040301	Upper Bull Creek	2,027	North Fork Cache La Poudre River-Bull Creek	12	2,016
10190007040302	Middle Bull Creek	3,366	North Fork Cache La Poudre River-Bull Creek	9	3,358
10190007040303	Lower Bull Creek	3,900	North Fork Cache La Poudre River-Bull Creek	0	3,900
10190007040304	UT to North Fork-Bull Creek	2,128	North Fork Cache La Poudre River-Bull Creek	0	2,128
10190007040305	Upper North Fork-Bull Creek	3,358	North Fork Cache La Poudre River-Bull Creek	0	3,358
10190007040306	Middle North Fork-Bull Creek	3,878	North Fork Cache La Poudre River-Bull Creek	0	3,878
10190007040307	Upper Mill Creek	1,947	North Fork Cache La Poudre River-Bull Creek	0	1,947
10190007040308	Middle Mill Creek	3,172	North Fork Cache La Poudre River-Bull Creek	0	3,172
10190007040309	Willow Creek-Mill Creek	2,212	North Fork Cache La Poudre River-Bull Creek	0	2,212
10190007040310	Lower Mill Creek	1,644	North Fork Cache La Poudre River-Bull Creek	0	1,644
10190007040311	Little Bull Creek	4,443	North Fork Cache La Poudre River-Bull Creek	0	4,443
10190007040312	Lower North Fork-Bull Creek	2,218	North Fork Cache La Poudre River-Bull Creek	0	2,218
10190007040401	UT1 to Trail Creek	1,175	Trail Creek-North Fork Cache La Poudre River	0	1,175
10190007040402	Upper Trail Creek	3,637	Trail Creek-North Fork Cache La Poudre River	0	3,637
10190007040403	UT2 to Trail Creek	2,406	Trail Creek-North Fork Cache La Poudre River	0	2,406
10190007040404	UT3 to Trail Creek	1,084	Trail Creek-North Fork Cache La Poudre River	0	1,084
10190007040405	UT4 to Trail Creek	600	Trail Creek-North Fork Cache La Poudre River	0	600
10190007040406	Pratt Creek	2,845	Trail Creek-North Fork Cache La Poudre River	0	2,845
10190007040407	Hamxe Creek	577	Trail Creek-North Fork Cache La Poudre River	0	577
10190007040408	Middle Trail Creek	3,280	Trail Creek-North Fork Cache La Poudre River	0	3,280
10190007040409	UT5 to Trail Creek	1,626	Trail Creek-North Fork Cache La Poudre River	0	1,626
10190007040410	Devils Creek	2,195	Trail Creek-North Fork Cache La Poudre River	0	2,195
10190007040411	Lower Trail Creek	3,609	Trail Creek-North Fork Cache La Poudre River	0	3,609
10190007050201	Upper West Fork Dale Creek	1,884	Lower Dale Creek	0	1,884
10190007050202	Lower West Fork Dale Creek	2,762	Lower Dale Creek	0	2,762
10190007050203	Upper Mason Allen Creek	1,031	Lower Dale Creek	0	1,031
10190007050204	Lower Mason Allen Creek	1,266	Lower Dale Creek	0	1,266
10190007050205	UT1 to Lower Dale Creek	2,419	Lower Dale Creek	0	2,419
10190007050206	UT2 to Lower Dale Creek	2,271	Lower Dale Creek	0	2,271
10190007050207	Mud Creek	568	Lower Dale Creek	0	568
10190007050208	UT3 to Lower Dale Creek	804	Lower Dale Creek	0	804
10190007050209	UT4 to Lower Dale Creek	1,055	Lower Dale Creek	0	1,055
10190007050210	Middle Lower Dale Creek	2,726	Lower Dale Creek	0	2,726
10190007050211	Upper Georges Gulch	1,738	Lower Dale Creek	0	1,738
10190007050212	Lower Georges Gulch	1,611	Lower Dale Creek	0	1,611
10190007050213	Lower Lower Dale Creek	1,756	Lower Dale Creek	0	1,756
10190007050301	Headwaters Fish Creek	1,883	Fish Creek-Dale Creek	0	1,883
10190007050302	Little Fish Creek	807	Fish Creek-Dale Creek	0	807
10190007050303	UT1 to Fish Creek	995	Fish Creek-Dale Creek	0	995
10190007050304	Kelsey Lake	2,786	Fish Creek-Dale Creek	0	2,786
10190007050305	Upper Fish Creek	3,956	Fish Creek-Dale Creek	0	3,956
10190007050306	UT2 to Fish Creek	598	Fish Creek-Dale Creek	0	598
10190007050307	UT3 to Fish Creek	643	Fish Creek-Dale Creek	0	643
10190007050308	UT4 to Fish Creek	516	Fish Creek-Dale Creek	0	516
10190007050309	UT5 to Fish Creek	5,301	Fish Creek-Dale Creek	0	5,301
10190007050310	UT6 to Fish Creek	1,333	Fish Creek-Dale Creek	0	1,333
10190007050311	Middle Fish Creek	1,338	Fish Creek-Dale Creek	0	1,338

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10190007050312	UT7 to Fish Creek	1,212	Fish Creek-Dale Creek	0	1,212
10190007050313	Lower Fish Creek	1,728	Fish Creek-Dale Creek	0	1,728
10190007050401	Upper Deadman Creek	4,508	Deadman Creek	0	4,508
10190007050402	UT1 to Deadman Creek	1,070	Deadman Creek	0	1,070
10190007050403	UT2 to Deadman Creek	552	Deadman Creek	0	552
10190007050404	Middle Deadman Creek	3,975	Deadman Creek	0	3,975
10190007050405	UT3 to Deadman Creek	583	Deadman Creek	0	583
10190007050406	UT4 to Deadman Creek	634	Deadman Creek	0	634
10190007050407	Lower Deadman Creek	3,342	Deadman Creek	0	3,342
10190007060101	UT1 to South Fork Lone Pine Creek	1,144	South Fork Lone Pine Creek	0	1,144
10190007060102	Headwaters South Fork Lone Pine Creek	2,093	South Fork Lone Pine Creek	0	2,093
10190007060103	UT2 to South Fork Lone Pine Creek	903	South Fork Lone Pine Creek	0	903
10190007060104	UT3 to South Fork Lone Pine Creek	1,586	South Fork Lone Pine Creek	0	1,586
10190007060105	Upper South Fork Lone Pine Creek	1,353	South Fork Lone Pine Creek	0	1,353
10190007060106	Bellaire Creek	1,508	South Fork Lone Pine Creek	15	1,493
10190007060107	Parvin Lake	2,243	South Fork Lone Pine Creek	78	2,164
10190007060108	Middle South Fork Lone Pine Creek	2,903	South Fork Lone Pine Creek	15	2,888
10190007060109	Lower South Fork Lone Pine Creek	2,573	South Fork Lone Pine Creek	0	2,573
10190007060201	Beartrap Creek	1,159	North Fork Lone Pine Creek	0	1,159
10190007060202	Headwaters North Fork Lone Pine Creek	3,550	North Fork Lone Pine Creek	2	3,548
10190007060203	Lake Nokomis	2,295	North Fork Lone Pine Creek	12	2,283
10190007060204	Upper North Fork Lone Pine Creek	2,931	North Fork Lone Pine Creek	16	2,915
10190007060205	Columbine Canyon	2,229	North Fork Lone Pine Creek	77	2,152
10190007060206	Middle North Fork Lone Pine Creek	3,723	North Fork Lone Pine Creek	135	3,588
10190007060207	UT to North Fork Lone Pine Creek	2,019	North Fork Lone Pine Creek	8	2,012
10190007060208	Lower North Fork Lone Pine Creek	3,107	North Fork Lone Pine Creek	0	3,107
10190007060209	Windy Gap Lake Creek	1,993	North Fork Lone Pine Creek	9	1,984
10190007060210	Outlet North Fork Lone Pine Creek	2,262	North Fork Lone Pine Creek	0	2,262
10190007060301	Headwaters Lone Pine Creek	897	Lone Pine Creek	0	897
10190007060302	UT1 to Lone Pine Creek	810	Lone Pine Creek	0	810
10190007060303	Upper Lone Pine Creek	3,456	Lone Pine Creek	0	3,456
10190007060304	UT to UT2 to Lone Pine Creek	1,408	Lone Pine Creek	0	1,408
10190007060305	UT2 to Lone Pine Creek	1,430	Lone Pine Creek	0	1,430
10190007060306	Middle Lone Pine Creek	1,685	Lone Pine Creek	0	1,685
10190007060307	UT3 to Lone Pine Creek	1,567	Lone Pine Creek	0	1,567
10190007060308	Lower Lone Pine Creek	2,898	Lone Pine Creek	0	2,898
10190007070101	Upper Sixmile Creek	1,245	Halligan Reservoir	0	1,245
10190007070102	UT to Sixmile Creek	851	Halligan Reservoir	0	851
10190007070103	Lower Sixmile Creek	2,659	Halligan Reservoir	0	2,659
10190007070104	UT1 to Halligan Reservoir	725	Halligan Reservoir	0	725
10190007070105	Upper Meadow Creek	818	Halligan Reservoir	0	818
10190007070106	UT to Meadow Creek	929	Halligan Reservoir	0	929
10190007070107	Middle Meadow Creek	1,972	Halligan Reservoir	0	1,972
10190007070108	UT2 to Halligan Reservoir	1,089	Halligan Reservoir	0	1,089
10190007070109	Lower Meadow Creek	1,998	Halligan Reservoir	0	1,998
10190007070110	Halligan Reservoir	2,840	Halligan Reservoir	266	2,574
10190007070201	Headwaters North Fork Rabbit Creek	1,871	Rabbit Creek	0	1,871
10190007070202	Upper North Fork Rabbit Creek	3,330	Rabbit Creek	0	3,330
10190007070203	Middle North Fork Rabbit Creek	2,006	Rabbit Creek	0	2,006
10190007070204	UT to North Fork Rabbit Creek	628	Rabbit Creek	0	628
10190007070205	Upper Middle Fork Rabbit Creek	2,242	Rabbit Creek	0	2,242
10190007070206	Lower Middle Fork Rabbit Creek	2,060	Rabbit Creek	0	2,060
10190007070207	Lower North Fork Rabbit Creek	4,057	Rabbit Creek	0	4,057
10190007070208	UT to Rabbit Creek	1,017	Rabbit Creek	0	1,017
10190007070209	UT to South Fork Rabbit Creek	3,681	Rabbit Creek	0	3,681
10190007070210	South Fork Rabbit Creek	4,496	Rabbit Creek	0	4,496
10190007070211	Lower Rabbit Creek	3,473	Rabbit Creek	0	3,473
10190007070301	Upper Stonewall Creek	3,090	Stonewall Creek	0	3,090
10190007070302	UT1 to Stonewall Creek	1,614	Stonewall Creek	0	1,614
10190007070303	Lonetree Creek	4,742	Stonewall Creek	0	4,742
10190007070304	Tenmile Creek	4,180	Stonewall Creek	0	4,180
10190007070305	UT2 to Stonewalll Creek	2,289	Stonewall Creek	0	2,289
10190007070306	Lower Stonewall Creek	4,630	Stonewall Creek	36	4,594
10190007070401	UT1 to North Fork-Seaman Reservoir	1,471	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	1,471
10190007070402	Headwaters North Fork-Seaman Reservoir	2,964	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	2,964
10190007070403	Upper North Fork-Seaman Reservoir	3,309	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	3,309
10190007070404	Deadman Butte Creek	3,569	Miton Seaman Reservoir-North Fork Cache La Poudre River	42	3,527

14 code HUC	7th Level Watershed Name	Watershed Area (acres)	6th Level Watershed Name	Waterbody Area (acres)	Watershed Area wo Lakes (acres)
10190007070405	UT2 to North Fork-Seaman Reservoir	1,135	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	1,135
10190007070406	UT3 to North Fork-Seaman Reservoir	1,681	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	1,681
10190007070407	Middle North Fork-Seaman Reservoir	2,422	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	2,422
10190007070408	UT4 to North Fork-Seaman Reservoir	1,218	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	1,218
10190007070409	UT5 to North Fork-Seaman Reservoir	842	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	842
10190007070410	UT6 to North Fork-Seaman Reservoir	1,283	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	1,283
10190007070411	Lower North Fork-Seaman Reservoir	1,865	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	1,865
10190007070412	Long Draw-Seaman Reservoir	2,133	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	2,133
10190007070413	UT7 to North Fork-Seaman Reservoir	641	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	641
10190007070414	Obenchain Draw-Seaman Reservoir	879	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	879
10190007070415	Outlet North Fork-Seaman Reservoir	1,115	Miton Seaman Reservoir-North Fork Cache La Poudre River	0	1,115
10190007070416	Greyrock Mountain Creek	2,235	Miton Seaman Reservoir-North Fork Cache La Poudre River	1	2,234
10190007070417	Milton Seaman Reservoir	1,754	Miton Seaman Reservoir-North Fork Cache La Poudre River	119	1,635
10190007080101	Upper Owl Canyon	3,192	Owl Creek	13	3,179
10190007080102	Middle Owl Canyon	3,502	Owl Creek	0	3,502
10190007080103	Lower Owl Canyon	4,569	Owl Creek	6	4,564
10190007080201	Santanka Gulch	376	Horsetooth Reservoir	0	376
10190007080202	Soldier Canyon	564	Horsetooth Reservoir	0	564
10190007080203	Well Gulch	287	Horsetooth Reservoir	0	287
10190007080204	Arthurs Rock Gulch	457	Horsetooth Reservoir	0	457
10190007080205	Mill Creek	821	Horsetooth Reservoir	0	821
10190007080206	Spring Canyon	969	Horsetooth Reservoir	0	969
10190007080207	Spring Creek	1,218	Horsetooth Reservoir	0	1,218
10190007080208	Horsetooth Reservoir	6,301	Horsetooth Reservoir	1,811	4,490
10190007080501	UT1 to Outlet Poudre River	748	City of Fort Collins-Cache La Poudre River	0	748
10190007080502	UT2 to Outlet Poudre River	420	City of Fort Collins-Cache La Poudre River	0	420
10190007080503	Outlet Poudre River	1,670	City of Fort Collins-Cache La Poudre River	0	1,670
10190007080504	Upper Lewstone	2,156	City of Fort Collins-Cache La Poudre River	0	2,156
10190007080505	UT to Lewstone	1,157	City of Fort Collins-Cache La Poudre River	0	1,157
10190007080506	Lower Lewstone	1,003	City of Fort Collins-Cache La Poudre River	0	1,003
10190007080507	Tunnel - FC CLP	1,577	City of Fort Collins-Cache La Poudre River	0	1,577
10190007080508	Log Canyon	1,133	City of Fort Collins-Cache La Poudre River	0	1,133
10190007080509	Upper Rist Canyon	1,912	City of Fort Collins-Cache La Poudre River	0	1,912
10190007080510	Lower Rist Canyon	1,667	City of Fort Collins-Cache La Poudre River	0	1,667
10190007080511	Long Brown Gulch	1,565	City of Fort Collins-Cache La Poudre River	0	1,565
10190007080512	Labeau Gulch	1,176	City of Fort Collins-Cache La Poudre River	0	1,176
10190007080513	Devil Gulch	939	City of Fort Collins-Cache La Poudre River	0	939
10190007080514	Empire Gulch	530	City of Fort Collins-Cache La Poudre River	0	530
10190007080515	City of Fort Collins-CLP	5,704	City of Fort Collins-Cache La Poudre River	82	5,622

RESILIENT FOREST DESCRIPTIONS BY VEGETATION TYPE

The following paragraphs describe the forest vegetation types of the Upper Poudre Watershed and the expected disturbance regimes within each type. The resilience components by forest type are also summarized in Tables 1 and 2 of the main report.

Ponderosa Pine

The historical montane forest was likely quite open with fewer trees, greater age diversity between stands, and larger openings than the area displays today. Openings are defined as areas capable of producing forest, but that have no trees, or only a very small number of trees per acre arranged as individuals or small groups. Studies have indicated that, historically, fire typically served to maintain open mature stands, as well as to maintain some areas as openings. Brown et al. (1999) and Kaufmann et al. (2000) provide evidence that frequent, mixed-severity fires were most common in ponderosa pine stands from 1000 to 1870 AD. The area of severe fires were relatively small in extent, but they were critical in creating openings of 20 to 40 acres that were maintained by the dry site conditions until regeneration occurred. The open forest was protected from extensive fires because of the distance between tree crowns and the openings.

Smaller surface fires that did not move into the crowns would have encouraged the maintenance of ponderosa pine on these sites and limited the spread of Douglas-fir, which does not tolerate fire well, to sites where fires were infrequent, particularly wetter, north-facing slopes. The smaller fires would also have kept the forest more open by limiting the growth of understory trees.

Variation in frequency and severity of fires created a varied vegetative pattern across the landscape. This mosaic pattern would have been maintained, as the patch-like variations of age classes, densities, and openings, caused fires to skip around rather than kill the majority of trees over large areas in a single fire event. Some stands would have had many age classes from seedlings to trees more than 400 years old. There were probably few snags (standing dead trees) and cavities in live trees. A few stands would have been nearly even-aged due to stand-replacing fires followed by even-aged regeneration.

One key to the sustainability of the historical forest was the open condition, which played a role in preventing the development of large crown fires. Compared to current conditions, the historical forest conditions would have had larger distances between tree crowns combined with larger openings, reducing the likelihood of large crown fires. Openings may have covered 20 to 25 percent of the area, and some of these openings may have persisted for decades due to climatic and seed source limitations. Regeneration would have begun immediately on other burned sites. Therefore, post-fire patterns of regrowth would have had variations both in space and time, contributing to the complexity of the landscape.

Ponderosa pine in the watershed can be divided into two classifications; xeric and mesic (Kaufmann et al. 2006). Each of these classifications had their own forest structure and species distribution that contributed to resilient conditions.

Xeric Ponderosa Pine

Xeric ponderosa pine sites consist of mostly ponderosa pine as the dominant vegetation, with smaller areas having no dominant tree type but having Gambel oak/mountain mahogany. These systems had a history of frequent, low intensity fires, which created more open forested conditions.

Xeric ponderosa pine is classified as:

1. Ponderosa pine stands below an elevation of 6,500 feet,
2. Ponderosa and Douglas-fir stands between 6,500 and 7,500 feet in elevation except on north slopes,
3. Ponderosa and Douglas-fir stands between 7,500 and 8,500 feet in elevation on south and west aspects, and exposed ridges.

Based upon the documented historic conditions and expected future conditions considering climate change, resilient xeric ponderosa pine areas would have the following characteristics:

- A more open forested condition than the mesic ponderosa areas,
- Some clumps of dense trees,
- Openings where at most individual trees are present, ranging in size from 1 to 40 acres, and covering 25 percent of the xeric ponderosa pine area,
- An average canopy cover between 15 to 25 percent,
- Connections to other xeric ponderosa pine areas or other areas of dense forest that are minimized by lower density ridge lines, openings or other natural features.

Mesic Ponderosa Pine

Mesic ponderosa pine likely developed under a mixed severity fire regime (Crane 1982 and Kaufmann et al. 2006), which created a greater variety of stand structures and ages than would have developed on the drier (more xeric) ponderosa pine sites.

Mesic ponderosa pine is classified as:

1. Ponderosa pine stands between 6,500 and 7,500 feet in elevation on north aspects,
2. Ponderosa pine stands between 7,500 and 8,500 feet in elevation on north and east aspects,
3. Ponderosa pine stands between 8,500 and 9,500 feet in elevation on all aspects.

Based upon the documented historic conditions and expected future conditions considering climate change, resilient mesic ponderosa pine areas would have the following characteristics:

- Relatively open forested conditions,
- Larger clumps (both in overall size and number of trees present per clump) compared to the xeric systems,
- Stand densities between 40 to 120 basal area (square feet per acre),
- Openings ranging in size between 1 to 20 acres and covering 20 percent of the mesic ponderosa pine area,
- An average canopy cover between 20 to 35 percent,
- Connections to other mesic ponderosa pine areas or other areas of dense forest that are minimized by lower density ridge lines, openings or other natural features.

Mixed Conifer

Mixed conifer areas are generally composed of Douglas-fir, lodgepole pine, aspen, ponderosa pine and some true firs. Mixed conifer areas vary substantially with aspect: cool–moist (mesic) types are found on north-facing aspects while the warm–dry (xeric) types are found on south-facing aspects (Romme et al. 2009). The historical disturbance regime was mixed-severity fires with a fire recurrence interval of 30-100 years (Crane 1982). In the Front Range, mixed conifer has a mean fire return interval between 17-22 years (Veblen et al. 2000) but with a range of 1-125 years.

The mixed severity fire regime in mixed conifer created a mosaic of forest conditions. Higher elevation mixed conifer forests experienced lower fire frequency with patches of stand-replacing fire, in addition to some areas of low severity surface fires (Veblen et al. 2000, Kaufmann et al. 2007). The mosaic conditions included even-aged stands created by stand-replacing fires, uneven-aged stands created and maintained by low severity fire, and some openings due to episodic tree regeneration (Schoennagel et al. 2004). Fire-created openings have been documented to persist for as long as 148 years (Kaufmann et al. 2000). In the Upper Poudre Watershed, climate is the main driver of fire in mixed conifer forests. Years that experience warm and dry spring and summer periods are strongly associated with widespread fire (Bessie and Johnson 1995, Veblen et al. 2000).

Because xeric mixed conifer areas are generally adjacent to upper montane ponderosa pine, they experience similar fire frequency and therefore exhibit similar forest structure influenced by mixed severity fire regime (Reynolds et al. 2013). Xeric mixed conifer areas, however, do have more species diversity than ponderosa pine forests. Mesic mixed conifer also experience mixed severity fire regimes but with a lower frequency due to wetter conditions (Reynolds et al. 2013).

Xeric mixed conifer is classified as:

1. All mixed conifer cover types on south and west aspects.

Mesic mixed conifer is classified as:

1. All mixed conifer cover types on north and east aspects,
2. Douglas-fir cover types between 7,500 and 9,000 feet in elevation on north and east aspects.

Based upon the documented historic conditions and expected future conditions considering climate change, resilient mixed conifer areas would have the following characteristics:

- An average canopy cover between 20 to 35 percent,
- Openings ranging in size between between 1 to 20 acres and covering 20 percent of the mixed conifer area,
- In mesic mixed conifer, a canopy cover of 35-50 percent with an average of 40 percent,
- Openings in mesic mixed conifer across 10 percent of the area,
- A mix of ages of seedlings, saplings, and mature trees, with less than 1/3 of the watershed in any one class,
- Connections to other mixed conifer areas or other areas of dense forest that are minimized by lower density ridge lines, openings or other natural features.

Lodgepole Pine

Lodgepole pine grows on a wide range of sites, typically between 7,500 and 10,000 feet and can occur in pure or mixed stands (Shepperd and Alexander 1983). Lodgepole pine is a mostly shade intolerant species that can exist as a climax species in some stands but is often a seral species that is eventually replaced by spruce and fir. Stand-replacing fires are natural in lodgepole pine and, because the majority of the cone production from the lodgepole species is serotinous (cones being covered in sap), the cones generally open up after a fire, creating even-aged seedlings soon after a fire. The frequency of natural fires in Rocky Mountain lodgepole pine stands ranges from a few years to 200 or more years (Davis et al. 1980). Low to moderate severity surface fires are likely to have a return interval on the order of a few decades, while stand-replacing fires are generally less frequent (Crane 1982). Lodgepole pine is susceptible to bark beetles, mistletoe, blowdown and fire (Lotan 1964).

Based upon the documented historic conditions and expected future conditions considering climate change, resilient lodgepole pine areas would have the following characteristics:

1. Canopy cover ranging from 50-90 percent with an average of 75 percent,
2. A mix of ages of seedlings, saplings, and mature trees, with less than 1/3 of the watershed in any one class,
3. Connections to other lodgepole pine areas or other areas of dense forest that are minimized by lower density ridge lines, openings or other natural features.

Spruce-fir

Spruce-fir stands are typically composed of the slow-growing Engelmann spruce, in association with the smaller, narrow-crowned subalpine fir. The spruce-fir combination often reaches a climax-type forest at high elevations, despite the existence of many uneven-aged stands. This is because both species are shade tolerant and tend to quickly repopulate shaded gaps in the forest.

The return interval for naturally occurring fires within the spruce-fir forest may be 300 years or longer. Unlike many other Colorado forest types, spruce-fir forests are not adapted to fire. Thin bark and the persistence of dead lower limbs increases the spruce's susceptibility to fire as well as the likelihood of intense crown fires and tree mortality. In the case of a stand-replacing fire, it may take as long as 300-400 years for a spruce-fir forest to regenerate.

Based upon the documented historic conditions and expected future conditions considering climate change, resilient spruce-fir areas would have the following characteristics:

1. A mix of ages of seedlings, saplings, and mature, with less than 1/2 of the watershed in any one class,
2. Connections to other spruce-fir stands or other areas of dense forest that are minimized by lower density ridge lines, openings or other natural features.

Aspen

Aspen usually occur as closed canopy stands. They are generally found between 5,000 to 10,000 feet in elevation. Because they require adequate moisture, they are usually found on north aspects or sites that are mesic. However, at higher elevations they are found on southern aspects because the northern aspects are too cold. Fire has been important in maintaining the vigor and extent of aspen by suckering from long-lived clones that prosper following fire. Aspen provides many benefits to the landscape, including natural fire breaks, species diversity and important wildlife habitat. Bartos (2000) argues that aspen has declined by 49 percent in Colorado due to encroachment by conifers. However, other researchers (Kulakowski and Veblen, 2006) do not agree that the magnitude of aspen

reduction has been as great as that suggested by Bartos. In general, the occurrence of large and severe fires would increase the extent of aspen and the lack of fires would allow the successional replacement of aspen by conifers (Veblen and Donnegan 2005).

Disturbance regimes in aspen are generally similar to adjacent conifer stands (Veblen and Donnegan, 2005). In the watershed, aspen occur adjacent to ponderosa pine, lodgepole pine, and mixed conifer forests that have mixed severity fire regimes with fire return intervals of between 30 and 100 years.

Aspen areas are defined as:

1. Aspen cover type,
2. Lodgepole pine, ponderosa pine, and mixed conifer cover types that are adjacent to aspen stands.

Based upon the documented historic conditions and expected future conditions considering climate change, resilient aspen areas would have the following characteristics:

- A mix of ages of sapling and mature trees, so that the mature class does not comprise more than 1/2 of the watershed,
- Conifer encroachment that is limited to older aspen stands.

HUC14	7th Level Watershed Name	WILDFIRE HAZARD	ECOSYSTEM SENSITIVITY	Landscape Condition	Vegetation Departure	Insect & Disease	ADAPTIVE CAPACITY	Simpson's Diversity	Topo-Climatic Variability	RESILIENT UPLANDS
10180001050301	Snow Lake	Lowest	Low	Low	Lowest	Moderate	High	Highest	Lowest	Low
10180001050302	Nokhu Crags	Low	Moderate	Low	Lowest	High	High	Highest	Lowest	Moderate
10180001050303	Diamond Peak	High	Highest	Highest	Moderate	Highest	High	Highest	Low	Highest
10180001050304	Lake Agnes	Low	Low	Low	Low	Moderate	Moderate	Highest	Lowest	Moderate
10180001050305	Headwaters Michigan River	High	Highest	High	Moderate	Highest	High	Highest	Lowest	High
10180010010101	Headwaters Laramie River-Rawah Creek	Lowest	Highest	Highest	Highest	Highest	Low	Moderate	Low	Moderate
10180010010102	Laramie Lake	Low	Highest	Highest	High	High	Highest	Highest	Highest	Highest
10180010010103	UT1 to Laramie River-Rawah Creek	Lowest	Low	Lowest	Moderate	Low	Low	Low	Low	Low
10180010010104	Two and One Half Creek	Lowest	Moderate	Low	Moderate	High	Low	Moderate	Low	Low
10180010010105	Upper Laramie River-Rawah Creek	Low	Highest	Highest	Highest	High	Moderate	High	Low	High
10180010010106	UT2 to Laramie River-Rawah Creek	Low	High	Low	High	High	Highest	Highest	Highest	High
10180010010107	Middle Laramie River-Rawah Creek	Low	Highest	Highest	Moderate	Highest	Moderate	Moderate	Low	High
10180010010108	Upper West Branch Laramie River-Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Low	Moderate	Lowest	Lowest
10180010010109	Middle West Branch Laramie River-Rawah Creek	High	Moderate	Lowest	Moderate	High	High	Highest	Lowest	High
10180010010110	North Fork West Branch Laramie River-Rawah Creek	Moderate	Lowest	Lowest	Low	Low	Low	High	Lowest	Low
10180010010111	Lower West Branch Laramie River-Rawah Creek	High	High	Low	High	Highest	Low	Low	Lowest	High
10180010010112	Half Mile Creek	High	Highest	High	High	Highest	High	High	Moderate	Highest
10180010010113	Mill Creek-Lower Supply Canal	Highest	High	Low	Highest	High	Moderate	Moderate	Moderate	Highest
10180010010114	Fall Creek-Lower Supply Canal	High	High	Low	High	Moderate	Low	Low	Moderate	Moderate
10180010010115	Rapid Creek-Lower Supply Canal	High	High	Lowest	Highest	Moderate	Moderate	Moderate	Moderate	High
10180010010116	Springer Creek-Lower Supply Canal	Highest	High	Lowest	Highest	High	Moderate	Moderate	High	Highest
10180010010117	Brinker Creek	High	High	Lowest	Highest	Highest	Highest	Highest	Highest	Highest
10180010010118	Jimmy Creek-Lower Supply Canal	High	High	Low	Highest	High	Moderate	Low	Moderate	High
10180010010119	Lower Laramie River-Rawah Creek	High	Highest	Highest	Highest	Highest	High	High	Moderate	Highest
10180010010120	Porter Creek	High	High	Moderate	High	Moderate	Highest	Highest	Moderate	Highest
10180010010121	Upper Rawah Creek	Low	Low	Lowest	Low	Low	High	High	Low	Moderate
10180010010122	North Fork Rawah Creek	Highest	High	Lowest	Highest	High	High	Moderate	High	Highest
10180010010123	Lower Rawah Creek	Highest	High	Lowest	Highest	High	Moderate	Moderate	Moderate	Highest
10180010010124	Outlet Laramie River-Rawah Creek	Moderate	Highest	Highest	Moderate	High	Moderate	Low	High	High
10180010010301	Columbine Ditch	High	Highest	High	High	Highest	Highest	Moderate	Highest	Highest
10180010010302	Bob Creek Ditch	High	Highest	Moderate	High	Highest	Highest	High	Highest	Highest
10180010030301	Upper Sand Creek-Wilson Ditch	High	Highest	Low	High	Highest	Highest	High	Highest	Highest
10180010030302	Middle Sand Creek-Wilson Ditch	High	Highest	Low	Highest	Highest	Highest	Highest	High	Highest
10180010030303	Lower Sand Creek-Wilson Ditch	Highest	Highest	Low	Highest	Highest	Highest	Highest	High	Highest
10190007010101	Upper Beaver Creek	Moderate	Lowest	Lowest	Low	Low	High	High	Moderate	Moderate
10190007010102	Comanche Lake	High	Lowest	Lowest	Low	Lowest	High	Highest	Low	Moderate
10190007010103	Browns Lake	Low	Low	Lowest	Moderate	Low	Moderate	Moderate	Moderate	Low
10190007010104	Comanche Reservoir	Moderate	Moderate	Lowest	Moderate	Highest	Moderate	Moderate	Low	Moderate
10190007010105	Hourglass Reservoir	Moderate	Low	Lowest	Low	Low	Moderate	Moderate	Low	Moderate
10190007010106	Middle Beaver Creek	Moderate	High	Low	Moderate	High	High	High	Moderate	High
10190007010107	Lower Beaver Creek	Low	High	Lowest	Moderate	Highest	Highest	Highest	High	High
10190007010201	Upper Head South Fork CLP	Low	Lowest	Lowest	Lowest	Lowest	Low	Low	Low	Lowest
10190007010202	UT to Head South Fork CLP	Moderate	Lowest	Lowest	Low	Lowest	Low	Moderate	Lowest	Low
10190007010203	Fall Creek-Headwaters South Fork CLP	High	Low	Lowest	Low	Moderate	Low	Moderate	Lowest	Moderate
10190007010204	Twin Lake Reservoir	Highest	High	Low	High	Highest	Moderate	High	Low	Highest
10190007010205	Lower Head South Fork CLP	Highest	High	Low	Moderate	Highest	Low	Low	Low	High
10190007010301	Upper Pennock Creek	Highest	High	Lowest	High	Highest	Moderate	Moderate	Low	Highest
10190007010302	UT1 to Pennock Creek	Highest	High	Lowest	High	Highest	Low	Moderate	Low	High
10190007010303	Middle Pennock Creek	Highest	High	Lowest	Highest	Highest	Moderate	Moderate	Low	Highest
10190007010304	UT2 to Pennock Creek	Highest	Moderate	Lowest	Moderate	Highest	Low	Low	Low	High
10190007010305	UT3 to Pennock Creek	Highest	Highest	Moderate	Highest	High	High	Highest	Low	Highest
10190007010306	UT4 to Pennock Creek	Moderate	High	Low	High	Highest	High	Highest	Low	High
10190007010307	Lower Pennock Creek	Highest	High	Low	Moderate	Highest	Moderate	High	Low	High
10190007010401	UT to Upper Little Beaver Creek	Lowest	Moderate	Lowest	Highest	Moderate	Moderate	Moderate	Moderate	Low
10190007010402	Upper Little Beaver Creek	Lowest	High	Lowest	Highest	High	Moderate	Moderate	Moderate	Moderate
10190007010403	UT to Little Beaver Creek	Lowest	Moderate	Lowest	Highest	Moderate	Moderate	Moderate	Moderate	Low
10190007010404	Middle Little Beaver Creek	Low	High	Lowest	Highest	Highest	High	Highest	Low	High
10190007010405	Jacks Gulch	Low	Highest	Low	Highest	Highest	Highest	Highest	High	High
10190007010406	Lower Little Beaver Creek	Low	High	Lowest	Highest	High	Moderate	Moderate	Moderate	Moderate
10190007010501	Upper Fish Creek-Pendergrass	Low	High	Lowest	Highest	High	High	High	Moderate	Moderate
10190007010502	Lower Fish Creek-Pendergrass	Low	High	Lowest	Moderate	Highest	High	High	Moderate	Moderate
10190007010503	Ratville	Low	Moderate	Low	Moderate	Low	Low	Lowest	Moderate	Low
10190007010504	Upper South Fork CLP River	Moderate	High	Low	High	Moderate	Low	Low	Low	Moderate
10190007010505	White Rock Creek	Lowest	Lowest	Lowest	Low	Lowest	Low	Low	Low	Lowest

HUC14	7th Level Watershed Name	WILDFIRE HAZARD	ECOSYSTEM SENSITIVITY	Landscape Condition	Vegetation Departure	Insect & Disease	ADAPTIVE CAPACITY	Simpson's Diversity	Topo-Climatic Variability	RESILIENT UPLANDS
10190007010506	Middle South Fork CLP River	Moderate	Low	Low	Moderate	Lowest	Lowest	Lowest	Low	Low
10190007010507	UT to South Fork CLP River	Lowest	Lowest	Lowest	Low	Lowest	Low	Low	Low	Lowest
10190007010508	Upper Pendergrass Creek	Low	Lowest	Lowest	Moderate	Lowest	Low	Low	Moderate	Lowest
10190007010509	UT to Pendergrass Creek	Lowest	Lowest	Lowest	Low	Lowest	Low	Low	Low	Lowest
10190007010510	Lower Pendergrass Creek	Moderate	Lowest	Low	Low	Lowest	Lowest	Lowest	Low	Low
10190007010511	Lower South Fork CLP River	High	Low	Low	Moderate	Lowest	Lowest	Lowest	Lowest	Low
10190007020101	Headwaters Hague Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Low	Moderate	Lowest	Lowest
10190007020102	Mummy Pass Creek	Lowest	Lowest	Lowest	Lowest	Low	Moderate	Moderate	High	Low
10190007020103	Upper Hague Creek	Lowest	Moderate	Lowest	Highest	High	Moderate	High	Lowest	Low
10190007020104	Lower Hague Creek	Lowest	Moderate	Lowest	Highest	Moderate	Moderate	High	Low	Moderate
10190007020201	Upper Upper Headwaters CLP	Moderate	Highest	Highest	Moderate	High	High	Highest	Low	High
10190007020202	Middle Upper Headwaters CLP	High	Highest	Highest	Moderate	Moderate	High	Highest	Low	High
10190007020203	Lower Upper Headwaters CLP	Highest	High	Low	High	High	High	High	Moderate	Highest
10190007020204	Upper Chapin Creek	Moderate	Low	Lowest	Moderate	Moderate	High	Highest	Low	Moderate
10190007020205	Lower Chapin Creek	Highest	Moderate	Lowest	High	Moderate	High	Highest	Low	High
10190007020206	Middle Headwaters CLP	Highest	High	Lowest	Highest	Highest	High	Highest	Low	Highest
10190007020207	Lower Headwaters CLP	High	Moderate	Lowest	Moderate	Moderate	High	Highest	Low	High
10190007020301	Neota Creek	High	Moderate	Lowest	High	Moderate	High	Highest	Low	High
10190007020302	UT to Long Draw Reservoir	Moderate	Moderate	Lowest	High	Moderate	Highest	Highest	High	High
10190007020303	Long Draw Reservoir	Highest	High	Low	Highest	Moderate	High	Highest	Low	Highest
10190007020304	Willow Creek-La Poudre Pass Creek	High	Moderate	Lowest	High	Moderate	High	Highest	Moderate	High
10190007020305	Upper Corral Creek	High	Moderate	Lowest	High	Moderate	High	Highest	Low	High
10190007020306	UT to Corral Creek	Moderate	High	High	Moderate	Moderate	Highest	Highest	High	High
10190007020307	Lower Corral Creek	Moderate	High	Low	Moderate	High	Highest	High	Highest	Highest
10190007020308	La Poudre Pass Creek	High	High	Low	High	High	Highest	Highest	High	Highest
10190007020401	Upper Joe Wright Creek	High	Highest	High	High	High	High	Highest	Low	Highest
10190007020402	Montgomery Creek	Low	Moderate	Low	Low	Moderate	Highest	Highest	Moderate	Moderate
10190007020403	Joe Wright Reservoir	Moderate	High	Highest	Moderate	Moderate	Highest	Highest	High	Highest
10190007020404	UT1 to Joe Wright Creek	Highest	High	Low	Highest	High	Highest	Highest	Highest	Highest
10190007020405	Bald Mountain	High	Moderate	Lowest	High	Moderate	Highest	Highest	High	High
10190007020406	North Fork Joe Wright Creek	Moderate	Moderate	Low	Low	High	Highest	Highest	Moderate	High
10190007020407	Sawmill Creek	Low	Low	Low	Lowest	Low	High	Highest	Low	Moderate
10190007020408	Middle Joe Wright Creek	High	Highest	Highest	High	Highest	Highest	Highest	Highest	Highest
10190007020409	Upper Trap Creek	Moderate	Low	Lowest	Moderate	Low	High	Highest	Low	Moderate
10190007020410	Lower Trap Creek	Moderate	High	Moderate	Moderate	Moderate	Moderate	High	Low	Moderate
10190007020411	Upper Fall Creek	Low	Lowest	Lowest	Lowest	Low	Low	Moderate	Lowest	Lowest
10190007020412	Lower Fall Creek	Low	Moderate	Lowest	Moderate	Highest	High	Highest	Low	Moderate
10190007020413	Upper Chambers Lake	Low	Highest	High	Highest	Moderate	High	High	Moderate	High
10190007020414	Barnes Meadow Reservoir	Moderate	High	Low	Moderate	High	Moderate	Moderate	Low	Moderate
10190007020415	Lower Joe Wright Creek	Moderate	Highest	Highest	Moderate	Highest	Moderate	High	Low	High
10190007020416	Lower Chambers Lake	Lowest	Highest	Highest	Highest	Highest	Moderate	Moderate	Low	Moderate
10190007020501	UT to Cascade Creek	Lowest	Low	Lowest	Moderate	Low	Moderate	High	Moderate	Low
10190007020502	Cascade Creek	Low	Low	Lowest	Low	Moderate	Moderate	High	Low	Low
10190007020503	Willow Creek-CLP River	Moderate	Moderate	Lowest	Moderate	Moderate	High	Moderate	Moderate	Moderate
10190007020504	Upper Willow Creek CLP	Moderate	High	Lowest	High	Highest	Moderate	High	Low	Moderate
10190007020505	Peterson Lake	Moderate	High	High	Moderate	Moderate	Highest	Highest	Moderate	High
10190007020506	UT to Willow Creek CLP	Highest	Moderate	Lowest	Highest	High	High	High	High	Highest
10190007020507	Middle Willow Creek CLP	High	Moderate	Lowest	High	High	Low	Moderate	Lowest	Moderate
10190007020508	Grass Lake Creek	Highest	Moderate	Lowest	Highest	High	High	High	Moderate	Highest
10190007020509	Upper May Creek	Moderate	Moderate	Lowest	Moderate	Moderate	Highest	Highest	Highest	High
10190007020510	Lower May Creek	High	Moderate	Lowest	Highest	Moderate	Highest	High	Highest	Highest
10190007020511	Lower Willow Creek CLP	Moderate	High	Low	Moderate	Highest	Low	Moderate	Lowest	Moderate
10190007020601	Upper West Fork Sheep Creek	Low	Low	Low	Moderate	Low	Highest	Highest	Highest	High
10190007020602	Lower West Fork Sheep Creek	Low	High	Lowest	Highest	High	High	Moderate	High	High
10190007020603	Upper East Fork Sheep Creek	Low	Moderate	Low	High	Low	Highest	Highest	Highest	Moderate
10190007020604	Lower East Fork Sheep Creek	Low	High	Low	High	Moderate	Highest	Moderate	Highest	High
10190007020605	UT1 to Sheep Creek	Low	High	Low	Highest	Moderate	Highest	High	Highest	High
10190007020606	UT2 to Sheep Creek	Low	High	Lowest	High	Highest	High	Moderate	High	Moderate
10190007020607	UT3 to Sheep Creek	Low	High	Lowest	Highest	High	Highest	Highest	High	High
10190007020608	Sheep Creek	Moderate	High	Lowest	High	Highest	Moderate	Highest	Low	High
10190007020701	Upper Roaring Creek	High	Highest	Moderate	Highest	Highest	High	High	High	Highest
10190007020702	UT to Roaring Creek	High	High	Lowest	Highest	Highest	Highest	Highest	Moderate	Highest
10190007020703	UT to East Fork Roaring Creek	Moderate	High	Low	High	Highest	High	Highest	Moderate	High
10190007020704	East Fork Roaring Creek	Low	Highest	Low	High	Highest	High	Highest	Low	High

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10190007020705	Lower Roaring Creek	Moderate	High	Lowest	High	High	High	Highest	Low	High
10190007020801	Twin Lakes	Low	High	Low	High	High	High	Highest	Moderate	High
10190007020802	Headwaters BH-Cache La Poudre	Moderate	Highest	Highest	Moderate	High	Lowest	Low	Lowest	Moderate
10190007020803	Tunnel Creek	Low	High	Low	High	Highest	Highest	Highest	Moderate	High
10190007020804	Upper Upper BH-Cache La Poudre	Moderate	Highest	Highest	Moderate	Highest	Lowest	Lowest	Lowest	Moderate
10190007020805	UT1 to BH-Cache La Poudre	Low	Highest	Moderate	High	High	Moderate	Moderate	Low	Moderate
10190007020806	Boston Peak Creek	Moderate	High	Lowest	High	Highest	Highest	Highest	Highest	Highest
10190007020807	Williams Gulch	Moderate	Moderate	Lowest	Moderate	High	Highest	Highest	Highest	High
10190007020808	Lower Upper BH-Cache La Poudre	Moderate	Highest	Highest	High	High	Lowest	Lowest	Lowest	Moderate
10190007020809	UT2 to BH-Cache La Poudre	Low	Moderate	Lowest	High	High	Moderate	High	Low	Moderate
10190007020810	Peterson Creek	Moderate	Highest	Low	High	Highest	High	Highest	Low	High
10190007020811	Upper Middle BH-Cache La Poudre	Low	Highest	Highest	High	Moderate	Lowest	Lowest	Lowest	Moderate
10190007020812	UT3 to BH-Cache La Poudre	Low	High	Moderate	High	High	Lowest	Low	Lowest	Moderate
10190007020813	UT4 to BH-Cache La Poudre	Low	High	Low	Highest	Highest	Low	Moderate	Low	Moderate
10190007020814	Washout Gulch	Moderate	High	Low	High	Highest	Lowest	Low	Lowest	Moderate
10190007020815	Upper Black Hollow Creek	Low	Highest	Moderate	Highest	High	Moderate	Moderate	Moderate	Moderate
10190007020816	Lower Black Hollow Creek	Low	Highest	Low	Highest	Highest	Low	Moderate	Lowest	Moderate
10190007020817	Lower Middle BH-Cache La Poudre	Low	Highest	Highest	Moderate	Moderate	Lowest	Lowest	Lowest	Low
10190007020818	Dry Creek	Moderate	High	Low	Moderate	Highest	Low	Moderate	Lowest	Moderate
10190007020819	Sheep Creek-Black Hollow	Low	Highest	Low	Highest	Highest	Low	Low	Lowest	Moderate
10190007020820	Crown Point Gulch	Low	Highest	Moderate	Highest	Highest	Low	Low	Low	Moderate
10190007020821	Mineral Springs Gulch	Low	Highest	Moderate	Highest	High	Moderate	Moderate	Low	High
10190007020822	Lower BH-Cache La Poudre	Moderate	High	Highest	Moderate	Low	Lowest	Lowest	Lowest	Moderate
10190007020901	UT to Bennett Creek	Lowest	High	Low	Highest	Low	Moderate	High	Moderate	Moderate
10190007020902	Upper Bennett Creek	Low	Highest	High	Moderate	High	High	High	Moderate	High
10190007020903	Middle Bennett Creek	Low	Moderate	Low	High	Low	Low	Lowest	Moderate	Low
10190007020904	Kyle Gulch	Low	Moderate	Low	High	Low	Moderate	Low	Moderate	Moderate
10190007020905	Lower Bennett Creek	Moderate	Low	Low	Low	Lowest	Lowest	Lowest	Lowest	Low
10190007021001	Upper Sevenmile Creek	Moderate	High	Low	High	Highest	High	Highest	Low	High
10190007021002	UT to Sevenmile	Low	Moderate	Low	Moderate	Low	Low	Low	Low	Low
10190007021003	Lower Sevenmile Creek	Low	High	Moderate	Moderate	Moderate	Lowest	Lowest	Lowest	Low
10190007021004	Upper Upper CLP River	Highest	Highest	Highest	Highest	Moderate	Lowest	Low	Lowest	High
10190007021005	Dadd Gulch	High	High	Low	Highest	Low	Low	Lowest	Low	Moderate
10190007021006	UT1 to Upper CLP River	Moderate	Moderate	Moderate	Highest	Lowest	Low	Moderate	Low	Moderate
10190007021007	UT2 to Upper CLP River	Highest	High	Low	Highest	Moderate	Low	Low	Low	High
10190007021008	Middle Upper CLP River	Highest	Highest	Highest	Highest	Low	Low	Low	Lowest	High
10190007021009	UT3 to Upper CLP River	Highest	Moderate	Low	Highest	Lowest	Moderate	High	Low	High
10190007021010	Eggers Gulch	Highest	High	Moderate	Highest	Lowest	Low	Low	Low	High
10190007021011	Lower Upper CLP River	Highest	Highest	Highest	Highest	Lowest	Lowest	Low	Lowest	High
10190007030101	Headwaters Elkhorn Creek	Low	Highest	Moderate	High	Highest	Highest	Highest	High	High
10190007030102	Swamp Creek	Low	High	High	Moderate	High	Highest	Highest	Highest	High
10190007030103	Upper Elkhorn Creek	Low	High	Low	High	Highest	High	Moderate	Highest	High
10190007030104	Upper Manhattan Creek	Low	Moderate	Moderate	Moderate	Low	Moderate	Low	High	Moderate
10190007030105	Lower Manhattan Creek	High	High	Moderate	High	Low	Moderate	Low	Moderate	High
10190007030106	Upper Middle Elkhorn Creek	High	High	Low	Highest	Low	Moderate	Moderate	Moderate	High
10190007030107	UT1 to Elkhorn Creek	Moderate	High	Moderate	High	Moderate	Moderate	Low	High	Moderate
10190007030108	UT2 to Elkhorn Creek	Highest	High	Moderate	Highest	Low	Moderate	Moderate	Moderate	High
10190007030109	Lower Middle Elkhorn Creek	Highest	Highest	Highest	Highest	Moderate	High	High	High	Highest
10190007030110	UT3 to Elkhorn Creek	Highest	High	Moderate	Highest	Low	Moderate	High	Low	High
10190007030111	UT4 to Elkhorn Creek	Highest	Moderate	Lowest	Highest	Lowest	Moderate	High	Low	High
10190007030112	Lower Elkhorn Creek	Highest	High	Moderate	Highest	Low	Low	Low	Low	High
10190007030113	UT5 to Elkhorn Creek	High	High	Highest	High	Lowest	Moderate	Low	Moderate	High
10190007030114	Outlet Elkhorn Creek	Highest	High	Moderate	Highest	Moderate	Low	Moderate	Low	High
10190007030201	Harlan Gulch	Moderate	Moderate	Low	Moderate	Low	Low	Lowest	Moderate	Moderate
10190007030202	UT to Stove Prairie Gulch	Moderate	Low	Low	Moderate	Lowest	Lowest	Lowest	Low	Low
10190007030203	Upper Stove Prairie Gulch	High	High	High	High	Lowest	Low	Low	Low	Moderate
10190007030204	Lower Stove Prairie Gulch	High	Low	Lowest	High	Lowest	Lowest	Low	Lowest	Low
10190007030205	Upper Youngs Gulch	High	Moderate	Moderate	High	Lowest	Low	Low	Low	Moderate
10190007030206	Lower Youngs Gulch	Highest	Low	Low	Moderate	Lowest	Lowest	Low	Lowest	Moderate
10190007030301	UT to Middle CLP River	High	Moderate	High	High	Lowest	Lowest	Low	Lowest	Moderate
10190007030302	Upper Poverty Gulch	Low	Lowest	Low	Low	Lowest	Low	Lowest	Moderate	Lowest
10190007030303	Lower Poverty Gulch	Moderate	Low	Low	Low	Lowest	Lowest	Lowest	Lowest	Low
10190007030304	Buck Gulch	Moderate	Low	Low	Moderate	Lowest	Low	Low	Low	Low
10190007030305	Upper Middle CLP River	High	Moderate	Highest	Moderate	Lowest	Lowest	Low	Lowest	Moderate

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10190007030306	Stevens Gulch	Moderate	Low	Highest	Low	Lowest	Low	Moderate	Lowest	Moderate
10190007030307	Upper Skin Gulch	Moderate	Lowest	Lowest	Low	Lowest	Lowest	Lowest	Lowest	Low
10190007030308	Lower Skin Gulch	Highest	Moderate	Low	High	Lowest	Lowest	Low	Lowest	Moderate
10190007030309	Cedar Gulch	High	Low	High	Lowest	Lowest	Low	Moderate	Lowest	Moderate
10190007030310	Lower Middle CLP River	High	Moderate	Highest	Moderate	Lowest	Lowest	Low	Lowest	Moderate
10190007030401	Upper Gordon Creek	Moderate	Moderate	Highest	Low	Lowest	High	Low	Highest	Moderate
10190007030402	UT1 to Gordon Creek	High	High	Highest	High	Low	Low	Low	Moderate	High
10190007030403	UT2 to Gordon Creek	Moderate	Moderate	Highest	Low	Lowest	Moderate	Low	High	Moderate
10190007030404	UT3 to Gordon Creek	Moderate	Low	High	Lowest	Lowest	Moderate	Low	High	Moderate
10190007030405	Middle Gordon Creek	Low	Moderate	Highest	Lowest	Lowest	Moderate	Moderate	High	Moderate
10190007030406	UT4 to Gordon Creek	Moderate	Moderate	Moderate	Moderate	Lowest	Moderate	Low	High	Moderate
10190007030407	Lower Gordon Creek	Low	Low	High	Lowest	Lowest	Moderate	Moderate	Moderate	Low
10190007030408	Hewlett Gulch	High	Low	Low	Moderate	Lowest	Low	Low	Lowest	Low
10190007030501	UT1 to Upper Lower CLP River	High	Lowest	Low	Lowest	Lowest	Low	Low	Low	Low
10190007030502	Falls Gulch	Moderate	Low	Moderate	Low	Lowest	Lowest	Low	Lowest	Low
10190007030503	Upper Lower CLP River	High	High	Highest	High	Lowest	Lowest	Low	Lowest	Moderate
10190007030504	UT to Hill Gulch	High	Low	Lowest	Moderate	Lowest	Low	Low	Lowest	Low
10190007030505	Watha Gulch	Moderate	Lowest	Lowest	Low	Lowest	Lowest	Low	Lowest	Low
10190007030506	Hill Gulch	High	Moderate	Low	High	Lowest	Lowest	Low	Lowest	Moderate
10190007030507	UT1 to Middle Lower CLP River	Highest	Moderate	Moderate	Highest	Lowest	Lowest	Low	Lowest	High
10190007030508	Middle Lower CLP River	Moderate	High	Highest	Highest	Lowest	Low	Moderate	Lowest	Moderate
10190007030509	Boyd Gulch	High	Moderate	Low	High	Lowest	Lowest	Low	Lowest	Moderate
10190007030510	UT1 to Lower Lower CLP River	Moderate	High	Highest	High	Lowest	Low	Moderate	Lowest	Moderate
10190007030511	Lower Lower CLP River	High	High	Highest	Moderate	Lowest	Lowest	Low	Lowest	Moderate
10190007040101	Headwaters North Fork-Panhandle Creek	High	Highest	Highest	Highest	Highest	High	High	High	Highest
10190007040102	Killpecker Creek	High	Highest	Moderate	Highest	Highest	Highest	Moderate	Highest	Highest
10190007040103	UT1 to North Fork-Panhandle Creek	High	Highest	High	Highest	High	Highest	Moderate	Highest	Highest
10190007040104	Upper North Fork-Panhandle Creek	High	Highest	Highest	Highest	Highest	High	High	High	Highest
10190007040105	Pearl Creek	Moderate	Highest	High	Moderate	High	Highest	High	Highest	Highest
10190007040106	UT2 to North Fork-Panhandle Creek	Moderate	Highest	Highest	High	Highest	Highest	Highest	Highest	Highest
10190007040107	Middle North Fork-Panhandle Creek	High	High	Moderate	Moderate	Highest	High	Moderate	High	Highest
10190007040108	Upper Panhandle Creek	High	High	Low	Highest	High	Highest	Highest	Highest	Highest
10190007040109	Middle Panhandle Creek	Highest	Highest	Moderate	Highest	Highest	Highest	High	Highest	Highest
10190007040110	South Fork Panhandle Creek	Highest	Highest	Low	High	Highest	Highest	High	Highest	Highest
10190007040111	Lower Panhandle Creek	High	Highest	Highest	Moderate	Highest	High	Moderate	Moderate	Highest
10190007040112	Lower North Fork-Panhandle Creek	High	High	Low	High	Moderate	Low	Low	Moderate	Moderate
10190007040201	Cow Creek	Highest	High	Lowest	Highest	Highest	Highest	Highest	High	Highest
10190007040202	Eaton Reservoir	Highest	High	Moderate	Moderate	Highest	Moderate	Moderate	Moderate	Highest
10190007040203	Upper Sheep Creek-North Fork	High	Highest	Highest	Low	High	High	Lowest	Highest	High
10190007040204	Trout Creek	Highest	Highest	Moderate	Moderate	Highest	High	Moderate	High	Highest
10190007040205	UT1 to Sheep Creek-North Fork	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Low	High	Moderate
10190007040206	West Fork Beaver Creek-North Fork	Highest	High	Lowest	High	Highest	Highest	Highest	Highest	Highest
10190007040207	Beaver Creek-North Fork	High	Highest	Moderate	High	Highest	Highest	High	Highest	Highest
10190007040208	Acme Creek	Highest	Highest	Moderate	Highest	Highest	Highest	Highest	Moderate	Highest
10190007040209	UT2 to Sheep Creek-North Fork	Moderate	High	Low	High	Moderate	High	Moderate	Highest	High
10190007040210	Middle Sheep Creek-North Fork	High	Highest	Highest	High	High	Moderate	Moderate	Low	High
10190007040211	UT3 to Sheep Creek-North Fork	Highest	Highest	Moderate	Highest	High	Highest	Highest	Moderate	Highest
10190007040212	UT4 to Sheep Creek-North Fork	High	Highest	Moderate	High	High	Lowest	Lowest	Low	Moderate
10190007040213	Upper George Creek	Highest	Highest	Low	Highest	Highest	Highest	High	Highest	Highest
10190007040214	Cornelius Creek	High	High	Lowest	High	Highest	Moderate	Moderate	Moderate	High
10190007040215	Lower George Creek	High	Highest	Low	Highest	Highest	Moderate	Moderate	Moderate	High
10190007040216	Lower Sheep Creek-North Fork	High	Highest	Highest	High	High	Low	Lowest	Low	High
10190007040301	Upper Bull Creek	Moderate	Moderate	Low	Highest	Lowest	Moderate	Moderate	High	Moderate
10190007040302	Middle Bull Creek	High	Moderate	Low	Highest	Lowest	High	High	High	High
10190007040303	Lower Bull Creek	Highest	High	High	Highest	Lowest	High	Moderate	Moderate	Highest
10190007040304	UT to North Fork-Bull Creek	Highest	High	Low	Highest	Moderate	Moderate	Low	Moderate	High
10190007040305	Upper North Fork-Bull Creek	Highest	High	Lowest	Highest	High	Low	Low	Lowest	High
10190007040306	Middle North Fork-Bull Creek	Highest	High	High	Highest	Low	Low	Low	Low	High
10190007040307	Upper Mill Creek	Highest	High	Low	Highest	High	Highest	High	Highest	Highest
10190007040308	Middle Mill Creek	Highest	High	Low	Highest	Moderate	Moderate	Low	Moderate	High
10190007040309	Willow Creek-Mill Creek	Highest	High	Low	Highest	Moderate	Moderate	Moderate	Low	High
10190007040310	Lower Mill Creek	Highest	Moderate	Low	Highest	Low	Lowest	Lowest	Low	Moderate
10190007040311	Little Bull Creek	High	Moderate	Low	High	Low	Low	Low	Moderate	Moderate
10190007040312	Lower North Fork-Bull Creek	High	Low	Lowest	Moderate	Low	Lowest	Lowest	Lowest	Low

HUC14	7th Level Watershed Name	WILDFIRE HAZARD	ECOSYSTEM SENSITIVITY	Landscape Condition	Vegetation Departure	Insect & Disease	ADAPTIVE CAPACITY	Simpson's Diversity	Topo-Climatic Variability	RESILIENT UPLANDS
10190007040401	UT1 to Trail Creek	Highest	High	Low	Highest	High	High	Moderate	High	Highest
10190007040402	Upper Trail Creek	Highest	High	Low	High	High	High	High	High	Highest
10190007040403	UT2 to Trail Creek	Highest	Highest	High	High	High	High	Low	High	Highest
10190007040404	UT3 to Trail Creek	Moderate	Highest	High	High	Moderate	High	Low	Highest	Highest
10190007040405	UT4 to Trail Creek	High	High	Lowest	Highest	Highest	High	Moderate	High	Highest
10190007040406	Pratt Creek	High	High	Low	High	Highest	Moderate	Low	Moderate	High
10190007040407	Hamxe Creek	Highest	Highest	Moderate	Highest	High	Highest	High	Highest	Highest
10190007040408	Middle Trail Creek	Highest	Highest	Low	Highest	Highest	Low	Lowest	Moderate	Highest
10190007040409	UT5 to Trail Creek	High	Highest	Moderate	Highest	Highest	Low	Lowest	Moderate	High
10190007040410	Devils Creek	High	Highest	Highest	Highest	High	Moderate	Lowest	Highest	Highest
10190007040411	Lower Trail Creek	High	High	High	High	Low	Low	Lowest	Moderate	Moderate
10190007050201	Upper West Fork Dale Creek	Lowest	Low	Highest	Lowest	Lowest	Highest	High	Highest	Moderate
10190007050202	Lower West Fork Dale Creek	Low	Lowest	Low	Lowest	Lowest	High	Low	Highest	Low
10190007050203	Upper Mason Allen Creek	Low	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Highest	Low
10190007050204	Lower Mason Allen Creek	High	Low	Low	Moderate	Lowest	Moderate	Low	Highest	Moderate
10190007050205	UT1 to Lower Dale Creek	Low	Low	High	Lowest	Lowest	High	Low	Highest	Moderate
10190007050206	UT2 to Lower Dale Creek	Low	Low	Moderate	Low	Lowest	High	Low	Highest	Moderate
10190007050207	Mud Creek	Moderate	High	Highest	Low	Moderate	Moderate	Lowest	Highest	High
10190007050208	UT3 to Lower Dale Creek	Moderate	High	Highest	Low	Moderate	High	Lowest	Highest	High
10190007050209	UT4 to Lower Dale Creek	Moderate	High	Highest	Low	Moderate	High	Lowest	Highest	High
10190007050210	Middle Lower Dale Creek	Moderate	Moderate	Highest	Low	Low	Moderate	Low	High	Moderate
10190007050211	Upper Georges Gulch	Highest	Moderate	Lowest	Highest	Low	Moderate	High	Moderate	High
10190007050212	Lower Georges Gulch	High	High	Moderate	Moderate	Moderate	Moderate	Low	High	High
10190007050213	Lower Lower Dale Creek	Low	Low	Low	Low	Lowest	Low	Low	Low	Low
10190007050301	Headwaters Fish Creek	High	Highest	High	High	Moderate	Moderate	Lowest	High	High
10190007050302	Little Fish Creek	Moderate	Highest	Highest	Moderate	Moderate	Moderate	Lowest	Highest	High
10190007050303	UT1 to Fish Creek	Low	Moderate	Highest	Lowest	Low	High	Lowest	Highest	Moderate
10190007050304	Kelsey Lake	Moderate	Moderate	Moderate	Moderate	Lowest	High	Low	Highest	High
10190007050305	Upper Fish Creek	Lowest	Low	High	Lowest	Lowest	Highest	Moderate	Highest	Moderate
10190007050306	UT2 to Fish Creek	Highest	High	Low	Highest	Moderate	Highest	Moderate	Highest	Highest
10190007050307	UT3 to Fish Creek	High	High	Low	Highest	Moderate	High	Moderate	High	Highest
10190007050308	UT4 to Fish Creek	High	Moderate	Lowest	Highest	Moderate	Moderate	Low	High	High
10190007050309	UT5 to Fish Creek	Lowest	Low	Highest	Lowest	Lowest	Highest	High	Highest	Moderate
10190007050310	UT6 to Fish Creek	Low	Moderate	Highest	Low	Lowest	High	Lowest	Highest	Moderate
10190007050311	Middle Fish Creek	High	High	High	Moderate	Low	Moderate	Low	High	High
10190007050312	UT7 to Fish Creek	Highest	Moderate	Lowest	Highest	Moderate	High	High	Low	Highest
10190007050313	Lower Fish Creek	High	Highest	High	Highest	Moderate	Low	Low	Moderate	High
10190007050401	Upper Deadman Creek	Low	Lowest	Low	Low	Lowest	High	Low	Highest	Low
10190007050402	UT1 to Deadman Creek	Low	Lowest	Low	Lowest	Lowest	Highest	Moderate	Highest	Moderate
10190007050403	UT2 to Deadman Creek	Low	Lowest	Lowest	Lowest	Lowest	Moderate	Moderate	Moderate	Low
10190007050404	Middle Deadman Creek	Low	Low	Low	Low	Lowest	Highest	Moderate	Highest	Moderate
10190007050405	UT3 to Deadman Creek	Lowest	Lowest	Low	Lowest	Lowest	Highest	Highest	High	Low
10190007050406	UT4 to Deadman Creek	Lowest	Low	Highest	Lowest	Lowest	Highest	Highest	High	Moderate
10190007050407	Lower Deadman Creek	Lowest	Low	High	Lowest	Lowest	Highest	Highest	Highest	Moderate
10190007060101	UT1 to South Fork Lone Pine Creek	High	High	Lowest	High	Highest	Highest	Highest	High	Highest
10190007060102	Headwaters South Fork Lone Pine Creek	Moderate	High	Lowest	Moderate	Highest	Highest	Highest	High	High
10190007060103	UT2 to South Fork Lone Pine Creek	High	High	Lowest	Highest	Highest	Highest	Highest	High	Highest
10190007060104	UT3 to South Fork Lone Pine Creek	Moderate	Highest	Highest	Moderate	Moderate	Highest	Moderate	Highest	High
10190007060105	Upper South Fork Lone Pine Creek	Moderate	High	Lowest	Moderate	Highest	Highest	High	Highest	High
10190007060106	Bellaire Creek	Moderate	Moderate	Moderate	High	Lowest	High	Low	Highest	Moderate
10190007060107	Parvin Lake	Moderate	High	Highest	High	Lowest	High	Lowest	Highest	High
10190007060108	Middle South Fork Lone Pine Creek	High	Highest	Highest	Highest	Lowest	Moderate	Low	High	Highest
10190007060109	Lower South Fork Lone Pine Creek	Highest	Highest	Highest	Highest	High	Moderate	Moderate	Moderate	Highest
10190007060201	Beartrap Creek	High	Highest	Moderate	Moderate	Highest	High	Low	High	High
10190007060202	Headwaters North Fork Lone Pine Creek	High	Highest	High	High	High	Moderate	Low	High	High
10190007060203	Lake Nokomis	Moderate	Highest	Highest	High	Highest	High	Low	Highest	Highest
10190007060204	Upper North Fork Lone Pine Creek	Moderate	High	Moderate	Highest	Lowest	Low	Low	Moderate	Moderate
10190007060205	Columbine Canyon	High	Highest	Highest	Highest	Low	High	High	High	Highest
10190007060206	Middle North Fork Lone Pine Creek	Highest	High	Highest	Highest	Lowest	High	High	Moderate	Highest
10190007060207	UT to North Fork Lone Pine Creek	Highest	Highest	Highest	Highest	Low	High	High	Moderate	Highest
10190007060208	Lower North Fork Lone Pine Creek	Highest	High	Low	Highest	Moderate	Moderate	High	Low	Highest
10190007060209	Windy Gap Lake Creek	Highest	Moderate	Lowest	Highest	Moderate	High	High	Low	Highest
10190007060210	Outlet North Fork Lone Pine Creek	Highest	High	Lowest	Highest	Moderate	Low	Moderate	Lowest	High
10190007060301	Headwaters Lone Pine Creek	Highest	High	Low	Highest	Moderate	Low	Low	Lowest	High

HUC14	7th Level Watershed Name	WILDFIRE HAZARD	ECOSYSTEM SENSITIVITY	Landscape Condition	Vegetation Departure	Insect & Disease	ADAPTIVE CAPACITY	Simpson's Diversity	Topo-Climatic Variability	RESILIENT UPLANDS
10190007060302	UT1 to Lone Pine Creek	Highest	Moderate	Lowest	Highest	Lowest	Low	Moderate	Low	High
10190007060303	Upper Lone Pine Creek	High	Moderate	Moderate	Moderate	Low	Lowest	Lowest	Lowest	Moderate
10190007060304	UT to UT2 to Lone Pine Creek	Low	Moderate	Highest	Lowest	Lowest	Moderate	Moderate	Moderate	Moderate
10190007060305	UT2 to Lone Pine Creek	Lowest	Lowest	Moderate	Lowest	Lowest	Highest	High	High	Low
10190007060306	Middle Lone Pine Creek	Low	Low	High	Lowest	Lowest	Moderate	Moderate	Moderate	Low
10190007060307	UT3 to Lone Pine Creek	Low	Low	Moderate	Lowest	Lowest	High	Moderate	High	Low
10190007060308	Lower Lone Pine Creek	Lowest	Low	Highest	Lowest	Lowest	High	High	High	Moderate
10190007070101	Upper Sixmile Creek	Lowest	Lowest	Low	Lowest	Lowest	Highest	Highest	Highest	Low
10190007070102	UT to Sixmile Creek	Lowest	Low	Highest	Lowest	Lowest	Highest	Highest	Highest	Moderate
10190007070103	Lower Sixmile Creek	Lowest	Low	High	Lowest	Lowest	Highest	Highest	Highest	Moderate
10190007070104	UT1 to Halligan Reservoir	Low	Lowest	Low	Lowest	Lowest	High	High	Moderate	Low
10190007070105	Upper Meadow Creek	Highest	High	High	Highest	Low	High	Highest	Moderate	Highest
10190007070106	UT to Meadow Creek	Highest	High	Low	Highest	High	High	High	High	Highest
10190007070107	Middle Meadow Creek	Moderate	Low	Moderate	Low	Lowest	Low	Low	Moderate	Moderate
10190007070108	UT2 to Halligan Reservoir	Low	Lowest	Low	Lowest	Lowest	Moderate	Moderate	Moderate	Low
10190007070109	Lower Meadow Creek	Low	Low	Moderate	Lowest	Lowest	High	Low	Highest	Moderate
10190007070110	Halligan Reservoir	Lowest	Lowest	Low	Lowest	Lowest	High	High	Moderate	Low
10190007070201	Headwaters North Fork Rabbit Creek	Highest	Moderate	Lowest	Highest	Low	Moderate	High	Low	High
10190007070202	Upper North Fork Rabbit Creek	High	Moderate	Moderate	High	Low	Low	Low	Low	Moderate
10190007070203	Middle North Fork Rabbit Creek	Moderate	Moderate	High	Low	Lowest	Moderate	Low	Moderate	Moderate
10190007070204	UT to North Fork Rabbit Creek	Moderate	Low	High	Lowest	Lowest	Moderate	Lowest	Highest	Moderate
10190007070205	Upper Middle Fork Rabbit Creek	Highest	Moderate	Lowest	Highest	Low	Low	Moderate	Lowest	High
10190007070206	Lower Middle Fork Rabbit Creek	Low	Lowest	Low	Lowest	Lowest	Low	Low	Moderate	Low
10190007070207	Lower North Fork Rabbit Creek	Low	Low	Moderate	Lowest	Lowest	Low	Lowest	Moderate	Low
10190007070208	UT to Rabbit Creek	Low	Low	Moderate	Lowest	Lowest	Moderate	Low	Highest	Moderate
10190007070209	UT to South Fork Rabbit Creek	Highest	High	Low	Highest	Moderate	Low	Low	Low	High
10190007070210	South Fork Rabbit Creek	High	Moderate	Low	High	Low	Low	Low	Moderate	Moderate
10190007070211	Lower Rabbit Creek	Low	Low	Moderate	Lowest	Lowest	Moderate	Moderate	Moderate	Low
10190007070301	Upper Stonewall Creek	Lowest	Lowest	Low	Lowest	Lowest	Highest	Highest	Highest	Low
10190007070302	UT1 to Stonewall Creek	Low	Lowest	Lowest	Lowest	Lowest	Highest	High	High	Low
10190007070303	Lonetree Creek	Lowest	Low	High	Lowest	Lowest	Highest	Highest	Highest	Moderate
10190007070304	Tenmile Creek	Lowest	Low	High	Lowest	Lowest	Highest	Highest	Highest	Moderate
10190007070305	UT2 to Stonewalll Creek	Lowest	Lowest	Lowest	Lowest	Lowest	High	High	High	Low
10190007070306	Lower Stonewall Creek	Lowest	Low	High	Lowest	Lowest	Highest	High	Highest	Moderate
10190007070401	UT1 to North Fork-Seaman Reservoir	Lowest	Lowest	Moderate	Lowest	Lowest	Highest	High	Highest	Moderate
10190007070402	Headwaters North Fork-Seaman Reservoir	Moderate	Lowest	Low	Lowest	Lowest	Low	Low	Low	Low
10190007070403	Upper North Fork-Seaman Reservoir	Lowest	Low	Highest	Lowest	Lowest	Highest	Highest	Highest	Moderate
10190007070404	Deadman Butte Creek	Lowest	Low	Highest	Lowest	Lowest	Highest	Highest	Highest	Moderate
10190007070405	UT2 to North Fork-Seaman Reservoir	Lowest	Low	Highest	Lowest	Lowest	Highest	Moderate	Highest	Moderate
10190007070406	UT3 to North Fork-Seaman Reservoir	Lowest	Low	Highest	Lowest	Lowest	Highest	High	Highest	Moderate
10190007070407	Middle North Fork-Seaman Reservoir	Lowest	Moderate	Highest	Lowest	Lowest	High	Moderate	High	Moderate
10190007070408	UT4 to North Fork-Seaman Reservoir	Moderate	Low	Low	Low	Lowest	Low	Moderate	Low	Low
10190007070409	UT5 to North Fork-Seaman Reservoir	Moderate	Lowest	Low	Low	Lowest	Low	Moderate	Low	Low
10190007070410	UT6 to North Fork-Seaman Reservoir	Moderate	Moderate	Moderate	Moderate	Low	Low	Low	Low	Moderate
10190007070411	Lower North Fork-Seaman Reservoir	Low	Low	High	Lowest	Lowest	Low	Moderate	Low	Low
10190007070412	Long Draw-Seaman Reservoir	High	Moderate	Low	High	Low	Low	Low	Low	Moderate
10190007070413	UT7 to North Fork-Seaman Reservoir	High	Moderate	Low	High	Lowest	Low	Low	Lowest	Moderate
10190007070414	Obenchain Draw-Seaman Reservoir	High	High	Moderate	High	Moderate	Lowest	Low	Lowest	Moderate
10190007070415	Outlet North Fork-Seaman Reservoir	Moderate	Low	Moderate	Low	Lowest	Lowest	Low	Lowest	Low
10190007070416	Greyrock Mountain Creek	High	Low	Low	Moderate	Lowest	Lowest	Low	Lowest	Moderate
10190007070417	Milton Seaman Reservoir	High	Low	Low	Moderate	Lowest	Lowest	Low	Lowest	Low
10190007080101	Upper Owl Canyon	Lowest	Low	Highest	Lowest	Lowest	Highest	Moderate	Highest	Moderate
10190007080102	Middle Owl Canyon	Low	Moderate	Highest	Lowest	Lowest	Moderate	Moderate	Moderate	Low
10190007080103	Lower Owl Canyon	Low	Low	Highest	Lowest	Lowest	Moderate	Moderate	Moderate	Low
10190007080201	Santanka Gulch	Moderate	High	Highest	Moderate	Low	Low	Low	Moderate	Moderate
10190007080202	Soldier Canyon	High	Moderate	Moderate	Highest	Lowest	Lowest	Lowest	Low	Moderate
10190007080203	Well Gulch	Highest	High	Lowest	Highest	Moderate	Low	Low	Lowest	High
10190007080204	Arthurs Rock Gulch	Highest	Moderate	Moderate	Highest	Lowest	Low	Low	Low	Moderate
10190007080205	Mill Creek	Highest	Moderate	Low	Highest	Moderate	Low	Moderate	Lowest	High
10190007080206	Spring Canyon	Highest	High	Moderate	Highest	Low	Low	Moderate	Lowest	High
10190007080207	Spring Creek	Moderate	High	Highest	Low	Low	Moderate	Low	Low	Moderate
10190007080208	Horsetooth Reservoir	Moderate	Moderate	Highest	Low	Lowest	Low	Low	Low	Moderate
10190007080501	UT1 to Outlet Poudre River	High	Low	Low	High	Lowest	Lowest	Low	Lowest	Low
10190007080502	UT2 to Outlet Poudre River	High	Moderate	Moderate	Highest	Lowest	Low	Moderate	Lowest	Moderate

HUC14	7th Level Watershed Name	WILDFIRE HAZARD	ECOSYSTEM SENSITIVITY	Landscape Condition	Vegetation Departure	Insect & Disease	ADAPTIVE CAPACITY	Simpson's Diversity	Topo-Climatic Variability	RESILIENT UPLANDS
10190007080503	Outlet Poudre River	High	Moderate	Highest	Moderate	Lowest	Lowest	Low	Lowest	Moderate
10190007080504	Upper Lewstone	High	High	Moderate	High	Low	Low	Low	Low	Moderate
10190007080505	UT to Lewstone	Moderate	Lowest	Lowest	Lowest	Lowest	Lowest	Low	Lowest	Lowest
10190007080506	Lower Lewstone	Moderate	Moderate	Moderate	Highest	Lowest	Low	Low	Low	Moderate
10190007080507	Tunnel - FC CLP	Low	Low	Highest	Lowest	Lowest	Moderate	High	Moderate	Moderate
10190007080508	Log Canyon	Moderate	Low	High	Low	Lowest	Low	Low	Low	Low
10190007080509	Upper Rist Canyon	Moderate	Moderate	Low	High	Lowest	Low	Low	Low	Moderate
10190007080510	Lower Rist Canyon	Highest	Moderate	Moderate	High	Lowest	Lowest	Low	Lowest	Moderate
10190007080511	Long Brown Gulch	High	Low	High	Low	Lowest	Low	Low	Low	Moderate
10190007080512	Labeau Gulch	Highest	Moderate	Low	Highest	Low	Lowest	Low	Lowest	Moderate
10190007080513	Devil Gulch	Highest	High	Low	Highest	Low	Low	Low	Lowest	High
10190007080514	Empire Gulch	High	High	Highest	High	Lowest	Low	Low	Low	Moderate
10190007080515	City of Fort Collins-CLP	Lowest	Low	Highest	Lowest	Lowest	High	Low	Highest	Moderate

HUC14	7th Level Watershed Name	ROADS HAZARD	DEBRIS FLOW HAZARD	HILLSLOPE EROSION	SEDIMENT TRANSPORT	RESILIENT WATERSHEDS & RIVER CORRIDORS
10180001050301	Snow Lake	Lowest	Highest	Lowest	Highest	Moderate
10180001050302	Nokhu Crags	Lowest	Highest	Low	Highest	High
10180001050303	Diamond Peak	Highest	Highest	Moderate	Moderate	Highest
10180001050304	Lake Agnes	Lowest	Highest	Low	Highest	Moderate
10180001050305	Headwaters Michigan River	Highest	Highest	Moderate	Moderate	Highest
10180010010101	Headwaters Laramie River-Rawah Creek	High	Highest	High	Highest	Highest
10180010010102	Laramie Lake	Moderate	Moderate	Lowest	Moderate	Moderate
10180010010103	UT1 to Laramie River-Rawah Creek	Lowest	High	High	Highest	High
10180010010104	Two and One Half Creek	Moderate	High	High	Highest	Highest
10180010010105	Upper Laramie River-Rawah Creek	High	Highest	Highest	Moderate	Highest
10180010010106	UT2 to Laramie River-Rawah Creek	Lowest	Highest	High	Low	Moderate
10180010010107	Middle Laramie River-Rawah Creek	Highest	Highest	Highest	Lowest	Highest
10180010010108	Upper West Branch Laramie River-Rawah Creek	Lowest	High	High	Highest	High
10180010010109	Middle West Branch Laramie River-Rawah Creek	Lowest	Highest	Highest	Highest	Highest
10180010010110	North Fork West Branch Laramie River-Rawah Creek	Lowest	High	Highest	High	High
10180010010111	Lower West Branch Laramie River-Rawah Creek	Moderate	Highest	Highest	Moderate	Highest
10180010010112	Half Mile Creek	Low	High	Highest	Moderate	Highest
10180010010113	Mill Creek-Lower Supply Canal	Lowest	Highest	Highest	Highest	Highest
10180010010114	Fall Creek-Lower Supply Canal	Moderate	Highest	Highest	Highest	Highest
10180010010115	Rapid Creek-Lower Supply Canal	High	Highest	Highest	Highest	Highest
10180010010116	Springer Creek-Lower Supply Canal	Moderate	Highest	Highest	Highest	Highest
10180010010117	Brinker Creek	Low	High	High	High	High
10180010010118	Jimmy Creek-Lower Supply Canal	Moderate	High	High	Highest	Highest
10180010010119	Lower Laramie River-Rawah Creek	Moderate	High	Highest	Lowest	High
10180010010120	Porter Creek	Low	High	Highest	High	High
10180010010121	Upper Rawah Creek	Lowest	Moderate	Moderate	High	Moderate
10180010010122	North Fork Rawah Creek	Lowest	High	Moderate	High	Moderate
10180010010123	Lower Rawah Creek	Lowest	High	High	High	Moderate
10180010010124	Outlet Laramie River-Rawah Creek	High	High	High	Lowest	Moderate
10180010010301	Columbine Ditch	Moderate	Moderate	High	Moderate	High
10180010010302	Bob Creek Ditch	High	Moderate	High	Low	High
10180010030301	Upper Sand Creek-Wilson Ditch	Highest	Moderate	High	Low	High
10180010030302	Middle Sand Creek-Wilson Ditch	Moderate	Moderate	Highest	Low	High
10180010030303	Lower Sand Creek-Wilson Ditch	Low	High	Highest	High	Highest
10190007010101	Upper Beaver Creek	Lowest	High	Moderate	High	Moderate
10190007010102	Comanche Lake	Lowest	Highest	High	Highest	High
10190007010103	Browns Lake	Lowest	High	Low	High	Moderate
10190007010104	Comanche Reservoir	Lowest	Highest	Moderate	High	High
10190007010105	Hourglass Reservoir	Low	Highest	Moderate	High	High
10190007010106	Middle Beaver Creek	Low	High	Low	Low	Moderate
10190007010107	Lower Beaver Creek	High	High	Lowest	Low	Moderate
10190007010201	Upper Head South Fork CLP	Lowest	High	High	High	High
10190007010202	UT to Head South Fork CLP	Lowest	Highest	Highest	Highest	Highest
10190007010203	Fall Creek-Headwaters South Fork CLP	Lowest	Highest	High	Highest	High
10190007010204	Twin Lake Reservoir	Low	Highest	High	Highest	Highest
10190007010205	Lower Head South Fork CLP	Highest	Highest	Highest	Low	Highest
10190007010301	Upper Pennock Creek	Lowest	High	High	Highest	High
10190007010302	UT1 to Pennock Creek	Lowest	Highest	High	Highest	High
10190007010303	Middle Pennock Creek	Lowest	Highest	High	Moderate	High
10190007010304	UT2 to Pennock Creek	Low	Highest	Highest	Highest	Highest
10190007010305	UT3 to Pennock Creek	High	Highest	High	Moderate	Highest
10190007010306	UT4 to Pennock Creek	Moderate	High	High	Moderate	High
10190007010307	Lower Pennock Creek	Moderate	Highest	High	Low	High
10190007010401	UT to Upper Little Beaver Creek	Lowest	Highest	Lowest	Highest	Moderate
10190007010402	Upper Little Beaver Creek	Lowest	High	Low	High	Moderate
10190007010403	UT to Little Beaver Creek	Lowest	Highest	Lowest	Highest	Moderate
10190007010404	Middle Little Beaver Creek	Lowest	High	Low	Low	Low
10190007010405	Jacks Gulch	Low	High	Lowest	Moderate	Low
10190007010406	Lower Little Beaver Creek	Moderate	Moderate	Lowest	Low	Low
10190007010501	Upper Fish Creek-Pendergrass	Lowest	High	Low	Moderate	Low
10190007010502	Lower Fish Creek-Pendergrass	Lowest	High	Low	Moderate	Low
10190007010503	Ratville	Highest	Moderate	Lowest	Moderate	High
10190007010504	Upper South Fork CLP River	Highest	Moderate	Low	Lowest	Moderate

HUC14	7th Level Watershed Name	ROADS HAZARD	DEBRIS FLOW HAZARD	HILLSLOPE EROSION	SEDIMENT TRANSPORT	RESILIENT WATERSHEDS & RIVER CORRIDORS
10190007010505	White Rock Creek	Moderate	High	Lowest	Highest	High
10190007010506	Middle South Fork CLP River	Lowest	Moderate	Low	Lowest	Lowest
10190007010507	UT to South Fork CLP River	Lowest	High	Lowest	Highest	Moderate
10190007010508	Upper Pendergrass Creek	Moderate	High	Lowest	Highest	High
10190007010509	UT to Pendergrass Creek	Lowest	High	Low	Highest	High
10190007010510	Lower Pendergrass Creek	Lowest	High	Low	Moderate	Low
10190007010511	Lower South Fork CLP River	Lowest	High	Moderate	Lowest	Low
10190007020101	Headwaters Hague Creek	Lowest	Moderate	Moderate	High	Moderate
10190007020102	Mummy Pass Creek	Lowest	Moderate	Moderate	Highest	Moderate
10190007020103	Upper Hague Creek	Lowest	Highest	Low	Moderate	Low
10190007020104	Lower Hague Creek	Lowest	High	Lowest	Moderate	Low
10190007020201	Upper Upper Headwaters CLP	Lowest	Moderate	Low	Lowest	Low
10190007020202	Middle Upper Headwaters CLP	Lowest	High	Moderate	Lowest	Low
10190007020203	Lower Upper Headwaters CLP	Lowest	High	High	Lowest	Low
10190007020204	Upper Chapin Creek	Lowest	High	Low	Moderate	Moderate
10190007020205	Lower Chapin Creek	Lowest	High	High	Lowest	Moderate
10190007020206	Middle Headwaters CLP	Lowest	High	High	Lowest	Low
10190007020207	Lower Headwaters CLP	Lowest	Highest	High	Lowest	Moderate
10190007020301	Neota Creek	Low	High	Moderate	High	High
10190007020302	UT to Long Draw Reservoir	Moderate	High	Low	Highest	High
10190007020303	Long Draw Reservoir	Lowest	High	High	Moderate	Moderate
10190007020304	Willow Creek-La Poudre Pass Creek	Lowest	Moderate	Low	Low	Low
10190007020305	Upper Corral Creek	Lowest	High	Moderate	Moderate	Moderate
10190007020306	UT to Corral Creek	Lowest	High	Lowest	Lowest	Lowest
10190007020307	Lower Corral Creek	Low	High	Low	Low	Low
10190007020308	La Poudre Pass Creek	Lowest	High	Moderate	Moderate	Moderate
10190007020401	Upper Joe Wright Creek	Low	High	High	Moderate	High
10190007020402	Montgomery Creek	Lowest	Highest	Low	Highest	High
10190007020403	Joe Wright Reservoir	Low	High	Moderate	Moderate	Moderate
10190007020404	UT1 to Joe Wright Creek	Lowest	Highest	Low	Lowest	Low
10190007020405	Bald Mountain	Lowest	High	Low	Highest	Moderate
10190007020406	North Fork Joe Wright Creek	Low	High	Moderate	Highest	High
10190007020407	Sawmill Creek	Moderate	Highest	Moderate	Highest	Highest
10190007020408	Middle Joe Wright Creek	Highest	High	Low	Low	High
10190007020409	Upper Trap Creek	Lowest	High	Moderate	Moderate	Low
10190007020410	Lower Trap Creek	Highest	High	Low	Moderate	High
10190007020411	Upper Fall Creek	Lowest	High	High	High	Moderate
10190007020412	Lower Fall Creek	Lowest	Highest	High	High	High
10190007020413	Upper Chambers Lake	High	Highest	Lowest	Low	Moderate
10190007020414	Barnes Meadow Reservoir	Lowest	Moderate	Low	Low	Low
10190007020415	Lower Joe Wright Creek	High	High	Moderate	Low	Moderate
10190007020416	Lower Chambers Lake	Highest	High	Moderate	Low	High
10190007020501	UT to Cascade Creek	Lowest	High	Moderate	Highest	High
10190007020502	Cascade Creek	Lowest	High	Moderate	Moderate	Low
10190007020503	Willow Creek-CLP River	Lowest	High	Moderate	High	Moderate
10190007020504	Upper Willow Creek CLP	Lowest	High	Moderate	Low	Low
10190007020505	Peterson Lake	Moderate	High	Moderate	Moderate	High
10190007020506	UT to Willow Creek CLP	Lowest	Highest	Moderate	Highest	High
10190007020507	Middle Willow Creek CLP	Lowest	High	High	Lowest	Low
10190007020508	Grass Lake Creek	Lowest	Highest	High	Highest	High
10190007020509	Upper May Creek	Lowest	High	Low	High	Low
10190007020510	Lower May Creek	Lowest	Highest	Low	High	Moderate
10190007020511	Lower Willow Creek CLP	Moderate	High	High	Low	High
10190007020601	Upper West Fork Sheep Creek	Lowest	High	Lowest	Moderate	Low
10190007020602	Lower West Fork Sheep Creek	Lowest	High	Lowest	Moderate	Low
10190007020603	Upper East Fork Sheep Creek	Low	High	Lowest	Moderate	Moderate
10190007020604	Lower East Fork Sheep Creek	Lowest	High	Lowest	Low	Low
10190007020605	UT1 to Sheep Creek	Lowest	High	Lowest	High	Moderate
10190007020606	UT2 to Sheep Creek	Lowest	High	Low	Moderate	Low
10190007020607	UT3 to Sheep Creek	Lowest	Highest	Low	Highest	High
10190007020608	Sheep Creek	Lowest	Highest	High	Highest	High
10190007020701	Upper Roaring Creek	High	High	Highest	Moderate	Highest
10190007020702	UT to Roaring Creek	Lowest	Highest	Highest	Highest	Highest

HUC14	7th Level Watershed Name	ROADS HAZARD	DEBRIS FLOW HAZARD	HILLSLOPE EROSION	SEDIMENT TRANSPORT	RESILIENT WATERSHEDS & RIVER CORRIDORS
10190007020703	UT to East Fork Roaring Creek	Lowest	High	Highest	Highest	High
10190007020704	East Fork Roaring Creek	Lowest	Highest	High	Highest	Highest
10190007020705	Lower Roaring Creek	Lowest	Highest	High	High	High
10190007020801	Twin Lakes	Lowest	High	Moderate	High	High
10190007020802	Headwaters BH-Cache La Poudre	High	Highest	High	Lowest	High
10190007020803	Tunnel Creek	Low	High	Highest	Highest	Highest
10190007020804	Upper Upper BH-Cache La Poudre	Low	Highest	Highest	Lowest	High
10190007020805	UT1 to BH-Cache La Poudre	Lowest	Highest	Moderate	Highest	High
10190007020806	Boston Peak Creek	Lowest	High	High	High	High
10190007020807	Williams Gulch	Lowest	High	High	High	High
10190007020808	Lower Upper BH-Cache La Poudre	Moderate	Highest	High	Lowest	High
10190007020809	UT2 to BH-Cache La Poudre	Lowest	Highest	Moderate	Highest	High
10190007020810	Peterson Creek	Lowest	Highest	Low	Highest	High
10190007020811	Upper Middle BH-Cache La Poudre	High	High	Low	Lowest	Moderate
10190007020812	UT3 to BH-Cache La Poudre	Lowest	Highest	Low	Highest	High
10190007020813	UT4 to BH-Cache La Poudre	Lowest	Highest	Low	Highest	High
10190007020814	Washout Gulch	Moderate	Highest	Low	Highest	Highest
10190007020815	Upper Black Hollow Creek	Moderate	High	Low	High	High
10190007020816	Lower Black Hollow Creek	Lowest	Highest	Low	High	Moderate
10190007020817	Lower Middle BH-Cache La Poudre	Highest	Highest	Low	High	Highest
10190007020818	Dry Creek	Moderate	Highest	Low	Highest	Highest
10190007020819	Sheep Creek-Black Hollow	Lowest	High	Low	High	Moderate
10190007020820	Crown Point Gulch	Lowest	Highest	Low	Highest	High
10190007020821	Mineral Springs Gulch	High	Highest	Low	Highest	Highest
10190007020822	Lower BH-Cache La Poudre	High	High	Moderate	Moderate	High
10190007020901	UT to Bennett Creek	High	High	Lowest	Highest	High
10190007020902	Upper Bennett Creek	Highest	High	Low	Moderate	High
10190007020903	Middle Bennett Creek	Highest	Moderate	Lowest	Low	Moderate
10190007020904	Kyle Gulch	Highest	Moderate	Lowest	High	Moderate
10190007020905	Lower Bennett Creek	Moderate	Moderate	Low	Moderate	Moderate
10190007021001	Upper Sevenmile Creek	Moderate	High	Low	Moderate	High
10190007021002	UT to Sevenmile	Highest	High	Moderate	Highest	Highest
10190007021003	Lower Sevenmile Creek	Highest	High	Low	Moderate	Highest
10190007021004	Upper Upper CLP River	High	High	Highest	Moderate	High
10190007021005	Dadd Gulch	Low	High	Moderate	Highest	High
10190007021006	UT1 to Upper CLP River	Lowest	High	Highest	Moderate	High
10190007021007	UT2 to Upper CLP River	Moderate	Highest	Moderate	Highest	Highest
10190007021008	Middle Upper CLP River	Moderate	High	Highest	Moderate	High
10190007021009	UT3 to Upper CLP River	Moderate	Moderate	Highest	Highest	Highest
10190007021010	Eggers Gulch	Moderate	Moderate	Highest	Moderate	High
10190007021011	Lower Upper CLP River	Highest	High	Moderate	Moderate	Highest
10190007030101	Headwaters Elkhorn Creek	High	High	Moderate	High	Highest
10190007030102	Swamp Creek	Highest	Moderate	Lowest	Low	Moderate
10190007030103	Upper Elkhorn Creek	Moderate	Moderate	High	Low	Moderate
10190007030104	Upper Manhattan Creek	Highest	Moderate	Low	Low	High
10190007030105	Lower Manhattan Creek	Highest	Moderate	Highest	Lowest	High
10190007030106	Upper Middle Elkhorn Creek	Low	Moderate	Highest	Lowest	Moderate
10190007030107	UT1 to Elkhorn Creek	High	Moderate	High	Moderate	High
10190007030108	UT2 to Elkhorn Creek	Highest	Moderate	Highest	High	Highest
10190007030109	Lower Middle Elkhorn Creek	Highest	Moderate	High	Lowest	High
10190007030110	UT3 to Elkhorn Creek	High	Moderate	Highest	High	Highest
10190007030111	UT4 to Elkhorn Creek	Lowest	Moderate	Highest	High	High
10190007030112	Lower Elkhorn Creek	Low	Moderate	Highest	Lowest	Moderate
10190007030113	UT5 to Elkhorn Creek	High	Low	High	Moderate	High
10190007030114	Outlet Elkhorn Creek	Low	Moderate	High	Low	Moderate
10190007030201	Harlan Gulch	Lowest	Moderate	Moderate	High	Moderate
10190007030202	UT to Stove Prairie Gulch	High	Moderate	Highest	Moderate	High
10190007030203	Upper Stove Prairie Gulch	Highest	High	Moderate	Moderate	Highest
10190007030204	Lower Stove Prairie Gulch	Moderate	High	High	Moderate	High
10190007030205	Upper Youngs Gulch	High	High	High	Moderate	High
10190007030206	Lower Youngs Gulch	Low	Highest	Moderate	Moderate	High
10190007030301	UT to Middle CLP River	Low	High	Highest	Highest	Highest
10190007030302	Upper Poverty Gulch	High	Moderate	Moderate	Moderate	High

HUC14	7th Level Watershed Name	ROADS HAZARD	DEBRIS FLOW HAZARD	HILLSLOPE EROSION	SEDIMENT TRANSPORT	RESILIENT WATERSHEDS & RIVER CORRIDORS
10190007030303	Lower Poverty Gulch	Lowest	High	Low	High	Moderate
10190007030304	Buck Gulch	Lowest	High	Low	Highest	Moderate
10190007030305	Upper Middle CLP River	Highest	High	Moderate	Lowest	High
10190007030306	Stevens Gulch	Moderate	Moderate	Low	High	Moderate
10190007030307	Upper Skin Gulch	Lowest	High	Moderate	Highest	High
10190007030308	Lower Skin Gulch	Highest	Highest	High	High	Highest
10190007030309	Cedar Gulch	Low	High	Moderate	High	High
10190007030310	Lower Middle CLP River	High	High	High	Moderate	High
10190007030401	Upper Gordon Creek	Highest	Low	High	Low	High
10190007030402	UT1 to Gordon Creek	High	Moderate	Moderate	Moderate	Moderate
10190007030403	UT2 to Gordon Creek	High	Low	Lowest	Low	Low
10190007030404	UT3 to Gordon Creek	High	Low	Moderate	Low	Moderate
10190007030405	Middle Gordon Creek	Highest	Moderate	Lowest	Lowest	Moderate
10190007030406	UT4 to Gordon Creek	Low	Low	Low	Moderate	Low
10190007030407	Lower Gordon Creek	Highest	Low	Moderate	Low	Moderate
10190007030408	Hewlett Gulch	Low	Moderate	High	Moderate	Moderate
10190007030501	UT1 to Upper Lower CLP River	Low	High	Low	High	Moderate
10190007030502	Falls Gulch	Moderate	Highest	Low	Highest	High
10190007030503	Upper Lower CLP River	Highest	Highest	High	Moderate	Highest
10190007030504	UT to Hill Gulch	Highest	Highest	Moderate	High	Highest
10190007030505	Watha Gulch	Lowest	High	Low	Highest	Moderate
10190007030506	Hill Gulch	High	Highest	Moderate	High	Highest
10190007030507	UT1 to Middle Lower CLP River	Lowest	Highest	Highest	Highest	Highest
10190007030508	Middle Lower CLP River	High	Highest	Low	Lowest	Moderate
10190007030509	Boyd Gulch	Highest	Highest	Low	Highest	Highest
10190007030510	UT1 to Lower Lower CLP River	Low	Highest	Low	Highest	High
10190007030511	Lower Lower CLP River	Highest	High	Moderate	High	Highest
10190007040101	Headwaters North Fork-Panhandle Creek	Moderate	Moderate	Highest	Moderate	Highest
10190007040102	Killpecker Creek	Moderate	High	Highest	High	Highest
10190007040103	UT1 to North Fork-Panhandle Creek	Highest	High	Highest	Moderate	Highest
10190007040104	Upper North Fork-Panhandle Creek	Highest	High	High	Moderate	Highest
10190007040105	Pearl Creek	High	High	Highest	High	Highest
10190007040106	UT2 to North Fork-Panhandle Creek	Low	Highest	High	High	High
10190007040107	Middle North Fork-Panhandle Creek	Highest	High	Highest	Moderate	Highest
10190007040108	Upper Panhandle Creek	Moderate	Moderate	High	Low	High
10190007040109	Middle Panhandle Creek	High	High	High	Low	High
10190007040110	South Fork Panhandle Creek	Highest	High	Highest	Moderate	Highest
10190007040111	Lower Panhandle Creek	Highest	Moderate	High	Low	High
10190007040112	Lower North Fork-Panhandle Creek	Moderate	High	Highest	Lowest	High
10190007040201	Cow Creek	Low	Moderate	Highest	Low	Moderate
10190007040202	Eaton Reservoir	Lowest	Moderate	Highest	Low	Moderate
10190007040203	Upper Sheep Creek-North Fork	High	Low	High	Lowest	Moderate
10190007040204	Trout Creek	Low	Moderate	Highest	Low	Moderate
10190007040205	UT1 to Sheep Creek-North Fork	Moderate	Moderate	Moderate	Moderate	Moderate
10190007040206	West Fork Beaver Creek-North Fork	Lowest	Moderate	Moderate	Low	Low
10190007040207	Beaver Creek-North Fork	Highest	High	Moderate	Low	High
10190007040208	Acme Creek	Highest	High	High	Moderate	Highest
10190007040209	UT2 to Sheep Creek-North Fork	High	Moderate	Low	Moderate	Moderate
10190007040210	Middle Sheep Creek-North Fork	Highest	Moderate	Moderate	Lowest	Moderate
10190007040211	UT3 to Sheep Creek-North Fork	Moderate	High	High	Moderate	High
10190007040212	UT4 to Sheep Creek-North Fork	High	Moderate	Moderate	Moderate	Moderate
10190007040213	Upper George Creek	High	Moderate	Moderate	Low	Moderate
10190007040214	Cornelius Creek	Low	High	High	Low	High
10190007040215	Lower George Creek	Highest	High	Moderate	Low	High
10190007040216	Lower Sheep Creek-North Fork	High	Moderate	High	Lowest	Moderate
10190007040301	Upper Bull Creek	Highest	Low	High	Lowest	Moderate
10190007040302	Middle Bull Creek	Highest	Low	High	Low	High
10190007040303	Lower Bull Creek	Low	Low	High	Low	Moderate
10190007040304	UT to North Fork-Bull Creek	High	Low	Moderate	Moderate	Moderate
10190007040305	Upper North Fork-Bull Creek	Lowest	Moderate	Highest	Low	Moderate
10190007040306	Middle North Fork-Bull Creek	High	Moderate	Highest	Moderate	High
10190007040307	Upper Mill Creek	Low	Lowest	High	Low	Low
10190007040308	Middle Mill Creek	High	Low	Highest	Low	High

HUC14	7th Level Watershed Name	ROADS HAZARD	DEBRIS FLOW HAZARD	HILLSLOPE EROSION	SEDIMENT TRANSPORT	RESILIENT WATERSHEDS & RIVER CORRIDORS
10190007040309	Willow Creek-Mill Creek	Low	Low	Highest	Low	Moderate
10190007040310	Lower Mill Creek	Low	Moderate	Highest	Low	High
10190007040311	Little Bull Creek	Moderate	Low	High	Lowest	Moderate
10190007040312	Lower North Fork-Bull Creek	Lowest	Moderate	High	Moderate	Moderate
10190007040401	UT1 to Trail Creek	Moderate	Moderate	Highest	Moderate	High
10190007040402	Upper Trail Creek	Highest	Moderate	Highest	Low	Highest
10190007040403	UT2 to Trail Creek	High	Low	Highest	Lowest	Moderate
10190007040404	UT3 to Trail Creek	Moderate	Low	High	Low	Moderate
10190007040405	UT4 to Trail Creek	High	High	Moderate	Moderate	High
10190007040406	Pratt Creek	Highest	Moderate	Moderate	Low	High
10190007040407	Hamxe Creek	High	Lowest	High	Moderate	High
10190007040408	Middle Trail Creek	High	Moderate	High	Lowest	Moderate
10190007040409	UT5 to Trail Creek	High	Moderate	Low	High	High
10190007040410	Devils Creek	Highest	Moderate	Low	Low	Moderate
10190007040411	Lower Trail Creek	Moderate	Low	Moderate	Lowest	Low
10190007050201	Upper West Fork Dale Creek	Low	Low	Moderate	Lowest	Low
10190007050202	Lower West Fork Dale Creek	Low	Low	Moderate	Lowest	Low
10190007050203	Upper Mason Allen Creek	Low	Low	Lowest	Lowest	Lowest
10190007050204	Lower Mason Allen Creek	Moderate	Low	Lowest	Lowest	Lowest
10190007050205	UT1 to Lower Dale Creek	Low	Lowest	Low	Low	Lowest
10190007050206	UT2 to Lower Dale Creek	Highest	Low	Lowest	Lowest	Low
10190007050207	Mud Creek	Highest	Low	High	High	High
10190007050208	UT3 to Lower Dale Creek	Moderate	Low	High	Moderate	Moderate
10190007050209	UT4 to Lower Dale Creek	Highest	Lowest	High	Moderate	Moderate
10190007050210	Middle Lower Dale Creek	Highest	Lowest	Moderate	Lowest	Moderate
10190007050211	Upper Georges Gulch	Moderate	Low	Highest	Low	Moderate
10190007050212	Lower Georges Gulch	Moderate	Low	High	Lowest	Low
10190007050213	Lower Lower Dale Creek	Lowest	Lowest	Low	Lowest	Lowest
10190007050301	Headwaters Fish Creek	Low	Low	Highest	Low	Moderate
10190007050302	Little Fish Creek	High	Low	High	Moderate	High
10190007050303	UT1 to Fish Creek	Low	Low	Moderate	Lowest	Low
10190007050304	Kelsey Lake	Low	Lowest	High	Lowest	Low
10190007050305	Upper Fish Creek	Moderate	Low	Moderate	Lowest	Low
10190007050306	UT2 to Fish Creek	Low	Lowest	High	Moderate	Moderate
10190007050307	UT3 to Fish Creek	Lowest	Low	High	Moderate	Moderate
10190007050308	UT4 to Fish Creek	Lowest	Low	Highest	Moderate	Moderate
10190007050309	UT5 to Fish Creek	Low	Low	Moderate	Low	Low
10190007050310	UT6 to Fish Creek	Low	Low	Low	Lowest	Low
10190007050311	Middle Fish Creek	Moderate	Low	Moderate	Lowest	Low
10190007050312	UT7 to Fish Creek	Low	Low	Highest	Lowest	Moderate
10190007050313	Lower Fish Creek	Highest	Moderate	Highest	Lowest	High
10190007050401	Upper Deadman Creek	Moderate	Low	Lowest	Lowest	Lowest
10190007050402	UT1 to Deadman Creek	Moderate	Low	Moderate	Low	Moderate
10190007050403	UT2 to Deadman Creek	Lowest	Moderate	Low	High	Low
10190007050404	Middle Deadman Creek	Moderate	Low	Moderate	Lowest	Low
10190007050405	UT3 to Deadman Creek	High	Moderate	Lowest	High	Moderate
10190007050406	UT4 to Deadman Creek	High	Low	Moderate	Moderate	Moderate
10190007050407	Lower Deadman Creek	Highest	Lowest	Moderate	Lowest	Low
10190007060101	UT1 to South Fork Lone Pine Creek	Lowest	Highest	Highest	Highest	Highest
10190007060102	Headwaters South Fork Lone Pine Creek	Lowest	High	Highest	Moderate	High
10190007060103	UT2 to South Fork Lone Pine Creek	Low	Highest	Highest	Highest	Highest
10190007060104	UT3 to South Fork Lone Pine Creek	Highest	Moderate	High	Low	Highest
10190007060105	Upper South Fork Lone Pine Creek	Low	High	High	Low	High
10190007060106	Bellaire Creek	Highest	Moderate	High	Lowest	High
10190007060107	Parvin Lake	Highest	Low	High	Lowest	High
10190007060108	Middle South Fork Lone Pine Creek	High	Low	High	Lowest	Moderate
10190007060109	Lower South Fork Lone Pine Creek	High	Moderate	Highest	Moderate	Highest
10190007060201	Beartrap Creek	Highest	Moderate	High	High	Highest
10190007060202	Headwaters North Fork Lone Pine Creek	Highest	High	Highest	Moderate	Highest
10190007060203	Lake Nokomis	Highest	High	Highest	Moderate	Highest
10190007060204	Upper North Fork Lone Pine Creek	High	Moderate	Highest	Low	High
10190007060205	Columbine Canyon	Highest	Low	Highest	Moderate	Highest
10190007060206	Middle North Fork Lone Pine Creek	Highest	Moderate	Highest	Low	Highest

HUC14	7th Level Watershed Name	ROADS HAZARD	DEBRIS FLOW HAZARD	HILLSLOPE EROSION	SEDIMENT TRANSPORT	RESILIENT WATERSHEDS & RIVER CORRIDORS
10190007060207	UT to North Fork Lone Pine Creek	Moderate	Low	High	Low	Moderate
10190007060208	Lower North Fork Lone Pine Creek	Low	Moderate	Highest	Low	Moderate
10190007060209	Windy Gap Lake Creek	Lowest	Moderate	Highest	Moderate	Moderate
10190007060210	Outlet North Fork Lone Pine Creek	Lowest	Moderate	Highest	Low	Moderate
10190007060301	Headwaters Lone Pine Creek	Lowest	High	Highest	Lowest	Moderate
10190007060302	UT1 to Lone Pine Creek	Lowest	High	Highest	Highest	High
10190007060303	Upper Lone Pine Creek	Low	Moderate	Highest	High	High
10190007060304	UT to UT2 to Lone Pine Creek	Moderate	Low	Low	Moderate	Moderate
10190007060305	UT2 to Lone Pine Creek	Moderate	Low	Low	Moderate	Moderate
10190007060306	Middle Lone Pine Creek	High	Lowest	High	Lowest	Low
10190007060307	UT3 to Lone Pine Creek	Moderate	Moderate	Low	Low	Moderate
10190007060308	Lower Lone Pine Creek	Highest	Low	Lowest	Lowest	Low
10190007070101	Upper Sixmile Creek	Low	Low	Moderate	Lowest	Low
10190007070102	UT to Sixmile Creek	Moderate	Lowest	Lowest	Lowest	Lowest
10190007070103	Lower Sixmile Creek	Low	Lowest	Low	Lowest	Lowest
10190007070104	UT1 to Halligan Reservoir	Lowest	Lowest	Low	Low	Lowest
10190007070105	Upper Meadow Creek	Moderate	Low	Highest	High	High
10190007070106	UT to Meadow Creek	Low	Low	High	Moderate	Moderate
10190007070107	Middle Meadow Creek	Highest	Low	Moderate	Lowest	Moderate
10190007070108	UT2 to Halligan Reservoir	Low	Lowest	Lowest	High	Low
10190007070109	Lower Meadow Creek	Highest	Lowest	Moderate	Lowest	Moderate
10190007070110	Halligan Reservoir	Lowest	Lowest	Moderate	Lowest	Lowest
10190007070201	Headwaters North Fork Rabbit Creek	Low	Low	Highest	Low	Moderate
10190007070202	Upper North Fork Rabbit Creek	High	Moderate	High	Moderate	High
10190007070203	Middle North Fork Rabbit Creek	High	Low	High	Low	Moderate
10190007070204	UT to North Fork Rabbit Creek	High	Lowest	High	Moderate	High
10190007070205	Upper Middle Fork Rabbit Creek	Moderate	Moderate	Highest	High	Highest
10190007070206	Lower Middle Fork Rabbit Creek	Highest	Low	High	Lowest	Moderate
10190007070207	Lower North Fork Rabbit Creek	High	Low	High	Lowest	Moderate
10190007070208	UT to Rabbit Creek	Moderate	Low	High	High	Moderate
10190007070209	UT to South Fork Rabbit Creek	Moderate	Moderate	Highest	High	High
10190007070210	South Fork Rabbit Creek	Low	Low	High	Low	Moderate
10190007070211	Lower Rabbit Creek	Moderate	Low	Low	Low	Low
10190007070301	Upper Stonewall Creek	Moderate	Low	Moderate	Low	Low
10190007070302	UT1 to Stonewall Creek	High	Low	Moderate	Low	Moderate
10190007070303	Lonetree Creek	Low	Lowest	Moderate	Lowest	Lowest
10190007070304	Tenmile Creek	Highest	Low	Moderate	Low	Moderate
10190007070305	UT2 to Stonewalll Creek	Low	Low	Lowest	Moderate	Low
10190007070306	Lower Stonewall Creek	Highest	Low	Lowest	Lowest	Low
10190007070401	UT1 to North Fork-Seaman Reservoir	Low	Moderate	Moderate	Low	Low
10190007070402	Headwaters North Fork-Seaman Reservoir	Low	Low	High	Lowest	Low
10190007070403	Upper North Fork-Seaman Reservoir	Highest	Low	Lowest	Low	Moderate
10190007070404	Deadman Butte Creek	Moderate	Low	Lowest	Lowest	Lowest
10190007070405	UT2 to North Fork-Seaman Reservoir	Moderate	Moderate	Low	Moderate	Moderate
10190007070406	UT3 to North Fork-Seaman Reservoir	Highest	Low	Lowest	Lowest	Low
10190007070407	Middle North Fork-Seaman Reservoir	High	Moderate	Lowest	Lowest	Low
10190007070408	UT4 to North Fork-Seaman Reservoir	Moderate	Moderate	Low	High	Moderate
10190007070409	UT5 to North Fork-Seaman Reservoir	Lowest	Moderate	Lowest	High	Moderate
10190007070410	UT6 to North Fork-Seaman Reservoir	High	Moderate	Highest	Highest	Highest
10190007070411	Lower North Fork-Seaman Reservoir	High	Low	High	Low	Moderate
10190007070412	Long Draw-Seaman Reservoir	Lowest	Moderate	Moderate	Moderate	Moderate
10190007070413	UT7 to North Fork-Seaman Reservoir	Lowest	Moderate	Low	Highest	Moderate
10190007070414	Obenchain Draw-Seaman Reservoir	High	High	Moderate	High	Highest
10190007070415	Outlet North Fork-Seaman Reservoir	Low	Moderate	Moderate	Moderate	Moderate
10190007070416	Greyrock Mountain Creek	Low	High	High	Moderate	Moderate
10190007070417	Milton Seaman Reservoir	High	Moderate	Low	Lowest	Moderate
10190007080101	Upper Owl Canyon	Highest	Low	Low	Lowest	Low
10190007080102	Middle Owl Canyon	Highest	Low	Lowest	Low	Low
10190007080103	Lower Owl Canyon	High	Low	Lowest	Moderate	Moderate
10190007080201	Santanka Gulch	High	Highest	Lowest	Highest	Highest
10190007080202	Soldier Canyon	Highest	Highest	Low	Highest	Highest
10190007080203	Well Gulch	Moderate	Highest	High	Highest	Highest
10190007080204	Arthurs Rock Gulch	Moderate	Highest	High	Highest	Highest

HUC14	7th Level Watershed Name	ROADS HAZARD	DEBRIS FLOW HAZARD	HILLSLOPE EROSION	SEDIMENT TRANSPORT	RESILIENT WATERSHEDS & RIVER CORRIDORS
10190007080205	Mill Creek	Low	Highest	Highest	Highest	Highest
10190007080206	Spring Canyon	High	High	Moderate	High	Highest
10190007080207	Spring Creek	Highest	Moderate	Low	Lowest	Moderate
10190007080208	Horsetooth Reservoir	Moderate	Moderate	Low	High	Moderate
10190007080501	UT1 to Outlet Poudre River	Lowest	Highest	Low	Highest	High
10190007080502	UT2 to Outlet Poudre River	Lowest	Highest	Low	Highest	High
10190007080503	Outlet Poudre River	Highest	High	Moderate	Moderate	Highest
10190007080504	Upper Lewstone	Highest	High	Moderate	Moderate	Highest
10190007080505	UT to Lewstone	Lowest	High	Low	Highest	Moderate
10190007080506	Lower Lewstone	High	High	Lowest	Moderate	Moderate
10190007080507	Tunnel - FC CLP	Low	Low	Lowest	Lowest	Lowest
10190007080508	Log Canyon	Highest	High	Low	High	High
10190007080509	Upper Rist Canyon	Highest	Moderate	High	High	Highest
10190007080510	Lower Rist Canyon	Highest	Highest	High	Moderate	Highest
10190007080511	Long Brown Gulch	Moderate	High	Low	Highest	High
10190007080512	Labeau Gulch	Low	Highest	Moderate	Highest	High
10190007080513	Devil Gulch	Highest	Highest	Low	Highest	Highest
10190007080514	Empire Gulch	Highest	Highest	Low	Highest	Highest
10190007080515	City of Fort Collins-CLP	Highest	Moderate	Lowest	Low	Moderate

HUC14	7th Level Watershed Name	LAND USE	Grazing	Development	Population	WATER QUALITY IMPAIRMENT	PROXIMITY TO WATER SUPPLY	SEDIMENT DEPOSITION	RELIABLE WATER SUPPLY
10180001050301	Snow Lake	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10180001050302	Nokhu Crags	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10180001050303	Diamond Peak	High	Lowest	Highest	Lowest	Low	Moderate	Lowest	Moderate
10180001050304	Lake Agnes	Lowest	Lowest	Lowest	Lowest	Low	High	Moderate	Moderate
10180001050305	Headwaters Michigan River	Moderate	Lowest	High	Lowest	Low	Moderate	Low	Moderate
10180010010101	Headwaters Laramie River-Rawah Creek	High	Lowest	Highest	Lowest	High	Highest	Highest	Highest
10180010010102	Laramie Lake	Lowest	Lowest	Low	Lowest	High	Highest	Highest	Highest
10180010010103	UT1 to Laramie River-Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10180010010104	Two and One Half Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	High	High
10180010010105	Upper Laramie River-Rawah Creek	Moderate	Lowest	High	Lowest	Moderate	Highest	Highest	Highest
10180010010106	UT2 to Laramie River-Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10180010010107	Middle Laramie River-Rawah Creek	Lowest	Lowest	Lowest	Lowest	High	Highest	Lowest	High
10180010010108	Upper West Branch Laramie River-Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10180010010109	Middle West Branch Laramie River-Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10180010010110	North Fork West Branch Laramie River-Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate
10180010010111	Lower West Branch Laramie River-Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10180010010112	Half Mile Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	High	Moderate
10180010010113	Mill Creek-Lower Supply Canal	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10180010010114	Fall Creek-Lower Supply Canal	Low	Low	Lowest	Lowest	Low	Highest	Highest	High
10180010010115	Rapid Creek-Lower Supply Canal	Lowest	Lowest	Lowest	Lowest	Low	Highest	Highest	High
10180010010116	Springer Creek-Lower Supply Canal	Lowest	Lowest	Lowest	Lowest	Low	Highest	Highest	High
10180010010117	Brinker Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	High	Moderate
10180010010118	Jimmy Creek-Lower Supply Canal	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	High	Moderate
10180010010119	Lower Laramie River-Rawah Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Lowest	Low
10180010010120	Porter Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate	High
10180010010121	Upper Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Moderate
10180010010122	North Fork Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10180010010123	Lower Rawah Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10180010010124	Outlet Laramie River-Rawah Creek	Highest	High	Moderate	Lowest	Highest	Low	Lowest	High
10180010010301	Columbine Ditch	Lowest	Lowest	Lowest	Lowest	High	Moderate	Lowest	Moderate
10180010010302	Bob Creek Ditch	Lowest	Lowest	Lowest	Lowest	High	Moderate	Low	Moderate
10180010030301	Upper Sand Creek-Wilson Ditch	Lowest	Lowest	Lowest	Lowest	High	Lowest	Lowest	Low
10180010030302	Middle Sand Creek-Wilson Ditch	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	Lowest	Lowest
10180010030303	Lower Sand Creek-Wilson Ditch	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low	Moderate
10190007010101	Upper Beaver Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007010102	Comanche Lake	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007010103	Browns Lake	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007010104	Comanche Reservoir	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007010105	Hourglass Reservoir	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007010106	Middle Beaver Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Low	Moderate
10190007010107	Lower Beaver Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Moderate	High
10190007010201	Upper Head South Fork CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Moderate
10190007010202	UT to Head South Fork CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007010203	Fall Creek-Headwaters South Fork CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007010204	Twin Lake Reservoir	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007010205	Lower Head South Fork CLP	Lowest	Lowest	Lowest	Lowest	Low	Highest	Moderate	High
10190007010301	Upper Pennock Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007010302	UT1 to Pennock Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007010303	Middle Pennock Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Highest	Highest
10190007010304	UT2 to Pennock Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007010305	UT3 to Pennock Creek	High	Lowest	Lowest	Highest	Low	Highest	Lowest	High
10190007010306	UT4 to Pennock Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Moderate	High
10190007010307	Lower Pennock Creek	Low	Lowest	Lowest	Low	Low	Highest	Low	High
10190007010401	UT to Upper Little Beaver Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007010402	Upper Little Beaver Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate
10190007010403	UT to Little Beaver Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007010404	Middle Little Beaver Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007010405	Jacks Gulch	Lowest	Lowest	Lowest	Lowest	Low	Highest	Low	High
10190007010406	Lower Little Beaver Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate
10190007010501	Upper Fish Creek-Pendergrass	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007010502	Lower Fish Creek-Pendergrass	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007010503	Ratville	Low	Lowest	Lowest	Low	Low	Highest	Moderate	High
10190007010504	Upper South Fork CLP River	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Lowest	High
10190007010505	White Rock Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate

HUC14	7th Level Watershed Name	LAND USE	Grazing	Development	Population	WATER QUALITY IMPAIRMENT	PROXIMITY TO WATER SUPPLY	SEDIMENT DEPOSITION	RELIABLE WATER SUPPLY
10190007010506	Middle South Fork CLP River	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007010507	UT to South Fork CLP River	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	High	High
10190007010508	Upper Pendergrass Creek	Low	Lowest	Lowest	Low	Low	Highest	Low	High
10190007010509	UT to Pendergrass Creek	Low	Lowest	Lowest	Low	Lowest	Highest	Lowest	Moderate
10190007010510	Lower Pendergrass Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Moderate	High
10190007010511	Lower South Fork CLP River	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Moderate
10190007020101	Headwaters Hague Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	High	Moderate
10190007020102	Mummy Pass Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020103	Upper Hague Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020104	Lower Hague Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Moderate
10190007020201	Upper Upper Headwaters CLP	Moderate	Lowest	High	Lowest	Lowest	Highest	Lowest	Moderate
10190007020202	Middle Upper Headwaters CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020203	Lower Upper Headwaters CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020204	Upper Chapin Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020205	Lower Chapin Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020206	Middle Headwaters CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020207	Lower Headwaters CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020301	Neota Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007020302	UT to Long Draw Reservoir	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007020303	Long Draw Reservoir	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007020304	Willow Creek-La Poudre Pass Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020305	Upper Corral Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Moderate
10190007020306	UT to Corral Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020307	Lower Corral Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007020308	La Poudre Pass Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	High	Moderate
10190007020401	Upper Joe Wright Creek	Moderate	Lowest	High	Lowest	Lowest	Highest	High	Highest
10190007020402	Montgomery Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007020403	Joe Wright Reservoir	High	Lowest	Highest	Lowest	Lowest	Highest	Lowest	High
10190007020404	UT1 to Joe Wright Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020405	Bald Mountain	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Moderate
10190007020406	North Fork Joe Wright Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	High	High
10190007020407	Sawmill Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007020408	Middle Joe Wright Creek	High	Lowest	Highest	Lowest	Low	Highest	Lowest	High
10190007020409	Upper Trap Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Moderate
10190007020410	Lower Trap Creek	High	Lowest	Highest	Lowest	Low	Highest	Low	Highest
10190007020411	Upper Fall Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020412	Lower Fall Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate
10190007020413	Upper Chambers Lake	Lowest	Lowest	Low	Lowest	Lowest	Highest	Highest	Highest
10190007020414	Barnes Meadow Reservoir	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007020415	Lower Joe Wright Creek	Highest	Lowest	Highest	Lowest	Low	Highest	Lowest	High
10190007020416	Lower Chambers Lake	High	Lowest	Highest	Lowest	Lowest	Highest	Highest	Highest
10190007020501	UT to Cascade Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020502	Cascade Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Moderate
10190007020503	Willow Creek-CLP River	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Moderate
10190007020504	Upper Willow Creek CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007020505	Peterson Lake	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	High	High
10190007020506	UT to Willow Creek CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020507	Middle Willow Creek CLP	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020508	Grass Lake Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020509	Upper May Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020510	Lower May Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007020511	Lower Willow Creek CLP	Low	Lowest	Low	Lowest	Low	Highest	Highest	Highest
10190007020601	Upper West Fork Sheep Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007020602	Lower West Fork Sheep Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Low	Moderate
10190007020603	Upper East Fork Sheep Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007020604	Lower East Fork Sheep Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Moderate	High
10190007020605	UT1 to Sheep Creek	Lowest	Lowest	Lowest	Low	Moderate	Highest	Lowest	Moderate
10190007020606	UT2 to Sheep Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020607	UT3 to Sheep Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate
10190007020608	Sheep Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High
10190007020701	Upper Roaring Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	High	High
10190007020702	UT to Roaring Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	High	High
10190007020703	UT to East Fork Roaring Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007020704	East Fork Roaring Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Low	Moderate

HUC14	7th Level Watershed Name	LAND USE	Grazing	Development	Population	WATER QUALITY IMPAIRMENT	PROXIMITY TO WATER SUPPLY	SEDIMENT DEPOSITION	RELIABLE WATER SUPPLY
10190007020705	Lower Roaring Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Highest	Highest
10190007020801	Twin Lakes	Lowest	Lowest	Lowest	Lowest	Low	Highest	Highest	High
10190007020802	Headwaters BH-Cache La Poudre	Highest	Lowest	Highest	Lowest	Highest	Highest	Lowest	Highest
10190007020803	Tunnel Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	High	High
10190007020804	Upper Upper BH-Cache La Poudre	Highest	Lowest	Highest	Moderate	High	Highest	Low	Highest
10190007020805	UT1 to BH-Cache La Poudre	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Moderate	High
10190007020806	Boston Peak Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	High	High
10190007020807	Williams Gulch	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Highest	Highest
10190007020808	Lower Upper BH-Cache La Poudre	Highest	Highest	High	Low	Highest	Highest	Low	Highest
10190007020809	UT2 to BH-Cache La Poudre	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate
10190007020810	Peterson Creek	Lowest	Lowest	Lowest	Lowest	High	Highest	Highest	Highest
10190007020811	Upper Middle BH-Cache La Poudre	Highest	Lowest	Highest	Highest	Highest	Highest	Moderate	Highest
10190007020812	UT3 to BH-Cache La Poudre	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Highest	Highest
10190007020813	UT4 to BH-Cache La Poudre	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020814	Washout Gulch	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Highest	Highest
10190007020815	Upper Black Hollow Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Low	Moderate
10190007020816	Lower Black Hollow Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate
10190007020817	Lower Middle BH-Cache La Poudre	Highest	Lowest	Highest	Low	Highest	Highest	Highest	Highest
10190007020818	Dry Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Highest	Highest
10190007020819	Sheep Creek-Black Hollow	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Moderate	High
10190007020820	Crown Point Gulch	Lowest	Lowest	Lowest	Lowest	High	Highest	Highest	Highest
10190007020821	Mineral Springs Gulch	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Highest	Highest
10190007020822	Lower BH-Cache La Poudre	Highest	Lowest	Highest	Highest	Highest	Highest	Highest	Highest
10190007020901	UT to Bennett Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Lowest	Moderate
10190007020902	Upper Bennett Creek	Low	Lowest	Lowest	Low	Low	Highest	Lowest	High
10190007020903	Middle Bennett Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007020904	Kyle Gulch	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007020905	Lower Bennett Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007021001	Upper Sevenmile Creek	Lowest	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007021002	UT to Sevenmile	Moderate	Lowest	Moderate	Lowest	Low	Highest	Highest	Highest
10190007021003	Lower Sevenmile Creek	Low	Lowest	Low	Lowest	Low	Highest	Low	High
10190007021004	Upper Upper CLP River	Highest	Lowest	Highest	Highest	Highest	Highest	High	Highest
10190007021005	Dadd Gulch	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Moderate	High
10190007021006	UT1 to Upper CLP River	Lowest	Lowest	Lowest	Lowest	Low	Highest	Moderate	High
10190007021007	UT2 to Upper CLP River	Low	Lowest	Lowest	Low	Moderate	Highest	Highest	Highest
10190007021008	Middle Upper CLP River	Highest	Lowest	Moderate	Highest	Highest	Highest	Moderate	Highest
10190007021009	UT3 to Upper CLP River	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	High	Highest
10190007021010	Eggers Gulch	Lowest	Lowest	Lowest	Lowest	Low	Highest	Moderate	High
10190007021011	Lower Upper CLP River	Highest	Lowest	Highest	Lowest	Highest	Highest	Highest	Highest
10190007030101	Headwaters Elkhorn Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Moderate	High
10190007030102	Swamp Creek	Low	Lowest	Lowest	Low	Moderate	Highest	Moderate	High
10190007030103	Upper Elkhorn Creek	Highest	Lowest	Lowest	Highest	Moderate	Highest	Low	Highest
10190007030104	Upper Manhattan Creek	Highest	Lowest	Moderate	Highest	Low	Highest	Low	Highest
10190007030105	Lower Manhattan Creek	Highest	Low	Lowest	Highest	Moderate	Highest	Lowest	Highest
10190007030106	Upper Middle Elkhorn Creek	Lowest	Lowest	Lowest	Low	Low	Highest	Moderate	High
10190007030107	UT1 to Elkhorn Creek	Highest	Lowest	Lowest	Highest	Low	Highest	Moderate	Highest
10190007030108	UT2 to Elkhorn Creek	Low	Lowest	Lowest	Low	High	Highest	High	Highest
10190007030109	Lower Middle Elkhorn Creek	Highest	Lowest	Lowest	Highest	Low	Highest	Lowest	Highest
10190007030110	UT3 to Elkhorn Creek	Low	Lowest	Lowest	Lowest	Low	Highest	Moderate	High
10190007030111	UT4 to Elkhorn Creek	Moderate	Lowest	Lowest	Moderate	Moderate	Highest	Lowest	High
10190007030112	Lower Elkhorn Creek	Low	Lowest	Lowest	Lowest	Low	Highest	Lowest	Moderate
10190007030113	UT5 to Elkhorn Creek	Highest	Lowest	Low	Highest	Low	Highest	Low	Highest
10190007030114	Outlet Elkhorn Creek	High	Lowest	Lowest	Highest	Low	Highest	Moderate	Highest
10190007030201	Harlan Gulch	Highest	Highest	Lowest	High	Lowest	Lowest	High	High
10190007030202	UT to Stove Prairie Gulch	Low	Lowest	Lowest	Low	Lowest	Lowest	Low	Low
10190007030203	Upper Stove Prairie Gulch	Highest	Low	Moderate	Highest	Lowest	Lowest	Highest	High
10190007030204	Lower Stove Prairie Gulch	Low	Lowest	Lowest	Lowest	Lowest	Low	Low	Low
10190007030205	Upper Youngs Gulch	Highest	Lowest	Lowest	High	Lowest	Moderate	Lowest	Moderate
10190007030206	Lower Youngs Gulch	Moderate	Lowest	Lowest	Moderate	Lowest	Highest	Low	High
10190007030301	UT to Middle CLP River	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007030302	Upper Poverty Gulch	Low	Lowest	Lowest	Low	Lowest	Lowest	Lowest	Lowest
10190007030303	Lower Poverty Gulch	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Low	Lowest
10190007030304	Buck Gulch	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007030305	Upper Middle CLP River	Highest	Lowest	Highest	Highest	Lowest	Lowest	Highest	High

HUC14	7th Level Watershed Name	LAND USE	Grazing	Development	Population	WATER QUALITY IMPAIRMENT	PROXIMITY TO WATER SUPPLY	SEDIMENT DEPOSITION	RELIABLE WATER SUPPLY
10190007030306	Stevens Gulch	High	Lowest	Lowest	Highest	Lowest	Lowest	Moderate	Moderate
10190007030307	Upper Skin Gulch	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest
10190007030308	Lower Skin Gulch	High	Lowest	High	Lowest	Lowest	Low	Lowest	Low
10190007030309	Cedar Gulch	High	Lowest	Lowest	Highest	Lowest	Highest	Lowest	High
10190007030310	Lower Middle CLP River	Highest	Lowest	Highest	Highest	Lowest	Highest	Highest	Highest
10190007030401	Upper Gordon Creek	Highest	Lowest	Moderate	Highest	Lowest	Lowest	Lowest	Low
10190007030402	UT1 to Gordon Creek	High	Lowest	Lowest	Highest	Lowest	Lowest	Lowest	Low
10190007030403	UT2 to Gordon Creek	Highest	Lowest	Lowest	Highest	Lowest	Lowest	Moderate	Moderate
10190007030404	UT3 to Gordon Creek	High	Lowest	Lowest	Highest	Lowest	Lowest	Lowest	Low
10190007030405	Middle Gordon Creek	Highest	Low	Lowest	Highest	Lowest	Lowest	High	High
10190007030406	UT4 to Gordon Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Low	Lowest
10190007030407	Lower Gordon Creek	Highest	Lowest	Lowest	Highest	Lowest	Lowest	Low	Low
10190007030408	Hewlett Gulch	High	Lowest	Lowest	High	Lowest	Highest	Low	High
10190007030501	UT1 to Upper Lower CLP River	High	Lowest	Lowest	Highest	Lowest	Highest	Lowest	High
10190007030502	Falls Gulch	Highest	Lowest	Lowest	Highest	Lowest	Highest	Highest	Highest
10190007030503	Upper Lower CLP River	Highest	Lowest	Highest	Highest	Lowest	Highest	Highest	Highest
10190007030504	UT to Hill Gulch	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low
10190007030505	Watha Gulch	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	High	High
10190007030506	Hill Gulch	Highest	Lowest	Lowest	Highest	Lowest	Highest	Low	High
10190007030507	UT1 to Middle Lower CLP River	Low	Lowest	Lowest	Moderate	Lowest	Highest	High	High
10190007030508	Middle Lower CLP River	Highest	Lowest	Highest	Highest	Lowest	Highest	High	Highest
10190007030509	Boyd Gulch	Moderate	Lowest	Lowest	Moderate	Lowest	Highest	Lowest	Moderate
10190007030510	UT1 to Lower Lower CLP River	Moderate	Lowest	Low	Lowest	Lowest	Highest	Lowest	Moderate
10190007030511	Lower Lower CLP River	Highest	Lowest	Highest	Highest	Low	Highest	Highest	Highest
10190007040101	Headwaters North Fork-Panhandle Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Lowest	Low
10190007040102	Killpecker Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Low	Low
10190007040103	UT1 to North Fork-Panhandle Creek	Lowest	Lowest	Low	Lowest	High	Lowest	Lowest	Low
10190007040104	Upper North Fork-Panhandle Creek	Lowest	Lowest	Low	Lowest	High	Lowest	Lowest	Low
10190007040105	Pearl Creek	Low	Lowest	Lowest	Low	Highest	Lowest	Lowest	Moderate
10190007040106	UT2 to North Fork-Panhandle Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	High	High
10190007040107	Middle North Fork-Panhandle Creek	High	Lowest	Lowest	Highest	Highest	Lowest	Moderate	Highest
10190007040108	Upper Panhandle Creek	Lowest	Lowest	Lowest	Lowest	High	Highest	Lowest	High
10190007040109	Middle Panhandle Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Lowest	Moderate
10190007040110	South Fork Panhandle Creek	Lowest	Lowest	Lowest	Lowest	Highest	Highest	Lowest	High
10190007040111	Lower Panhandle Creek	High	Lowest	Lowest	Highest	Moderate	Highest	High	Highest
10190007040112	Lower North Fork-Panhandle Creek	High	Lowest	Lowest	Highest	High	Lowest	Lowest	Moderate
10190007040201	Cow Creek	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High	Highest
10190007040202	Eaton Reservoir	Lowest	Lowest	Lowest	Lowest	Moderate	Highest	Highest	Highest
10190007040203	Upper Sheep Creek-North Fork	Lowest	Lowest	Lowest	Lowest	High	Lowest	Moderate	Moderate
10190007040204	Trout Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Highest	Moderate
10190007040205	UT1 to Sheep Creek-North Fork	Lowest	Lowest	Lowest	Lowest	High	Lowest	Moderate	Moderate
10190007040206	West Fork Beaver Creek-North Fork	Lowest	Lowest	Lowest	Lowest	High	Lowest	Low	Low
10190007040207	Beaver Creek-North Fork	Lowest	Lowest	Lowest	Lowest	High	Lowest	Lowest	Low
10190007040208	Acme Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Moderate	Moderate
10190007040209	UT2 to Sheep Creek-North Fork	Lowest	Lowest	Lowest	Lowest	High	Lowest	High	Moderate
10190007040210	Middle Sheep Creek-North Fork	High	Lowest	Highest	Lowest	High	Lowest	Lowest	Moderate
10190007040211	UT3 to Sheep Creek-North Fork	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	High	Moderate
10190007040212	UT4 to Sheep Creek-North Fork	Lowest	Lowest	Lowest	Lowest	High	Lowest	Moderate	Moderate
10190007040213	Upper George Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	Lowest	Low
10190007040214	Cornelius Creek	Lowest	Lowest	Lowest	Low	Moderate	Lowest	Lowest	Low
10190007040215	Lower George Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low	Moderate
10190007040216	Lower Sheep Creek-North Fork	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	Lowest	Low
10190007040301	Upper Bull Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Lowest	Low
10190007040302	Middle Bull Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Lowest	Moderate
10190007040303	Lower Bull Creek	Highest	Lowest	Lowest	Highest	Highest	Lowest	Lowest	High
10190007040304	UT to North Fork-Bull Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low	Moderate
10190007040305	Upper North Fork-Bull Creek	Moderate	Moderate	Lowest	Lowest	Highest	Lowest	Low	High
10190007040306	Middle North Fork-Bull Creek	High	Moderate	Lowest	Lowest	Highest	Lowest	High	Highest
10190007040307	Upper Mill Creek	Low	Lowest	Lowest	Low	High	Lowest	Lowest	Low
10190007040308	Middle Mill Creek	Low	Lowest	Lowest	Low	High	Lowest	Low	Moderate
10190007040309	Willow Creek-Mill Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Low	Low
10190007040310	Lower Mill Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	High	Moderate
10190007040311	Little Bull Creek	Low	Lowest	Lowest	Low	Highest	Low	Moderate	High
10190007040312	Lower North Fork-Bull Creek	Lowest	Lowest	Lowest	Lowest	Highest	Highest	Highest	Highest

HUC14	7th Level Watershed Name	LAND USE	Grazing	Development	Population	WATER QUALITY IMPAIRMENT	PROXIMITY TO WATER SUPPLY	SEDIMENT DEPOSITION	RELIABLE WATER SUPPLY
10190007040401	UT1 to Trail Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate	Moderate
10190007040402	Upper Trail Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low	Moderate
10190007040403	UT2 to Trail Creek	Low	Lowest	Lowest	Low	Low	Lowest	Low	Low
10190007040404	UT3 to Trail Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	Moderate	Moderate
10190007040405	UT4 to Trail Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Highest	High
10190007040406	Pratt Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Lowest	Low
10190007040407	Hamxe Creek	Moderate	Lowest	Lowest	High	Highest	Lowest	Highest	Highest
10190007040408	Middle Trail Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Lowest	Low
10190007040409	UT5 to Trail Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Lowest	Low
10190007040410	Devils Creek	Highest	Lowest	High	Highest	Highest	Lowest	Low	High
10190007040411	Lower Trail Creek	Highest	High	Lowest	Low	High	Lowest	Moderate	High
10190007050201	Upper West Fork Dale Creek	Lowest	Lowest	Lowest	Low	Lowest	Lowest	Lowest	Lowest
10190007050202	Lower West Fork Dale Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007050203	Upper Mason Allen Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007050204	Lower Mason Allen Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007050205	UT1 to Lower Dale Creek	Lowest	Lowest	Lowest	Lowest	Low	Lowest	Low	Lowest
10190007050206	UT2 to Lower Dale Creek	Lowest	Lowest	Lowest	Lowest	Low	Lowest	Lowest	Lowest
10190007050207	Mud Creek	Highest	Lowest	Moderate	Highest	Highest	Lowest	Lowest	High
10190007050208	UT3 to Lower Dale Creek	High	Lowest	Lowest	Highest	Highest	Lowest	Lowest	High
10190007050209	UT4 to Lower Dale Creek	Highest	Lowest	Low	Highest	High	Lowest	Lowest	High
10190007050210	Middle Lower Dale Creek	Highest	Low	Low	Moderate	Highest	Lowest	Moderate	Highest
10190007050211	Upper Georges Gulch	Lowest	Lowest	Lowest	Low	Highest	Lowest	Low	Moderate
10190007050212	Lower Georges Gulch	Highest	Highest	Lowest	Highest	High	Lowest	Lowest	Moderate
10190007050213	Lower Lower Dale Creek	Highest	High	Lowest	Low	Highest	Lowest	Lowest	High
10190007050301	Headwaters Fish Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007050302	Little Fish Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007050303	UT1 to Fish Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007050304	Kelsey Lake	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	Lowest	Lowest
10190007050305	Upper Fish Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007050306	UT2 to Fish Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Highest	High
10190007050307	UT3 to Fish Creek	Lowest	Lowest	Lowest	Low	Highest	Lowest	Highest	High
10190007050308	UT4 to Fish Creek	Lowest	Lowest	Lowest	Low	Highest	Lowest	Highest	High
10190007050309	UT5 to Fish Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Low	Lowest
10190007050310	UT6 to Fish Creek	Lowest	Lowest	Lowest	Lowest	Low	Lowest	Low	Low
10190007050311	Middle Fish Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Lowest	Low
10190007050312	UT7 to Fish Creek	Lowest	Lowest	Lowest	Lowest	High	Lowest	Lowest	Low
10190007050313	Lower Fish Creek	Low	Lowest	Lowest	Low	Highest	Lowest	Lowest	Moderate
10190007050401	Upper Deadman Creek	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest
10190007050402	UT1 to Deadman Creek	Low	Lowest	Lowest	Low	High	Lowest	Lowest	Low
10190007050403	UT2 to Deadman Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Highest	High
10190007050404	Middle Deadman Creek	Lowest	Lowest	Lowest	Low	Moderate	Lowest	Lowest	Low
10190007050405	UT3 to Deadman Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Highest	High
10190007050406	UT4 to Deadman Creek	High	Lowest	Lowest	Highest	Highest	Lowest	Lowest	High
10190007050407	Lower Deadman Creek	Moderate	Lowest	Lowest	High	Highest	Lowest	Lowest	Moderate
10190007060101	UT1 to South Fork Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	Highest	Moderate
10190007060102	Headwaters South Fork Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Low	Lowest	Lowest	Lowest
10190007060103	UT2 to South Fork Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	Highest	Moderate
10190007060104	UT3 to South Fork Lone Pine Creek	Highest	Lowest	Highest	Highest	Low	Lowest	Low	Moderate
10190007060105	Upper South Fork Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Low	Lowest	Lowest	Lowest
10190007060106	Bellaire Creek	High	Moderate	Low	Low	High	Lowest	Lowest	Moderate
10190007060107	Parvin Lake	Highest	High	Highest	Highest	Moderate	Lowest	Highest	Highest
10190007060108	Middle South Fork Lone Pine Creek	Highest	Lowest	High	Highest	Moderate	Lowest	Lowest	Moderate
10190007060109	Lower South Fork Lone Pine Creek	Highest	Lowest	Low	Highest	Low	Lowest	Low	Moderate
10190007060201	Beartrap Creek	High	Lowest	Lowest	Highest	Moderate	Lowest	Moderate	High
10190007060202	Headwaters North Fork Lone Pine Creek	Highest	Lowest	Lowest	Highest	Moderate	Lowest	Low	Moderate
10190007060203	Lake Nokomis	Highest	Lowest	Lowest	Highest	Moderate	Lowest	Lowest	Moderate
10190007060204	Upper North Fork Lone Pine Creek	Highest	Lowest	Lowest	Highest	Low	Lowest	Low	Moderate
10190007060205	Columbine Canyon	Highest	Lowest	Highest	Highest	Moderate	Lowest	Lowest	Moderate
10190007060206	Middle North Fork Lone Pine Creek	Highest	Lowest	Low	Highest	Moderate	Lowest	Highest	Highest
10190007060207	UT to North Fork Lone Pine Creek	Highest	Highest	Lowest	High	Low	Lowest	Lowest	Moderate
10190007060208	Lower North Fork Lone Pine Creek	Moderate	Moderate	Lowest	Lowest	Moderate	Lowest	Lowest	Low
10190007060209	Windy Gap Lake Creek	Lowest	Lowest	Lowest	Low	Moderate	Lowest	Low	Low
10190007060210	Outlet North Fork Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Low	Lowest	Low	Low
10190007060301	Headwaters Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Lowest	Low

HUC14	7th Level Watershed Name	LAND USE	Grazing	Development	Population	WATER QUALITY IMPAIRMENT	PROXIMITY TO WATER SUPPLY	SEDIMENT DEPOSITION	RELIABLE WATER SUPPLY
10190007060302	UT1 to Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Highest	High
10190007060303	Upper Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Highest	High
10190007060304	UT to UT2 to Lone Pine Creek	Highest	Lowest	Moderate	Highest	Highest	Lowest	Lowest	High
10190007060305	UT2 to Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Low	Moderate
10190007060306	Middle Lone Pine Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Lowest	Low
10190007060307	UT3 to Lone Pine Creek	Highest	Highest	Lowest	High	High	Lowest	High	Highest
10190007060308	Lower Lone Pine Creek	Highest	Highest	Lowest	Highest	Highest	Lowest	Lowest	High
10190007070101	Upper Sixmile Creek	High	Lowest	Lowest	Highest	Highest	Lowest	Moderate	Highest
10190007070102	UT to Sixmile Creek	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High	Highest
10190007070103	Lower Sixmile Creek	Low	Lowest	Lowest	Lowest	Highest	Highest	Lowest	Highest
10190007070104	UT1 to Halligan Reservoir	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High	Highest
10190007070105	Upper Meadow Creek	Moderate	Lowest	Lowest	Moderate	High	Lowest	Lowest	Low
10190007070106	UT to Meadow Creek	Moderate	Lowest	Lowest	Moderate	Highest	Highest	Lowest	Highest
10190007070107	Middle Meadow Creek	Moderate	Low	Lowest	Low	Moderate	Highest	Low	Highest
10190007070108	UT2 to Halligan Reservoir	Lowest	Lowest	Lowest	Lowest	Highest	Highest	Highest	Highest
10190007070109	Lower Meadow Creek	Moderate	Lowest	Low	Low	Highest	Highest	Low	Highest
10190007070110	Halligan Reservoir	Lowest	Lowest	Lowest	Lowest	Low	Highest	Highest	Highest
10190007070201	Headwaters North Fork Rabbit Creek	Lowest	Lowest	Lowest	Lowest	Low	Lowest	Lowest	Lowest
10190007070202	Upper North Fork Rabbit Creek	Moderate	Lowest	Lowest	Moderate	High	Lowest	Low	Moderate
10190007070203	Middle North Fork Rabbit Creek	Highest	Lowest	Lowest	Highest	High	Lowest	Low	High
10190007070204	UT to North Fork Rabbit Creek	Highest	Lowest	Low	Highest	Highest	Lowest	Highest	Highest
10190007070205	Upper Middle Fork Rabbit Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	High	Moderate
10190007070206	Lower Middle Fork Rabbit Creek	Lowest	Lowest	Lowest	Low	Moderate	Lowest	Lowest	Low
10190007070207	Lower North Fork Rabbit Creek	High	Lowest	Lowest	Highest	High	Lowest	Lowest	Moderate
10190007070208	UT to Rabbit Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Lowest	Low
10190007070209	UT to South Fork Rabbit Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Moderate	Moderate
10190007070210	South Fork Rabbit Creek	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Lowest	Moderate
10190007070211	Lower Rabbit Creek	Highest	High	Lowest	Moderate	High	Lowest	Moderate	High
10190007070301	Upper Stonewall Creek	Low	Lowest	Lowest	Low	High	Lowest	Lowest	Low
10190007070302	UT1 to Stonewall Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	Low	Low
10190007070303	Lonetree Creek	Moderate	Lowest	Low	Moderate	Moderate	Lowest	Lowest	Moderate
10190007070304	Tenmile Creek	Highest	Lowest	Lowest	Highest	High	Lowest	Lowest	Moderate
10190007070305	UT2 to Stonewalll Creek	Lowest	Lowest	Lowest	Lowest	Moderate	Lowest	Lowest	Lowest
10190007070306	Lower Stonewall Creek	High	Low	Low	Moderate	Moderate	Lowest	Low	Moderate
10190007070401	UT1 to North Fork-Seaman Reservoir	Lowest	Lowest	Lowest	Lowest	High	Lowest	Lowest	Low
10190007070402	Headwaters North Fork-Seaman Reservoir	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Lowest	Moderate
10190007070403	Upper North Fork-Seaman Reservoir	Highest	Highest	Low	Low	Highest	Lowest	Moderate	Highest
10190007070404	Deadman Butte Creek	Highest	Moderate	Lowest	Moderate	Moderate	Lowest	Lowest	Moderate
10190007070405	UT2 to North Fork-Seaman Reservoir	Highest	Highest	Lowest	Highest	Highest	Lowest	Moderate	Highest
10190007070406	UT3 to North Fork-Seaman Reservoir	Highest	Lowest	Highest	Highest	High	Lowest	Lowest	High
10190007070407	Middle North Fork-Seaman Reservoir	Highest	Moderate	Lowest	Highest	High	Lowest	Lowest	High
10190007070408	UT4 to North Fork-Seaman Reservoir	Lowest	Lowest	Lowest	Lowest	Highest	Lowest	Highest	High
10190007070409	UT5 to North Fork-Seaman Reservoir	Lowest	Lowest	Lowest	Lowest	Highest	Low	Highest	High
10190007070410	UT6 to North Fork-Seaman Reservoir	High	Lowest	Lowest	Highest	Highest	Highest	Highest	Highest
10190007070411	Lower North Fork-Seaman Reservoir	Moderate	Lowest	Lowest	High	Highest	Moderate	Low	High
10190007070412	Long Draw-Seaman Reservoir	Lowest	Lowest	Lowest	Lowest	Highest	Moderate	Lowest	Moderate
10190007070413	UT7 to North Fork-Seaman Reservoir	Lowest	Lowest	Lowest	Lowest	Highest	Highest	Highest	Highest
10190007070414	Obenchain Draw-Seaman Reservoir	Highest	Lowest	Lowest	Highest	Highest	Highest	High	Highest
10190007070415	Outlet North Fork-Seaman Reservoir	Moderate	Lowest	Lowest	High	Highest	Highest	Highest	Highest
10190007070416	Greyrock Mountain Creek	Low	Lowest	Lowest	Low	High	Highest	Moderate	Highest
10190007070417	Milton Seaman Reservoir	Low	Lowest	Lowest	Low	Highest	Highest	High	Highest
10190007080101	Upper Owl Canyon	Highest	Lowest	Highest	Highest	Lowest	Lowest	Lowest	Low
10190007080102	Middle Owl Canyon	Highest	Lowest	Moderate	Highest	Lowest	Lowest	Low	Moderate
10190007080103	Lower Owl Canyon	Highest	Low	High	Highest	Lowest	Lowest	Low	Moderate
10190007080201	Santanka Gulch	Highest	Lowest	Highest	Highest	Lowest	Highest	Highest	Highest
10190007080202	Soldier Canyon	High	Lowest	Lowest	Highest	Lowest	Highest	Highest	Highest
10190007080203	Well Gulch	Moderate	Lowest	Lowest	Moderate	Lowest	Highest	Highest	Highest
10190007080204	Arthurs Rock Gulch	High	Lowest	Lowest	High	Lowest	Highest	Highest	Highest
10190007080205	Mill Creek	Moderate	Lowest	Lowest	High	Lowest	Highest	High	High
10190007080206	Spring Canyon	Highest	Lowest	Moderate	Highest	Lowest	Highest	Highest	Highest
10190007080207	Spring Creek	Highest	Lowest	Highest	Highest	Lowest	Highest	Lowest	High
10190007080208	Horsetooth Reservoir	Highest	Lowest	Highest	Highest	Lowest	Highest	Highest	Highest
10190007080501	UT1 to Outlet Poudre River	Lowest	Lowest	Lowest	Low	Lowest	Highest	High	High
10190007080502	UT2 to Outlet Poudre River	Lowest	Lowest	Lowest	Lowest	Lowest	Highest	Highest	High

HUC14	7th Level Watershed Name	LAND USE	Grazing	Development	Population	WATER QUALITY IMPAIRMENT	PROXIMITY TO WATER SUPPLY	SEDIMENT DEPOSITION	RELIABLE WATER SUPPLY
10190007080503	Outlet Poudre River	Highest	Lowest	Highest	Highest	Highest	Highest	Highest	Highest
10190007080504	Upper Lewstone	Highest	Lowest	Highest	Highest	Lowest	Lowest	Lowest	Low
10190007080505	UT to Lewstone	Lowest	Lowest	Lowest	Lowest	Lowest	Lowest	Moderate	Low
10190007080506	Lower Lewstone	Moderate	Lowest	Lowest	High	Lowest	Lowest	Lowest	Lowest
10190007080507	Tunnel - FC CLP	Low	Lowest	Lowest	Moderate	Lowest	Lowest	Lowest	Lowest
10190007080508	Log Canyon	Highest	Low	Lowest	Highest	Lowest	Lowest	Moderate	Moderate
10190007080509	Upper Rist Canyon	Highest	Lowest	Low	Highest	Lowest	Lowest	Low	Moderate
10190007080510	Lower Rist Canyon	Highest	Lowest	Highest	Highest	Lowest	Lowest	Lowest	Low
10190007080511	Long Brown Gulch	Low	Lowest	Lowest	Moderate	Lowest	Lowest	High	Low
10190007080512	Labeau Gulch	Moderate	Lowest	Lowest	Moderate	Lowest	Lowest	Moderate	Low
10190007080513	Devil Gulch	High	Lowest	Lowest	Highest	Lowest	Lowest	Highest	High
10190007080514	Empire Gulch	Highest	Lowest	Highest	Highest	Lowest	Lowest	Highest	High
10190007080515	City of Fort Collins-CLP	Highest	Highest	Highest	Highest	Low	Lowest	Moderate	High

HUC14	7th Level Watershed Name	RESILIENT UPLANDS	RESILIENT WATERSHED AND RIVER CORRIDOR	RELIABLE WATER SUPPLY	OVERALL RANK
10180001050301	Snow Lake	Low	Moderate	High	Moderate
10180001050302	Nokhu Crags	Moderate	High	Low	Moderate
10180001050303	Diamond Peak	Highest	Highest	Moderate	Highest
10180001050304	Lake Agnes	Moderate	Moderate	Moderate	Moderate
10180001050305	Headwaters Michigan River	High	Highest	Moderate	Highest
10180010010101	Headwaters Laramie River-Rawah Creek	Moderate	Highest	Highest	Highest
10180010010102	Laramie Lake	Highest	Moderate	Highest	Highest
10180010010103	UT1 to Laramie River-Rawah Creek	Low	High	Low	Low
10180010010104	Two and One Half Creek	Low	Highest	High	High
10180010010105	Upper Laramie River-Rawah Creek	High	Highest	Highest	Highest
10180010010106	UT2 to Laramie River-Rawah Creek	High	Moderate	Low	Moderate
10180010010107	Middle Laramie River-Rawah Creek	High	Highest	High	High
10180010010108	Upper West Branch Laramie River-Rawah Creek	Lowest	High	High	Moderate
10180010010109	Middle West Branch Laramie River-Rawah Creek	High	Highest	High	Highest
10180010010110	North Fork West Branch Laramie River-Rawah Creek	Low	High	Moderate	Moderate
10180010010111	Lower West Branch Laramie River-Rawah Creek	High	Highest	Moderate	High
10180010010112	Half Mile Creek	Highest	Highest	Moderate	Highest
10180010010113	Mill Creek-Lower Supply Canal	Highest	Highest	High	Highest
10180010010114	Fall Creek-Lower Supply Canal	Moderate	Highest	High	Highest
10180010010115	Rapid Creek-Lower Supply Canal	High	Highest	High	Highest
10180010010116	Springer Creek-Lower Supply Canal	Highest	Highest	High	Highest
10180010010117	Brinker Creek	Highest	High	Moderate	High
10180010010118	Jimmy Creek-Lower Supply Canal	High	Highest	Moderate	Highest
10180010010119	Lower Laramie River-Rawah Creek	Highest	High	Low	High
10180010010120	Porter Creek	Highest	High	High	Highest
10180010010121	Upper Rawah Creek	Moderate	Moderate	Moderate	Moderate
10180010010122	North Fork Rawah Creek	Highest	Moderate	Low	Moderate
10180010010123	Lower Rawah Creek	Highest	Moderate	Moderate	High
10180010010124	Outlet Laramie River-Rawah Creek	High	Moderate	High	High
10180010010301	Columbine Ditch	Highest	High	Moderate	High
10180010010302	Bob Creek Ditch	Highest	High	Moderate	High
10180010030301	Upper Sand Creek-Wilson Ditch	Highest	High	Low	High
10180010030302	Middle Sand Creek-Wilson Ditch	Highest	High	Lowest	High
10180010030303	Lower Sand Creek-Wilson Ditch	Highest	Highest	Moderate	Highest
10190007010101	Upper Beaver Creek	Moderate	Moderate	Low	Low
10190007010102	Comanche Lake	Moderate	High	Low	Moderate
10190007010103	Browns Lake	Low	Moderate	Moderate	Low
10190007010104	Comanche Reservoir	Moderate	High	High	High
10190007010105	Hourglass Reservoir	Moderate	High	Moderate	Moderate
10190007010106	Middle Beaver Creek	High	Moderate	Moderate	Moderate
10190007010107	Lower Beaver Creek	High	Moderate	High	High
10190007010201	Upper Head South Fork CLP	Lowest	High	Moderate	Low
10190007010202	UT to Head South Fork CLP	Low	Highest	Low	Moderate
10190007010203	Fall Creek-Headwaters South Fork CLP	Moderate	High	High	High
10190007010204	Twin Lake Reservoir	Highest	Highest	Moderate	High
10190007010205	Lower Head South Fork CLP	High	Highest	High	Highest
10190007010301	Upper Pennock Creek	Highest	High	Moderate	High
10190007010302	UT1 to Pennock Creek	High	High	Moderate	High
10190007010303	Middle Pennock Creek	Highest	High	Highest	Highest
10190007010304	UT2 to Pennock Creek	High	Highest	Moderate	High
10190007010305	UT3 to Pennock Creek	Highest	Highest	High	Highest
10190007010306	UT4 to Pennock Creek	High	High	High	High
10190007010307	Lower Pennock Creek	High	High	High	High
10190007010401	UT to Upper Little Beaver Creek	Low	Moderate	Low	Moderate
10190007010402	Upper Little Beaver Creek	Moderate	Moderate	Moderate	Low
10190007010403	UT to Little Beaver Creek	Low	Moderate	Low	Low
10190007010404	Middle Little Beaver Creek	High	Low	Moderate	Low
10190007010405	Jacks Gulch	High	Low	High	Moderate
10190007010406	Lower Little Beaver Creek	Moderate	Low	Moderate	Moderate
10190007010501	Upper Fish Creek-Pendergrass	Moderate	Low	Low	Moderate
10190007010502	Lower Fish Creek-Pendergrass	Moderate	Low	Moderate	Moderate
10190007010503	Ratville	Low	High	High	Moderate
10190007010504	Upper South Fork CLP River	Moderate	Moderate	High	Moderate

HUC14	7th Level Watershed Name	RESILIENT UPLANDS	RESILIENT WATERSHED AND RIVER CORRIDOR	RELIABLE WATER SUPPLY	OVERALL RANK
10190007010505	White Rock Creek	Lowest	High	Moderate	Moderate
10190007010506	Middle South Fork CLP River	Low	Lowest	Moderate	Low
10190007010507	UT to South Fork CLP River	Lowest	Moderate	High	Moderate
10190007010508	Upper Pendergrass Creek	Lowest	High	High	Moderate
10190007010509	UT to Pendergrass Creek	Lowest	High	Moderate	Low
10190007010510	Lower Pendergrass Creek	Low	Low	High	Low
10190007010511	Lower South Fork CLP River	Low	Low	Moderate	Low
10190007020101	Headwaters Hague Creek	Lowest	Moderate	Moderate	Low
10190007020102	Mummy Pass Creek	Low	Moderate	Moderate	Low
10190007020103	Upper Hague Creek	Low	Low	Moderate	Low
10190007020104	Lower Hague Creek	Moderate	Low	Moderate	Low
10190007020201	Upper Upper Headwaters CLP	High	Low	Moderate	Moderate
10190007020202	Middle Upper Headwaters CLP	High	Low	Low	Moderate
10190007020203	Lower Upper Headwaters CLP	Highest	Low	Low	Moderate
10190007020204	Upper Chapin Creek	Moderate	Moderate	Moderate	Moderate
10190007020205	Lower Chapin Creek	High	Moderate	Low	Moderate
10190007020206	Middle Headwaters CLP	Highest	Low	Moderate	Moderate
10190007020207	Lower Headwaters CLP	High	Moderate	Low	Moderate
10190007020301	Neota Creek	High	High	High	High
10190007020302	UT to Long Draw Reservoir	High	High	High	Highest
10190007020303	Long Draw Reservoir	Highest	Moderate	High	High
10190007020304	Willow Creek-La Poudre Pass Creek	High	Low	Moderate	Moderate
10190007020305	Upper Corral Creek	High	Moderate	Moderate	Moderate
10190007020306	UT to Corral Creek	High	Lowest	Low	Low
10190007020307	Lower Corral Creek	Highest	Low	Moderate	Moderate
10190007020308	La Poudre Pass Creek	Highest	Moderate	Moderate	High
10190007020401	Upper Joe Wright Creek	Highest	High	Highest	Highest
10190007020402	Montgomery Creek	Moderate	High	High	High
10190007020403	Joe Wright Reservoir	Highest	Moderate	High	High
10190007020404	UT1 to Joe Wright Creek	Highest	Low	Low	Moderate
10190007020405	Bald Mountain	High	Moderate	Moderate	High
10190007020406	North Fork Joe Wright Creek	High	High	High	High
10190007020407	Sawmill Creek	Moderate	Highest	High	High
10190007020408	Middle Joe Wright Creek	Highest	High	High	Highest
10190007020409	Upper Trap Creek	Moderate	Low	Moderate	Moderate
10190007020410	Lower Trap Creek	Moderate	High	Highest	Highest
10190007020411	Upper Fall Creek	Lowest	Moderate	Moderate	Low
10190007020412	Lower Fall Creek	Moderate	High	Moderate	Moderate
10190007020413	Upper Chambers Lake	High	Moderate	Highest	High
10190007020414	Barnes Meadow Reservoir	Moderate	Low	High	Moderate
10190007020415	Lower Joe Wright Creek	High	Moderate	High	High
10190007020416	Lower Chambers Lake	Moderate	High	Highest	Highest
10190007020501	UT to Cascade Creek	Low	High	Low	Low
10190007020502	Cascade Creek	Low	Low	Moderate	Moderate
10190007020503	Willow Creek-CLP River	Moderate	Moderate	Moderate	Moderate
10190007020504	Upper Willow Creek CLP	Moderate	Low	High	Moderate
10190007020505	Peterson Lake	High	High	High	High
10190007020506	UT to Willow Creek CLP	Highest	High	Moderate	High
10190007020507	Middle Willow Creek CLP	Moderate	Low	Moderate	Moderate
10190007020508	Grass Lake Creek	Highest	High	Low	High
10190007020509	Upper May Creek	High	Low	Low	Moderate
10190007020510	Lower May Creek	Highest	Moderate	Low	Moderate
10190007020511	Lower Willow Creek CLP	Moderate	High	Highest	High
10190007020601	Upper West Fork Sheep Creek	High	Low	Moderate	Moderate
10190007020602	Lower West Fork Sheep Creek	High	Low	Moderate	Moderate
10190007020603	Upper East Fork Sheep Creek	Moderate	Moderate	Moderate	Moderate
10190007020604	Lower East Fork Sheep Creek	High	Low	High	Moderate
10190007020605	UT1 to Sheep Creek	High	Moderate	Moderate	Moderate
10190007020606	UT2 to Sheep Creek	Moderate	Low	Moderate	Moderate
10190007020607	UT3 to Sheep Creek	High	High	Moderate	Moderate
10190007020608	Sheep Creek	High	High	High	Highest
10190007020701	Upper Roaring Creek	Highest	Highest	High	Highest
10190007020702	UT to Roaring Creek	Highest	Highest	High	Highest

HUC14	7th Level Watershed Name	RESILIENT UPLANDS	RESILIENT WATERSHED AND RIVER CORRIDOR	RELIABLE WATER SUPPLY	OVERALL RANK
10190007020703	UT to East Fork Roaring Creek	High	High	Moderate	High
10190007020704	East Fork Roaring Creek	High	Highest	Moderate	High
10190007020705	Lower Roaring Creek	High	High	Highest	Highest
10190007020801	Twin Lakes	High	High	High	High
10190007020802	Headwaters BH-Cache La Poudre	Moderate	High	Highest	Highest
10190007020803	Tunnel Creek	High	Highest	High	Highest
10190007020804	Upper Upper BH-Cache La Poudre	Moderate	High	Highest	High
10190007020805	UT1 to BH-Cache La Poudre	Moderate	High	High	High
10190007020806	Boston Peak Creek	Highest	High	High	Highest
10190007020807	Williams Gulch	High	High	Highest	Highest
10190007020808	Lower Upper BH-Cache La Poudre	Moderate	High	Highest	High
10190007020809	UT2 to BH-Cache La Poudre	Moderate	High	Moderate	Moderate
10190007020810	Peterson Creek	High	High	Highest	Highest
10190007020811	Upper Middle BH-Cache La Poudre	Moderate	Moderate	Highest	High
10190007020812	UT3 to BH-Cache La Poudre	Moderate	High	Highest	High
10190007020813	UT4 to BH-Cache La Poudre	Moderate	High	Moderate	Moderate
10190007020814	Washout Gulch	Moderate	Highest	Highest	Highest
10190007020815	Upper Black Hollow Creek	Moderate	High	Moderate	Moderate
10190007020816	Lower Black Hollow Creek	Moderate	Moderate	Moderate	Moderate
10190007020817	Lower Middle BH-Cache La Poudre	Low	Highest	Highest	Highest
10190007020818	Dry Creek	Moderate	Highest	Highest	Highest
10190007020819	Sheep Creek-Black Hollow	Moderate	Moderate	High	Moderate
10190007020820	Crown Point Gulch	Moderate	High	Highest	High
10190007020821	Mineral Springs Gulch	High	Highest	Highest	Highest
10190007020822	Lower BH-Cache La Poudre	Moderate	High	Highest	High
10190007020901	UT to Bennett Creek	Moderate	High	Moderate	High
10190007020902	Upper Bennett Creek	High	High	High	High
10190007020903	Middle Bennett Creek	Low	Moderate	Moderate	Low
10190007020904	Kyle Gulch	Moderate	Moderate	Moderate	Moderate
10190007020905	Lower Bennett Creek	Low	Moderate	Low	Low
10190007021001	Upper Sevenmile Creek	High	High	Moderate	High
10190007021002	UT to Sevenmile	Low	Highest	Highest	Highest
10190007021003	Lower Sevenmile Creek	Low	Highest	High	High
10190007021004	Upper Upper CLP River	High	High	Highest	Highest
10190007021005	Dadd Gulch	Moderate	High	High	High
10190007021006	UT1 to Upper CLP River	Moderate	High	High	High
10190007021007	UT2 to Upper CLP River	High	Highest	Highest	Highest
10190007021008	Middle Upper CLP River	High	High	Highest	Highest
10190007021009	UT3 to Upper CLP River	High	Highest	Highest	Highest
10190007021010	Eggers Gulch	High	High	High	High
10190007021011	Lower Upper CLP River	High	Highest	Highest	Highest
10190007030101	Headwaters Elkhorn Creek	High	Highest	High	Highest
10190007030102	Swamp Creek	High	Moderate	High	High
10190007030103	Upper Elkhorn Creek	High	Moderate	Highest	High
10190007030104	Upper Manhattan Creek	Moderate	High	Highest	High
10190007030105	Lower Manhattan Creek	High	High	Highest	High
10190007030106	Upper Middle Elkhorn Creek	High	Moderate	High	High
10190007030107	UT1 to Elkhorn Creek	Moderate	High	Highest	High
10190007030108	UT2 to Elkhorn Creek	High	Highest	Highest	Highest
10190007030109	Lower Middle Elkhorn Creek	Highest	High	Highest	Highest
10190007030110	UT3 to Elkhorn Creek	High	Highest	High	Highest
10190007030111	UT4 to Elkhorn Creek	High	High	High	High
10190007030112	Lower Elkhorn Creek	High	Moderate	Moderate	Moderate
10190007030113	UT5 to Elkhorn Creek	High	High	Highest	Highest
10190007030114	Outlet Elkhorn Creek	High	Moderate	Highest	High
10190007030201	Harlan Gulch	Moderate	Moderate	High	Moderate
10190007030202	UT to Stove Prairie Gulch	Low	High	Low	Low
10190007030203	Upper Stove Prairie Gulch	Moderate	Highest	High	High
10190007030204	Lower Stove Prairie Gulch	Low	High	Low	Moderate
10190007030205	Upper Youngs Gulch	Moderate	High	Moderate	Moderate
10190007030206	Lower Youngs Gulch	Moderate	High	High	Moderate
10190007030301	UT to Middle CLP River	Moderate	Highest	Lowest	Moderate
10190007030302	Upper Poverty Gulch	Lowest	High	Lowest	Low

HUC14	7th Level Watershed Name	RESILIENT UPLANDS	RESILIENT WATERSHED AND RIVER CORRIDOR	RELIABLE WATER SUPPLY	OVERALL RANK
10190007030303	Lower Poverty Gulch	Low	Moderate	Lowest	Lowest
10190007030304	Buck Gulch	Low	Moderate	Lowest	Low
10190007030305	Upper Middle CLP River	Moderate	High	High	High
10190007030306	Stevens Gulch	Moderate	Moderate	Moderate	Moderate
10190007030307	Upper Skin Gulch	Low	High	Lowest	Low
10190007030308	Lower Skin Gulch	Moderate	Highest	Low	High
10190007030309	Cedar Gulch	Moderate	High	High	Moderate
10190007030310	Lower Middle CLP River	Moderate	High	Highest	High
10190007030401	Upper Gordon Creek	Moderate	High	Low	Moderate
10190007030402	UT1 to Gordon Creek	High	Moderate	Low	Moderate
10190007030403	UT2 to Gordon Creek	Moderate	Low	Moderate	Moderate
10190007030404	UT3 to Gordon Creek	Moderate	Moderate	Low	Low
10190007030405	Middle Gordon Creek	Moderate	Moderate	High	Moderate
10190007030406	UT4 to Gordon Creek	Moderate	Low	Lowest	Low
10190007030407	Lower Gordon Creek	Low	Moderate	Low	Moderate
10190007030408	Hewlett Gulch	Low	Moderate	High	Moderate
10190007030501	UT1 to Upper Lower CLP River	Low	Moderate	High	Moderate
10190007030502	Falls Gulch	Low	High	Highest	High
10190007030503	Upper Lower CLP River	Moderate	Highest	Highest	Highest
10190007030504	UT to Hill Gulch	Low	Highest	Low	Moderate
10190007030505	Watha Gulch	Low	Moderate	High	Moderate
10190007030506	Hill Gulch	Moderate	Highest	High	High
10190007030507	UT1 to Middle Lower CLP River	High	Highest	High	Highest
10190007030508	Middle Lower CLP River	Moderate	Moderate	Highest	High
10190007030509	Boyd Gulch	Moderate	Highest	Moderate	High
10190007030510	UT1 to Lower Lower CLP River	Moderate	High	Moderate	Moderate
10190007030511	Lower Lower CLP River	Moderate	Highest	Highest	Highest
10190007040101	Headwaters North Fork-Panhandle Creek	Highest	Highest	Low	High
10190007040102	Killpecker Creek	Highest	Highest	Low	Highest
10190007040103	UT1 to North Fork-Panhandle Creek	Highest	Highest	Low	Highest
10190007040104	Upper North Fork-Panhandle Creek	Highest	Highest	Low	High
10190007040105	Pearl Creek	Highest	Highest	Moderate	High
10190007040106	UT2 to North Fork-Panhandle Creek	Highest	High	High	Highest
10190007040107	Middle North Fork-Panhandle Creek	Highest	Highest	Highest	Highest
10190007040108	Upper Panhandle Creek	Highest	High	High	High
10190007040109	Middle Panhandle Creek	Highest	High	Moderate	Highest
10190007040110	South Fork Panhandle Creek	Highest	Highest	High	Highest
10190007040111	Lower Panhandle Creek	Highest	High	Highest	Highest
10190007040112	Lower North Fork-Panhandle Creek	Moderate	High	Moderate	High
10190007040201	Cow Creek	Highest	Moderate	Highest	Highest
10190007040202	Eaton Reservoir	Highest	Moderate	Highest	High
10190007040203	Upper Sheep Creek-North Fork	High	Moderate	Moderate	Moderate
10190007040204	Trout Creek	Highest	Moderate	Moderate	High
10190007040205	UT1 to Sheep Creek-North Fork	Moderate	Moderate	Moderate	Moderate
10190007040206	West Fork Beaver Creek-North Fork	Highest	Low	Low	Moderate
10190007040207	Beaver Creek-North Fork	Highest	High	Low	High
10190007040208	Acme Creek	Highest	Highest	Moderate	Highest
10190007040209	UT2 to Sheep Creek-North Fork	High	Moderate	Moderate	High
10190007040210	Middle Sheep Creek-North Fork	High	Moderate	Moderate	High
10190007040211	UT3 to Sheep Creek-North Fork	Highest	High	Moderate	Highest
10190007040212	UT4 to Sheep Creek-North Fork	Moderate	Moderate	Moderate	Moderate
10190007040213	Upper George Creek	Highest	Moderate	Low	High
10190007040214	Cornelius Creek	High	High	Low	Moderate
10190007040215	Lower George Creek	High	High	Moderate	High
10190007040216	Lower Sheep Creek-North Fork	High	Moderate	Low	Moderate
10190007040301	Upper Bull Creek	Moderate	Moderate	Low	Moderate
10190007040302	Middle Bull Creek	High	High	Moderate	High
10190007040303	Lower Bull Creek	Highest	Moderate	High	High
10190007040304	UT to North Fork-Bull Creek	High	Moderate	Moderate	High
10190007040305	Upper North Fork-Bull Creek	High	Moderate	High	High
10190007040306	Middle North Fork-Bull Creek	High	High	Highest	Highest
10190007040307	Upper Mill Creek	Highest	Low	Low	Moderate
10190007040308	Middle Mill Creek	High	High	Moderate	High

HUC14	7th Level Watershed Name	RESILIENT UPLANDS	RESILIENT WATERSHED AND RIVER CORRIDOR	RELIABLE WATER SUPPLY	OVERALL RANK
10190007040309	Willow Creek-Mill Creek	High	Moderate	Low	Moderate
10190007040310	Lower Mill Creek	Moderate	High	Moderate	Moderate
10190007040311	Little Bull Creek	Moderate	Moderate	High	Moderate
10190007040312	Lower North Fork-Bull Creek	Low	Moderate	Highest	High
10190007040401	UT1 to Trail Creek	Highest	High	Moderate	High
10190007040402	Upper Trail Creek	Highest	Highest	Moderate	High
10190007040403	UT2 to Trail Creek	Highest	Moderate	Low	Moderate
10190007040404	UT3 to Trail Creek	Highest	Moderate	Moderate	Moderate
10190007040405	UT4 to Trail Creek	Highest	High	High	High
10190007040406	Pratt Creek	High	High	Low	Moderate
10190007040407	Hamxe Creek	Highest	High	Highest	Highest
10190007040408	Middle Trail Creek	Highest	Moderate	Low	Moderate
10190007040409	UT5 to Trail Creek	High	High	Low	High
10190007040410	Devils Creek	Highest	Moderate	High	Highest
10190007040411	Lower Trail Creek	Moderate	Low	High	Moderate
10190007050201	Upper West Fork Dale Creek	Moderate	Low	Lowest	Lowest
10190007050202	Lower West Fork Dale Creek	Low	Low	Lowest	Lowest
10190007050203	Upper Mason Allen Creek	Low	Lowest	Lowest	Lowest
10190007050204	Lower Mason Allen Creek	Moderate	Lowest	Lowest	Lowest
10190007050205	UT1 to Lower Dale Creek	Moderate	Lowest	Lowest	Lowest
10190007050206	UT2 to Lower Dale Creek	Moderate	Low	Lowest	Lowest
10190007050207	Mud Creek	High	High	High	High
10190007050208	UT3 to Lower Dale Creek	High	Moderate	High	High
10190007050209	UT4 to Lower Dale Creek	High	Moderate	High	High
10190007050210	Middle Lower Dale Creek	Moderate	Moderate	Highest	High
10190007050211	Upper Georges Gulch	High	Moderate	Moderate	High
10190007050212	Lower Georges Gulch	High	Low	Moderate	Moderate
10190007050213	Lower Lower Dale Creek	Low	Lowest	High	Low
10190007050301	Headwaters Fish Creek	High	Moderate	Lowest	Low
10190007050302	Little Fish Creek	High	High	Lowest	Moderate
10190007050303	UT1 to Fish Creek	Moderate	Low	Lowest	Lowest
10190007050304	Kelsey Lake	High	Low	Lowest	Low
10190007050305	Upper Fish Creek	Moderate	Low	Lowest	Lowest
10190007050306	UT2 to Fish Creek	Highest	Moderate	High	High
10190007050307	UT3 to Fish Creek	Highest	Moderate	High	High
10190007050308	UT4 to Fish Creek	High	Moderate	High	High
10190007050309	UT5 to Fish Creek	Moderate	Low	Lowest	Low
10190007050310	UT6 to Fish Creek	Moderate	Low	Low	Low
10190007050311	Middle Fish Creek	High	Low	Low	Low
10190007050312	UT7 to Fish Creek	Highest	Moderate	Low	Moderate
10190007050313	Lower Fish Creek	High	High	Moderate	High
10190007050401	Upper Deadman Creek	Low	Lowest	Lowest	Lowest
10190007050402	UT1 to Deadman Creek	Moderate	Moderate	Low	Low
10190007050403	UT2 to Deadman Creek	Low	Low	High	Low
10190007050404	Middle Deadman Creek	Moderate	Low	Low	Low
10190007050405	UT3 to Deadman Creek	Low	Moderate	High	Moderate
10190007050406	UT4 to Deadman Creek	Moderate	Moderate	High	Moderate
10190007050407	Lower Deadman Creek	Moderate	Low	Moderate	Moderate
10190007060101	UT1 to South Fork Lone Pine Creek	Highest	Highest	Moderate	Highest
10190007060102	Headwaters South Fork Lone Pine Creek	High	High	Lowest	Moderate
10190007060103	UT2 to South Fork Lone Pine Creek	Highest	Highest	Moderate	Highest
10190007060104	UT3 to South Fork Lone Pine Creek	High	Highest	Moderate	High
10190007060105	Upper South Fork Lone Pine Creek	High	High	Lowest	Moderate
10190007060106	Bellaire Creek	Moderate	High	Moderate	High
10190007060107	Parvin Lake	High	High	Highest	Highest
10190007060108	Middle South Fork Lone Pine Creek	Highest	Moderate	Moderate	High
10190007060109	Lower South Fork Lone Pine Creek	Highest	Highest	Moderate	Highest
10190007060201	Beartrap Creek	High	Highest	High	Highest
10190007060202	Headwaters North Fork Lone Pine Creek	High	Highest	Moderate	Highest
10190007060203	Lake Nokomis	Highest	Highest	Moderate	Highest
10190007060204	Upper North Fork Lone Pine Creek	Moderate	High	Moderate	High
10190007060205	Columbine Canyon	Highest	Highest	Moderate	Highest
10190007060206	Middle North Fork Lone Pine Creek	Highest	Highest	Highest	Highest

HUC14	7th Level Watershed Name	RESILIENT UPLANDS	RESILIENT WATERSHED AND RIVER CORRIDOR	RELIABLE WATER SUPPLY	OVERALL RANK
10190007060207	UT to North Fork Lone Pine Creek	Highest	Moderate	Moderate	High
10190007060208	Lower North Fork Lone Pine Creek	Highest	Moderate	Low	Moderate
10190007060209	Windy Gap Lake Creek	Highest	Moderate	Low	Moderate
10190007060210	Outlet North Fork Lone Pine Creek	High	Moderate	Low	Moderate
10190007060301	Headwaters Lone Pine Creek	High	Moderate	Low	Moderate
10190007060302	UT1 to Lone Pine Creek	High	High	High	High
10190007060303	Upper Lone Pine Creek	Moderate	High	High	High
10190007060304	UT to UT2 to Lone Pine Creek	Moderate	Moderate	High	Moderate
10190007060305	UT2 to Lone Pine Creek	Low	Moderate	Moderate	Moderate
10190007060306	Middle Lone Pine Creek	Low	Low	Low	Low
10190007060307	UT3 to Lone Pine Creek	Low	Moderate	Highest	Moderate
10190007060308	Lower Lone Pine Creek	Moderate	Low	High	Moderate
10190007070101	Upper Sixmile Creek	Low	Low	Highest	Moderate
10190007070102	UT to Sixmile Creek	Moderate	Lowest	Highest	Moderate
10190007070103	Lower Sixmile Creek	Moderate	Lowest	Highest	Moderate
10190007070104	UT1 to Halligan Reservoir	Low	Lowest	Highest	Low
10190007070105	Upper Meadow Creek	Highest	High	Low	High
10190007070106	UT to Meadow Creek	Highest	Moderate	Highest	Highest
10190007070107	Middle Meadow Creek	Moderate	Moderate	Highest	Moderate
10190007070108	UT2 to Halligan Reservoir	Low	Low	Highest	Moderate
10190007070109	Lower Meadow Creek	Moderate	Moderate	Highest	High
10190007070110	Halligan Reservoir	Low	Lowest	Highest	Low
10190007070201	Headwaters North Fork Rabbit Creek	High	Moderate	Lowest	Moderate
10190007070202	Upper North Fork Rabbit Creek	Moderate	High	Moderate	Moderate
10190007070203	Middle North Fork Rabbit Creek	Moderate	Moderate	High	Moderate
10190007070204	UT to North Fork Rabbit Creek	Moderate	High	Highest	High
10190007070205	Upper Middle Fork Rabbit Creek	High	Highest	Moderate	High
10190007070206	Lower Middle Fork Rabbit Creek	Low	Moderate	Low	Low
10190007070207	Lower North Fork Rabbit Creek	Low	Moderate	Moderate	Moderate
10190007070208	UT to Rabbit Creek	Moderate	Moderate	Low	Moderate
10190007070209	UT to South Fork Rabbit Creek	High	High	Moderate	High
10190007070210	South Fork Rabbit Creek	Moderate	Moderate	Moderate	Moderate
10190007070211	Lower Rabbit Creek	Low	Low	High	Moderate
10190007070301	Upper Stonewall Creek	Low	Low	Low	Low
10190007070302	UT1 to Stonewall Creek	Low	Moderate	Low	Low
10190007070303	Lonetree Creek	Moderate	Lowest	Moderate	Low
10190007070304	Tenmile Creek	Moderate	Moderate	Moderate	Moderate
10190007070305	UT2 to Stonewalll Creek	Low	Low	Lowest	Lowest
10190007070306	Lower Stonewall Creek	Moderate	Low	Moderate	Moderate
10190007070401	UT1 to North Fork-Seaman Reservoir	Moderate	Low	Low	Low
10190007070402	Headwaters North Fork-Seaman Reservoir	Low	Low	Moderate	Low
10190007070403	Upper North Fork-Seaman Reservoir	Moderate	Moderate	Highest	High
10190007070404	Deadman Butte Creek	Moderate	Lowest	Moderate	Low
10190007070405	UT2 to North Fork-Seaman Reservoir	Moderate	Moderate	Highest	Moderate
10190007070406	UT3 to North Fork-Seaman Reservoir	Moderate	Low	High	Moderate
10190007070407	Middle North Fork-Seaman Reservoir	Moderate	Low	High	Moderate
10190007070408	UT4 to North Fork-Seaman Reservoir	Low	Moderate	High	Moderate
10190007070409	UT5 to North Fork-Seaman Reservoir	Low	Moderate	High	Moderate
10190007070410	UT6 to North Fork-Seaman Reservoir	Moderate	Highest	Highest	Highest
10190007070411	Lower North Fork-Seaman Reservoir	Low	Moderate	High	Moderate
10190007070412	Long Draw-Seaman Reservoir	Moderate	Moderate	Moderate	Moderate
10190007070413	UT7 to North Fork-Seaman Reservoir	Moderate	Moderate	Highest	High
10190007070414	Obenchain Draw-Seaman Reservoir	Moderate	Highest	Highest	Highest
10190007070415	Outlet North Fork-Seaman Reservoir	Low	Moderate	Highest	High
10190007070416	Greyrock Mountain Creek	Moderate	Moderate	Highest	High
10190007070417	Milton Seaman Reservoir	Low	Moderate	Highest	High
10190007080101	Upper Owl Canyon	Moderate	Low	Low	Low
10190007080102	Middle Owl Canyon	Low	Low	Moderate	Low
10190007080103	Lower Owl Canyon	Low	Moderate	Moderate	Low
10190007080201	Santanka Gulch	Moderate	Highest	Highest	Highest
10190007080202	Soldier Canyon	Moderate	Highest	Highest	Highest
10190007080203	Well Gulch	High	Highest	Highest	Highest
10190007080204	Arthurs Rock Gulch	Moderate	Highest	Highest	Highest

HUC14	7th Level Watershed Name	RESILIENT UPLANDS	RESILIENT WATERSHED AND RIVER CORRIDOR	RELIABLE WATER SUPPLY	OVERALL RANK
10190007080205	Mill Creek	High	Highest	High	Highest
10190007080206	Spring Canyon	High	Highest	Highest	Highest
10190007080207	Spring Creek	Moderate	Moderate	High	High
10190007080208	Horsetooth Reservoir	Moderate	Moderate	Highest	High
10190007080501	UT1 to Outlet Poudre River	Low	High	High	Moderate
10190007080502	UT2 to Outlet Poudre River	Moderate	High	High	High
10190007080503	Outlet Poudre River	Moderate	Highest	Highest	Highest
10190007080504	Upper Lewstone	Moderate	Highest	Low	High
10190007080505	UT to Lewstone	Lowest	Moderate	Low	Low
10190007080506	Lower Lewstone	Moderate	Moderate	Lowest	Low
10190007080507	Tunnel - FC CLP	Moderate	Lowest	Lowest	Lowest
10190007080508	Log Canyon	Low	High	Moderate	Moderate
10190007080509	Upper Rist Canyon	Moderate	Highest	Moderate	High
10190007080510	Lower Rist Canyon	Moderate	Highest	Low	High
10190007080511	Long Brown Gulch	Moderate	High	Low	Moderate
10190007080512	Labeau Gulch	Moderate	High	Low	Moderate
10190007080513	Devil Gulch	High	Highest	High	High
10190007080514	Empire Gulch	Moderate	Highest	High	High
10190007080515	City of Fort Collins-CLP	Moderate	Moderate	High	Moderate