MEMORANDUM

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From:	Spirit Environmental: Conor Merrigan, Bekah Bailey, Dylan Costelloe
CC:	Design Workshop
Date:	8/19/24
Project Name:	Frisco Comprehensive Plan and Three-mile Plan
Project #:	7651
Subject:	Environmental Assessment

MEMORANDUM PURPOSE

This ecological baseline conditions assessment encompasses a comprehensive evaluation of the surrounding landscape, habitats, regional watershed influences, and hazards and vulnerabilities in the context of climate impacts and water supply. This memorandum closes with an initial presentation of potential opportunities within the context of the comprehensive planning process.

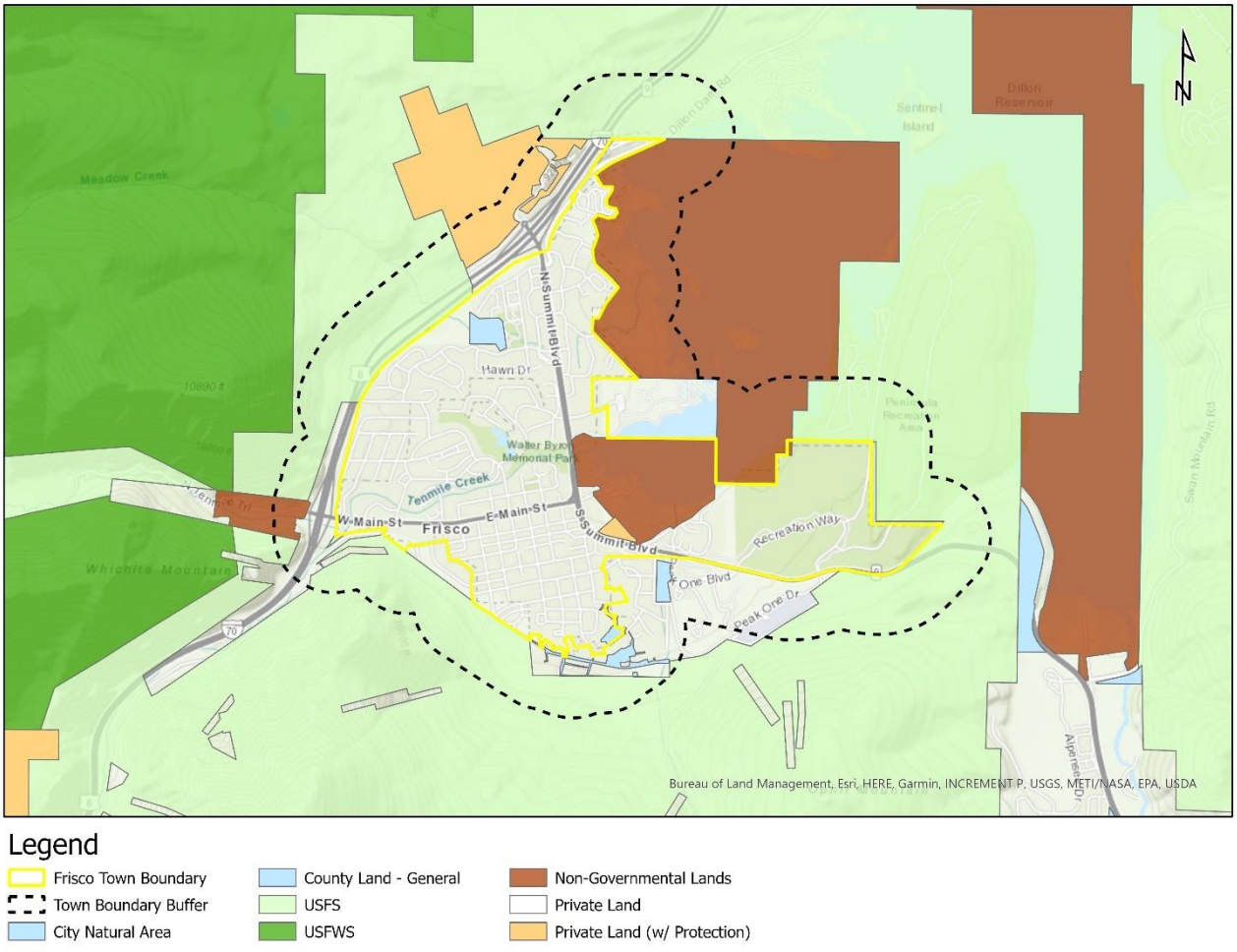
Contents

Frisco Areas of Significance

Frisco's open spaces and parks encompass forests, wetlands, meadows, riparian zones, and designated parklands. These areas support biodiversity, offer recreational opportunities, and contribute to water quality and scenic beauty. Popular parks in Frisco include Walter Byron Park, Meadow Creek Park, and Frisco Adventure Park.

Dillon Reservoir, adjacent to Frisco, is an integral part of the local landscape, playing a pivotal role in the hydrological system of the Upper Colorado River Basin, acting as a key water storage facility that regulates stream flow and supports water quality. It provides critical ecosystem services including water purification and flood mitigation. The Dillon Reservoir is bordered by the White River National Forest, which spans 2.3 million acres. This vast tract of forested land is crucial for maintaining biodiversity, offering extensive habitats for wildlife, and providing a buffer for the watershed.

Figure 1 Frisco Land by Ownership



Legend

- Frisco Town Boundary
- Town Boundary Buffer
- City Natural Area
- County Land - General
- USFS
- USFWS
- Non-Governmental Lands
- Private Land
- Private Land (w/ Protection)

Source: Map was prepared by Spirit Environmental using data from Colorado Ownership, Management and Protection (COMaP)

Sensitive Species Habitat Areas

In May of 2024, the Natural Resource team at Spirit Environmental performed a review of databases of sensitive species maintained by the U.S. Fish and Wildlife Service (USFWS), Colorado Parks and Wildlife (CPW) and Colorado Natural Heritage Program (CNHP) to determine the potential of occurrence of state or federally listed species within the Town of Frisco, Colorado.

An Information for Planning and Construction (IPaC) report was obtained from the USFWS.[1] No critical habitats or national wildlife refuges were encountered within the Town limits or surrounding area of Frisco. However, the Colorado Conservation Data Explorer (CODEX) identified a State listed Important Bird Area (IBA) directly west of the Town limits.[2] This IBA is recognized due to its significant role in the conservation of avian species, which includes both migratory and resident birds. The area serves as a crucial habitat for various bird species throughout different seasons. The IPaC report lists a total of eight regulatory species with the potential to occur within Frisco. Eight were listed as threatened and endangered species, one candidate species, and one proposed endangered species. Additionally, the CODEX identifies one additional state candidate species.

Of the species identified, five are highly likely to occur in Frisco due to the presence of potential habitat. The following table summarizes these species:

Species	Status	Description of Preferred Habitat	Determination of Potential Habitat Present
Bald Eagle (*Haliaeetus leucocephalus*)	SC	Deciduous or coniferous forested areas near large bodies of water or rivers.	Habitat is present within Frisco. Additionally, Bald Eagle winter foraging area present around Dillon Reservoir,
Canada Lynx (*Lynx canadensis*)	LT	Distribution is closely associated with the boreal spruce-fir forest ecosystem.	Potential habitats present within surrounding USFS land.
Gray Wolf (*Canis lupus*)	EP	Typically found in temperate forests, mountains, tundra, taiga, and grasslands.	Potential habitats present within surrounding USFS land
Mexican Spotted Owl (*Strix occidentalis lucida*)	LT	Occurs in forested mountains and canyonlands throughout the southwestern U.S. and Mexico	Potential habitats present within Frisco and surrounding USFS land.
Bonytail (*Gila elegans*)	LE	Restricted to warm-water reaches of main-stem streams, but they have been found in reservoirs and backwaters of the Colorado.	Potential habitat is present within Dillon Reservoir.

[1] United States Fish & Wildlife Service. Environmental Conservation Online System: Information for Planning and Conservation. Harris County, Texas. Available online at: https://ecos.fws.gov/ipac/.
[2] Colorado Natural Heritage Program and Colorado Parks and Wildlife, "CODEX: Colorado's Conservation Data Explorer," CODEX, n.d

Species	Status	Description of Preferred Habitat	Determination of Potential Habitat Present
Colorado Pikeminnow (*Ptychocheilus lucius*	LE	Inhabit larger rivers in the Colorado River basin. predominate in shoreline habitats and were associated with sandy substrate.	Suitable habitat is not present.
Humpback Chub (*Gila cypha*)	LT	Warm-water canyons of the Colorado River basin.	Suitable habitat is not present.
Razorback Sucker (*Xyrauchen texanus*)	LE	Found throughout the Colorado River basin in both lake and river habitats but are most common in backwaters, floodplains, flatwater river sections and reservoirs.	Potential habitat is present within Dillon Reservoir.
Monarch Butterfly (*Danaus plexippus*)	LC	Silty Monarch butterflies can be found in prairies, meadows, grasslands, and along roadsides across most of North America. Milkweed and flowering plants are needed for Monarch habitat.	Potential habitat is present within open grassland areas of Frisco.
LE = listed endangered, LT = listed threatened, ST = state threatened, SE =state endangered, SC= state candidate			

Meadow Creek was identified by CODEX to have a "Very High Biodiversity Significance".[2] Areas with very high biodiversity significance are identified as important to the continued existence of ecological processes that support rare and imperiled species, subspecies, and natural communities in Colorado. The Meadow Creek site is located between Dillon Reservoir and the Gore Range (Figure 1). It encompasses the northern portion of the Town and portions of Giberson Bay and Frisco Bay. The portion of the site northwest of Frisco and I-70, which is owned both privately and publicly, consists of a western slope sagebrush community (*Artemisia tridentata vaseyana / Festuca thurberi*). The willow carr (*Salix geyeriana /Carex aquatilis*) that follows Meadow Creek is fragmented but is an important functioning urban wetland. There are several kettle ponds scattered throughout the site that support aquatic vegetation e.g., pondweed (*Potamogeton gramineus)* and chorus frog (*Pseudacris triseriata*).

The Meadow Creek site contains a good occurrence of a globally imperiled sagebrush community. It also supports one of the best examples observed in Summit County of a globally common montane aspen forest (Populus tremuloides / tall forbs). The globally vulnerable montane willow (Salix geyeriana / Carex aquatilis) carr is located where Meadow Creek enters the reservoir on a floodplain that was formerly a very extensive willow carr. It is also located between the sewage disposal ponds and Frisco Bay where it is a highly functioning wetland (Figure 2).

Additionally, the wetlands in Frisco are essential ecosystems that provide vital support to diverse plant and animal life adapted to saturated conditions. They serve as crucial habitat for various species, including waterfowl and migratory birds, playing a fundamental role in sustaining biodiversity. Preserving and restoring these wetland habitats is paramount for maintaining ecosystem health and ensuring the continued provision of valuable support to both wildlife and human communities.

Figure 2 Potential Conservation Areas in Frisco

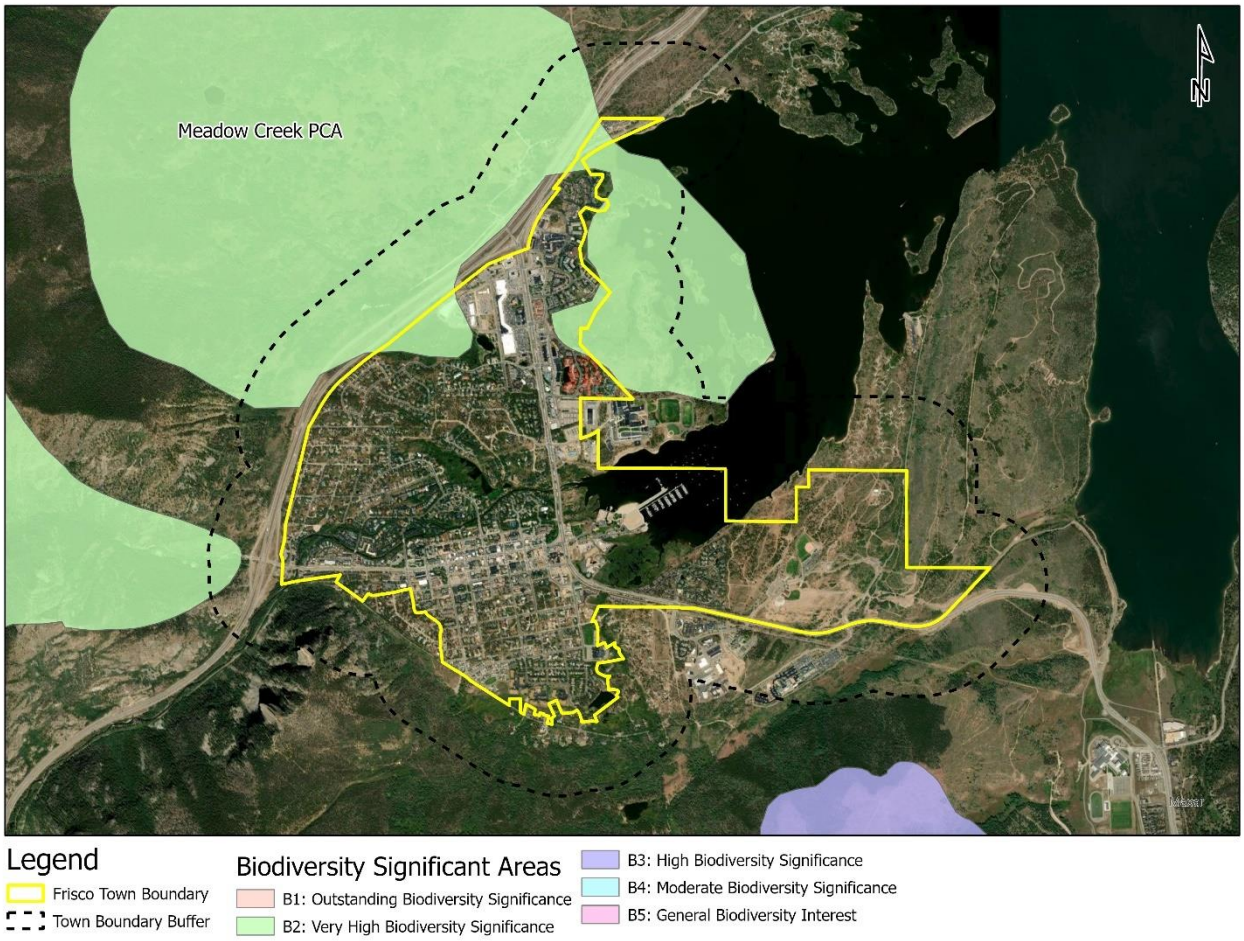
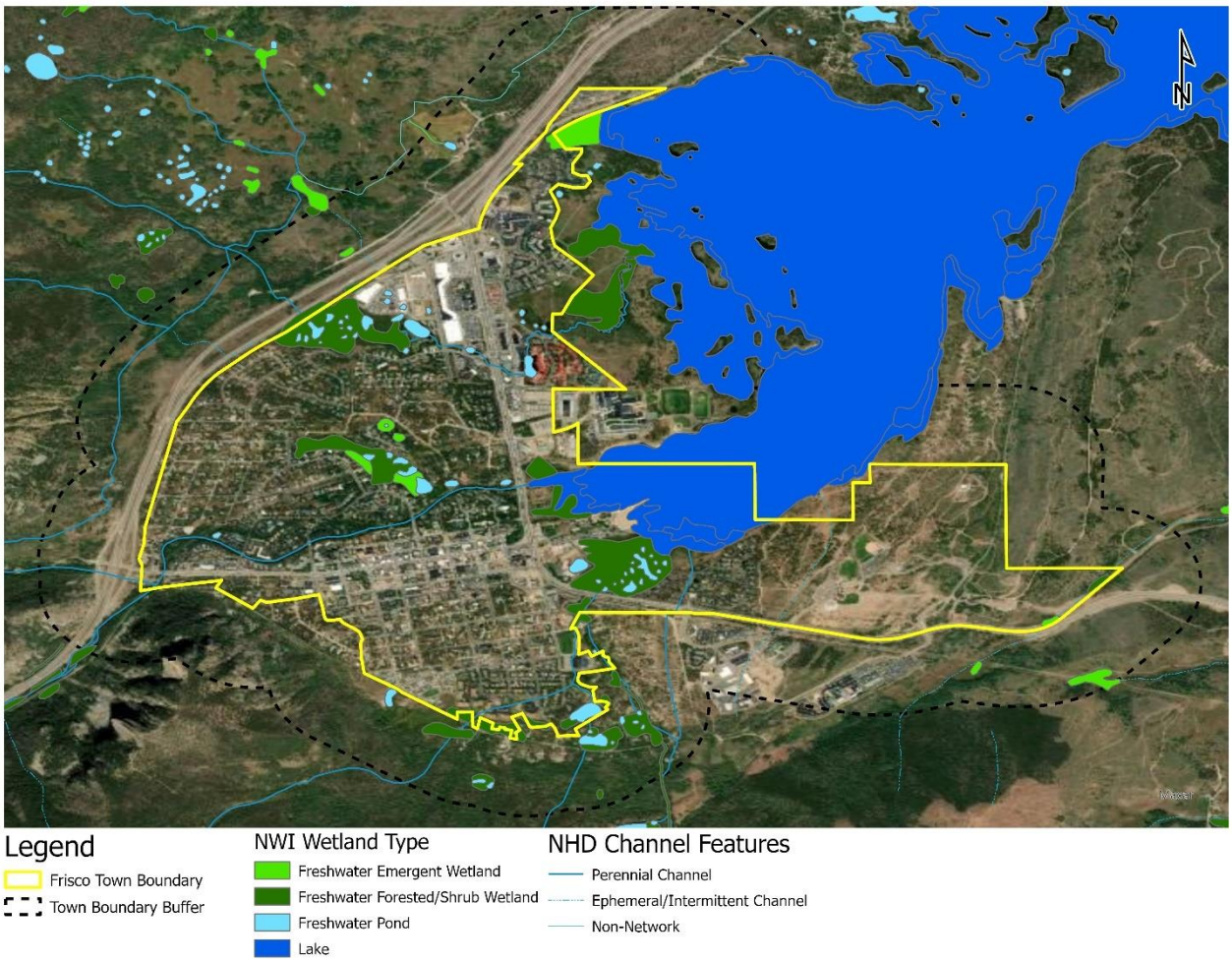


Figure 3 Environmentally Sensitive Areas



Ecosystems Represented in Frisco

General Climactic Classifications

Frisco is in the Southern Rocky Mountains province of the Rocky Mountain System. Frisco's climate is profoundly influenced by its high elevation within the Rocky Mountains, which brings cooler temperatures compared to lower-lying areas. The surrounding mountainous terrain plays a critical role in shaping weather patterns, altering wind directions and precipitation distribution across various elevations and slopes. Frisco experiences a continental climate regime with distinct seasonal variations—cold, snowy winters and mild summers—accentuated by its inland location far from large bodies of water. Pacific weather systems also impact the region, particularly in winter, bringing substantial snowfall from storms originating in the Pacific Ocean. Additionally, microclimatic variations, resulting from Frisco's complex topography, contribute to localized differences in temperature, precipitation, and wind patterns, influencing agricultural productivity, ecological processes, and human activities within the area.[3]

[3] United States Department of Agriculture, N. R. C. S. (2006). Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin (p. 682).

Typically, Frisco experiences light rainfall and low humidity. Frisco averages about 15 inches of rainfall annually over about 74 rainfall days, primarily peaking May through July, and about 117 inches of snow on average. The average annual temperature ranges from a low of -19 to a high of 84 degrees F, with a year-round average of 36 degrees F. Summer rainfall commonly occurs during high-intensity, convective thunderstorms. About half of the annual precipitation occurs as snow in winter and the proportion increases with elevation. In the surrounding mountains, deep snowpacks accumulate throughout winter and generally persist into spring or early summer.[4]

Topography

Frisco lies at an elevation of approximately 9,075 feet (2,766 meters) above sea level. The Town is surrounded by mountain vistas and characterized by a varied topography shaped by the forces glacial and fluvial processes over millennia. The terrain gradually rises towards the surrounding mountain peaks, reaching elevations exceeding 13,000 feet (3,962 meters) in some areas. The landforms surrounding Frisco include valleys, ridges, and plateaus, sculpted by glacial and fluvial processes. Glacial activity during the Pleistocene epoch created U- shaped valleys and moraines in the surrounding mountainous terrain. Geologically, the rocks exposed in the mountains surrounding Frisco are mostly Precambrian igneous and metamorphic rocks, which in many places are flanked by steeply dipping Mesozoic sedimentary rocks. Younger igneous rocks, primarily basalt and andesitic lava flows, tuffs, breccias, and conglomerates, are throughout this area. Alluvial fans at the base of the mountains are recharge zones for local basins and valley fill aquifers. They also are important sources of sand and gravel.[5]

Soils

The soils in the Frisco area are categorized into three main associations as per the NRCS Soil Survey by United States Department of Agriculture (USDA).[6] These include:

1. **Argicryolls**: formed in slope alluvium, colluvium, till, or slide deposits on mountain slopes, fan remnants, moraines, and landslide.
2. **Glossocryalfs**: formed in colluvium and slope alluvium on mountain slopes, in areas with granite, gneiss, and schist bedrock.
3. **Haplocryolls:** that formed in colluvium or slope alluviumover residuum on mountain slopes, in areas with granite, gneiss, and schist bedrock.

Additionally, Histic Cryaquolls, a significant soil type in Frisco, are characterized by their nearly level terrain and high organic matter content, indicative of saturated conditions prevalent in wet environments. These soils play a crucial role in regulating water dynamics, supporting diverse wetland ecosystems, and contributing to overall landscape biodiversity. While their saturated nature presents challenges for certain land use activities such as agriculture and development, conservation efforts aimed at preserving wetland habitats associated with these soils are essential for maintaining water quality, ecological integrity, and the provision of vital ecosystem services in the Frisco area.

[4] Averages are presented form 2000-2024 based on NOAA online weather data.
[5] United States Department of Agriculture, N. R. C. S. (2006). Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin (p. 682).
[6] Soil Survey, Natural Resources Conservation Service (NRCS), United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/.

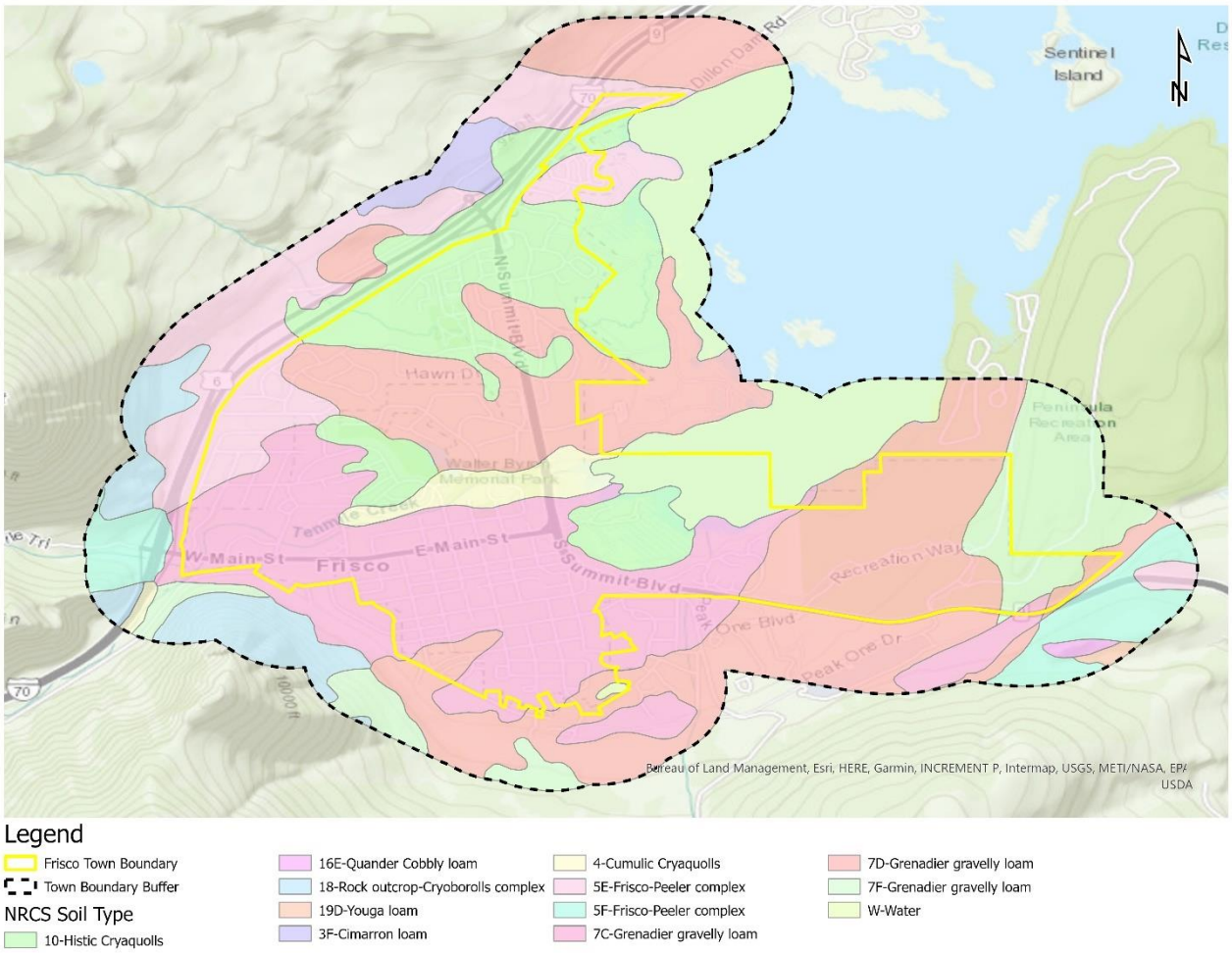


Figure 4 Soil Profile

Water and Watershed Management[7]

Service area characteristics.

Boundaries and Population.

The Town spans three square miles along the southwest shores of Dillon Reservoir, providing water services to properties within its incorporated boundaries as well as neighboring unincorporated areas, as depicted in Figure 1. The Town of Frisco's tourism-driven environment is characterized by significant seasonality and population variability. Therefore, the demands on water fluctuate with the tourist populations that frequent Frisco as well as with water usage for snowmaking.

[7] Town of Frisco. (2018). *Water Efficiency Plan.*

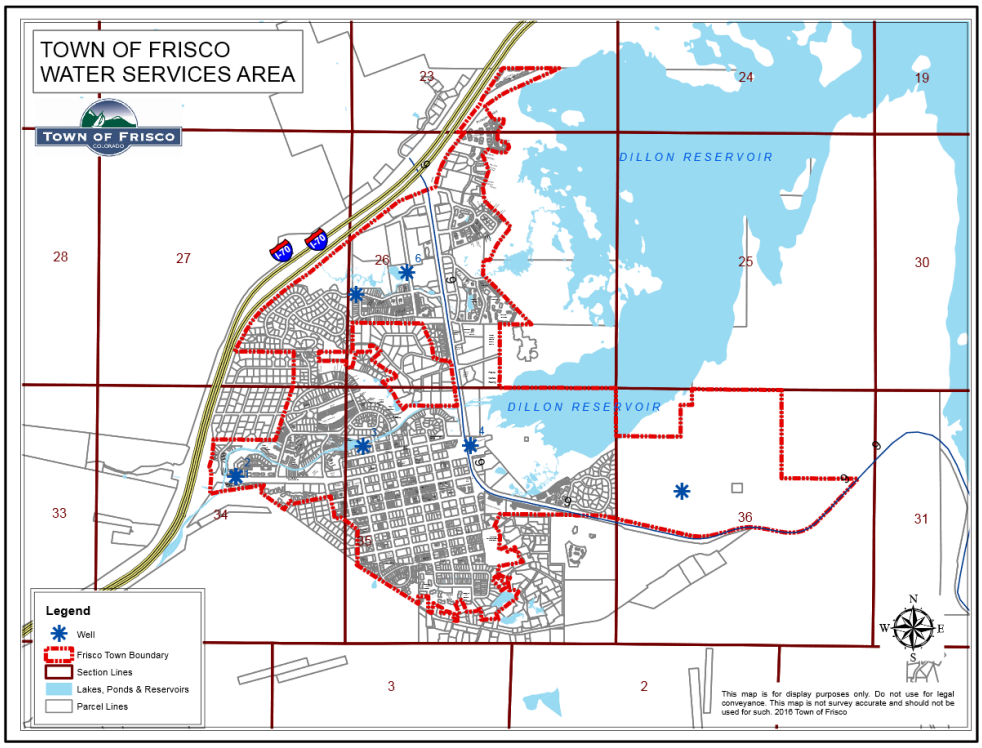


Figure 1: Town of Frisco Water Service Area

Sectors

Residential water consumption dominates in Frisco, accounting for over half of the Town's total water usage, despite roughly 60% of its housing units remaining unoccupied for portions of the year. The Town's housing infrastructure, predominantly constructed in the late 1980s and early 1990s, offers potential for indoor water conservation by upgrading older fixtures and appliances. While there are adjacent unincorporated residential areas, their self-supply through wells or existing connection to the Town's water system minimizes their impact on Frisco's water resources. Notably, industrial water usage is absent within the Town, while major consumers in the commercial sector include the hospital, commercial laundry facilities, restaurants, and breweries. Water used for snowmaking is restricted to 30 ac-ft/yr, sourced from groundwater wells. Per the Town's water rights, snowmaking is only permitted for use between November and February. It is important to note that ski resorts maintain independent water rights for snowmaking and other purposes, separate from the Town's supplies.

Raw water supply and watershed description

The Town of Frisco relies on a combination of groundwater and surface water sources, with rights to divert up to 1,413 acre-feet per year. Existing water rights allow Frisco to divert 2.5 cubic feet per second (cfs) from North Tenmile Creek as well as of 748 gallons per minute (gpm) (equivalent to 1,207 ac-ft/yr) from a groundwater supply accessed through seven wells along Tenmile Creek and Meadow Creek. As of 2018, Wells 5 and 6 served as the primary groundwater sources, while Wells 1 and 2 have been discontinued due to contamination and Wells 6 and 7 were drilled as replacements. Although Well 3 was last utilized in 2013 to supplement the Town's water supply, Emergency Well 4 remains unused in recent memory. Well 7 was operational starting in 2018 with a production rate of 500 gpm but has been offline since July 2022 due to a P-FAS concern.[8]

[8] Per conversations with Town water staff on April 26 and May 9th, 2024

Frisco operates a surface water treatment plant (WTP) known as the Wayne Bristol Surface Water Treatment Plant with a capacity of one million gallons per day (MGD) located outside of Town. In 2009, the treatment process was upgraded to microfiltration, and chlorine contact time was increased for disinfection. The WTP operates most of the year, except when surface water quality is affected by snowmelt runoff during spring and early summer and low flows occur during the winter. Groundwater supplies are used year-round to supplement WTP production, ensuring high-quality drinking water that meets established standards. The Town exclusively distributes treated water that meets drinking water standards, without distributing raw, non-potable, or reclaimed water supplies.

Historic trends

Treated Water

Annual treated water production volumes from 1996 to 2015, as illustrated in Figure 4, indicate a consistent average decline of -1% year-over-year, with data for 1997-98 unavailable.

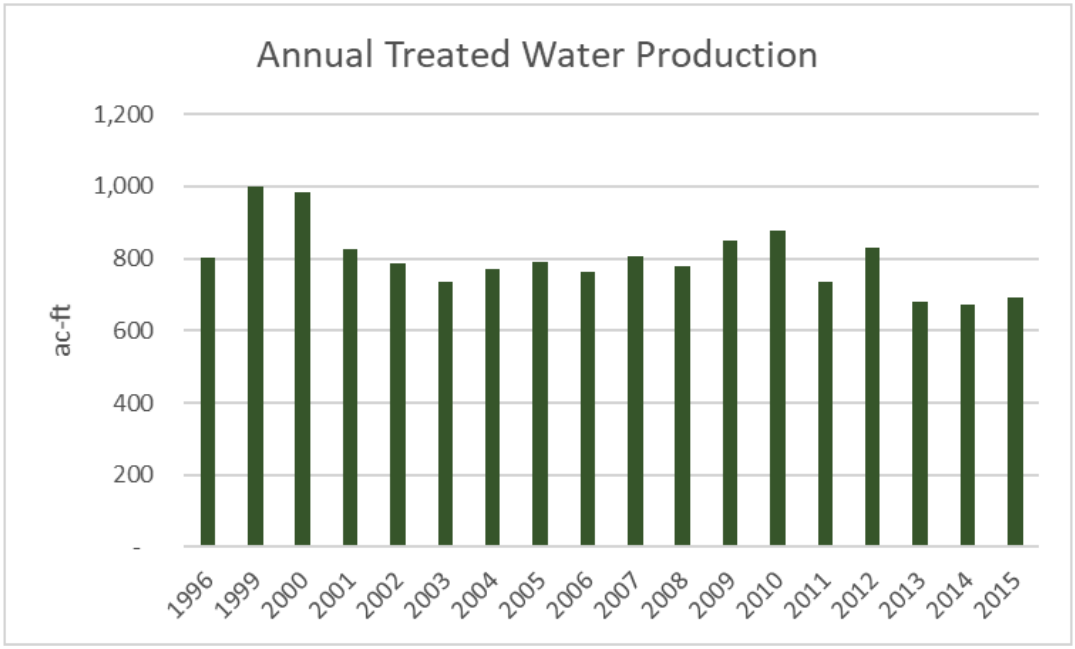


Figure 4. Annual Treated Water Production (1996-2015) – data for 1997-98 are not available

Annual production volumes, water sales, and sales by sector for the period 2011-2015 are detailed in the table below:

Table 4. Summary of Production, Total Sales, and Sales by Sector (2011 2015)

Year	Total Production (ac-ft)	Total Water Sales (ac-ft)	Residential Sales (ac-ft)	Commercial Sales (ac-ft)	Snowmaking Sales (ac-ft)
2011	653	577	366	181	30
2012	757	598	380	188	30
2013	682	594	391	173	30
2014	662	545	323	192	30
2015	691	588	363	195	30

Water Production

Since 1996, the Town has witnessed an average annual decline of 1% in water production volumes, amounting to 691 acre-feet in total production by 2015. This decrease remains at an average of 1% when normalizing for the service population. In 2015, system-wide water use reached 105 gallons per capita per day.

Monthly Water Use

Analysis of monthly water production data from 1996 to 2015 reveals that outdoor water use amounts to an average of 19% of annual demands, with a notable spike from June to August, nearly doubling system demands. Minor increases in water use from November to March are attributed to transient residents and day visitors during ski season.

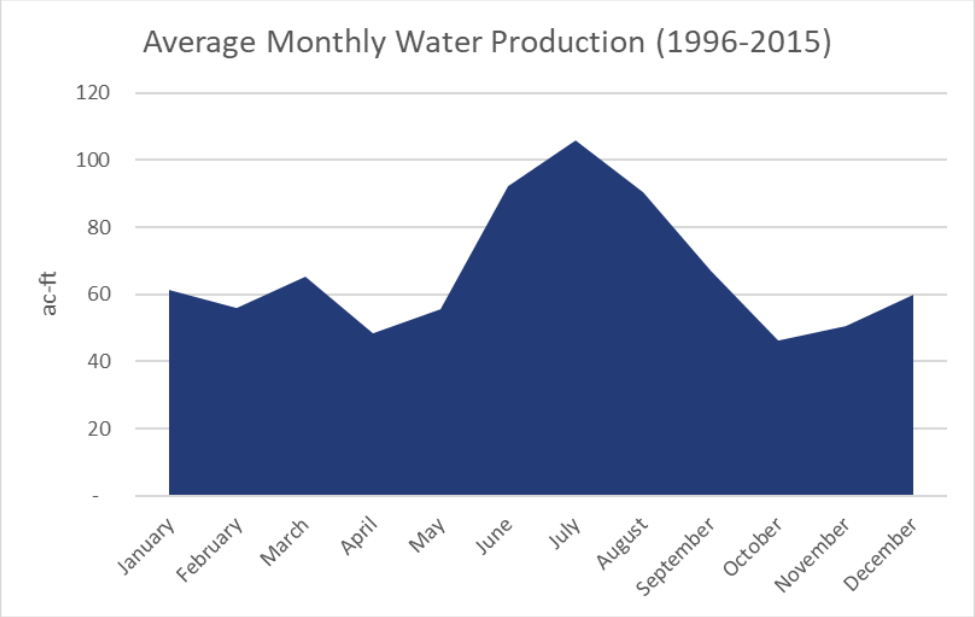


Figure 6: Average Monthly Water Production (1996-2015)

System-wide Water Use

The Town employs system-wide per capita demands as a key measure of system efficiency, calculated using residential and commercial water sales and the average annual population served, encompassing both permanent and visiting populations. Over the five years indicated below, the Town has maintained an average system-wide per capita demand of 105 gallons per capita per day (gpcd). During this time, Frisco also experienced a 1% increase in the average population served year-over-year, coupled with a corresponding 1% decline in per capita water use year-over-year, demonstrating a net gain in efficiency.

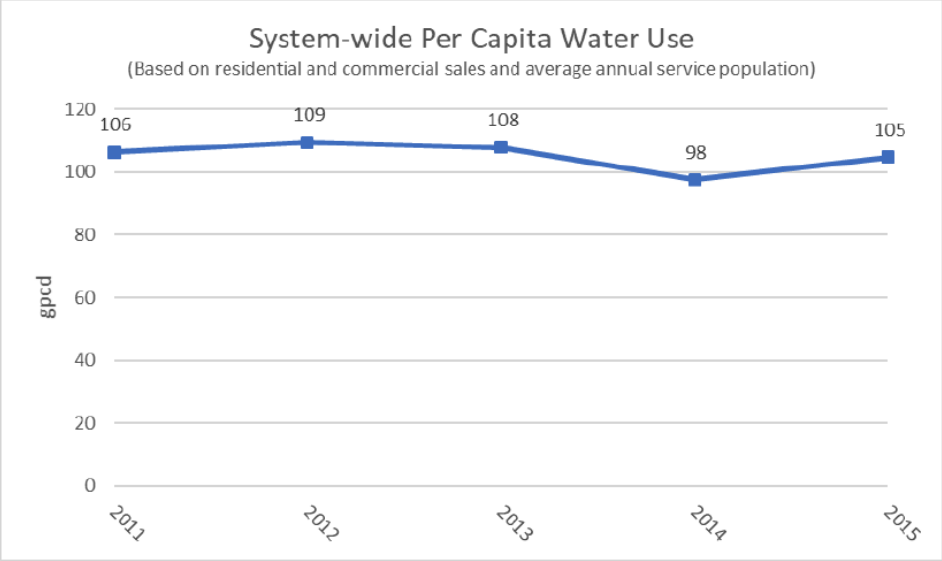


Figure 7. System-wide Per Capita Water Use (2011-2015)

Residential Water Use

Per capita water use values are computed using residential sales and the permanent service population, excluding the number of visitors served. Figure 8 illustrates residential per capita water use values from 2011 to 2015, indicating an average annual decline of 3% over this period.

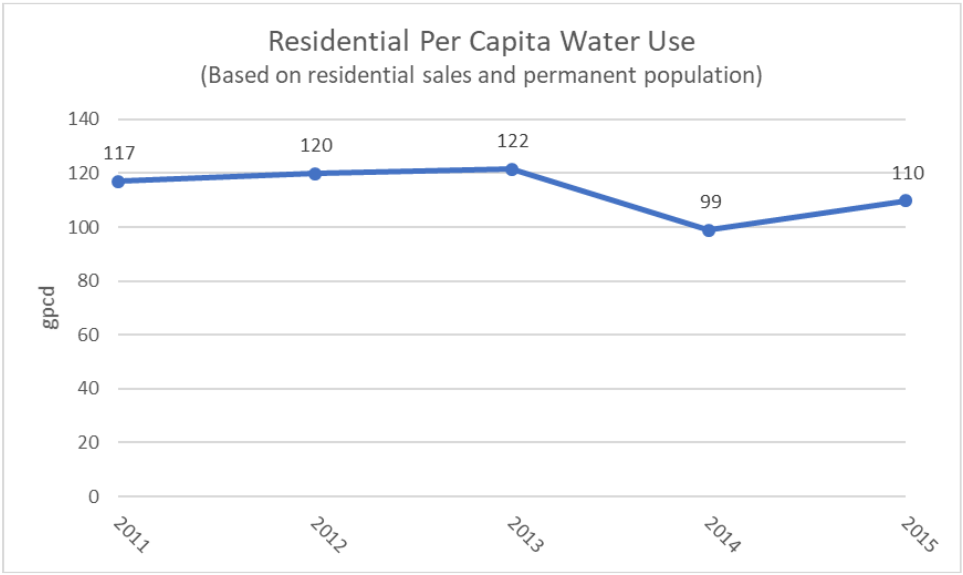


Figure 8. Residential Per Capita Water Use (2011-2015)

Storage and Distribution

Treated water is conveyed through a 24-mile network of ductile iron piping. As a gravity-fed system, it does not require or use pump stations. Given the Town's relatively flat terrain, the distribution system operates within a single pressure zone, with water pressure ranging from 45 - 80 pounds per square inch (psi). A map of the water distribution system is depicted in Figure 3. The Town maintains a total treated water storage capacity of 2.53 million gallons (MG), distributed among three storage tanks: an inground tank with a capacity of 1.2 MG, an aboveground tank with a capacity of 0.83 MG, and a 0.5-MG tank situated at the water treatment plant (WTP).

Figure 3: Town of Frisco Water Distribution System

System Reliability

The Town's water system boasts exceptional reliability, having never experienced a loss of water supply or failure to meet system demands, even during significant droughts in 2002 and 2012. This reliability is underpinned by the

utilization of both surface water and groundwater supplies, which serve as the Town's primary strategy for ensuring system robustness. In terms of planning, the Town has determined the firm yield of the current water supply system to be 1,100 gallons per minute (gpm), equivalent to 1,775 acre-feet per year, more than double the current system demands.

Table 3. Firm Yield Estimates

Water Supply Source	Firm Yield (gpm)
Surface water diversions	700
Well 3	400
Well 4	200
Well 5	550
Well 6	550
Well 7	500[e]
TOTAL	1,100

[e]=estimated

Future needs

Over the five years covered by the last water efficiency plan, approximately two-thirds of the Town's water supply was sourced from groundwater, with the remaining third from surface water diversions. Both dry conditions and low winter flows can limit availability from North Tenmile Creek. Despite a preference for surface water due to lower energy requirements, the Town is prompted to prioritize Meadow Creek well water when flow in Tenmile Creek drops below 7 cfs. According to 2018 development projections, the Town estimated future water demands at buildout to reach 1,975 acre-feet per year, primarily for indoor use (1,811 ac-ft/yr). Outdoor water use is expected to decline due to changes in development standards aimed at promoting water efficiency. With current rights to 1,413 ac-ft of water, the Town would need to secure additional water rights to meet future demands. These projections are being evaluated as part of several new studies the Town initiated in the summer of 2024; therefore, existing projections may be updated in the near future.

Environmental Hazards and Vulnerabilities

Situated at the convergence of the Rocky Mountains, Frisco is exposed to several natural environmental hazards. Urban development intersecting with present natural hazards amplifies risk through the alteration of natural drainage systems, the expansion of wildland-urban interfaces, and the introduction of the urban heat island effect. There is a need for integrated risk assessment and management strategies through the lens of climate risk to ensure that Frisco will remain prepared and resilient.

Water Availability and Drought

The Rocky Mountains are expected to face significant impacts from climate change, including reduced snowpack which is a major source of water for the region. Snowpack acts as a natural reservoir, releasing water gradually during spring and summer. Recent trends influenced by climate change have raised concerns about long-term water security. Shorter and warmer winters have led to reduced snowpack levels, resulting in reduced water availability during the critical spring and summer months when demand is highest. This decreased snowpack not only affects water supply but also impacts the timing of water runoff. Earlier snowmelt can lead to a mismatch between peak water availability and peak demand periods, potentially straining local water systems.

Summit County has faced significant drought events six times in the past 35 years, with the most recent occurrences

in 2002 and 2012. While the Town of Frisco has historically managed to meet water demands during these periods, the droughts underscored the importance of comprehensive utility planning to prevent shortages in the future. During the severe drought of 2002, Frisco had to take drastic measures, including shutting down the Water Treatment Plant (WTP) for approximately seven months due to critically low water levels in North Tenmile Creek. Fortunately, groundwater supply wells remained relatively unaffected by the drought and were able to meet the system's demands. In response to these challenges, the Town implemented a water conservation ordinance in 2003. This ordinance includes permanent voluntary water use restrictions and a three-phased drought response plan aimed at promoting water conservation and resilience in the face of future drought events. These proactive measures reflect Frisco's commitment to ensuring the sustainability and reliability of its water supply system in the wake of recurring drought challenges.

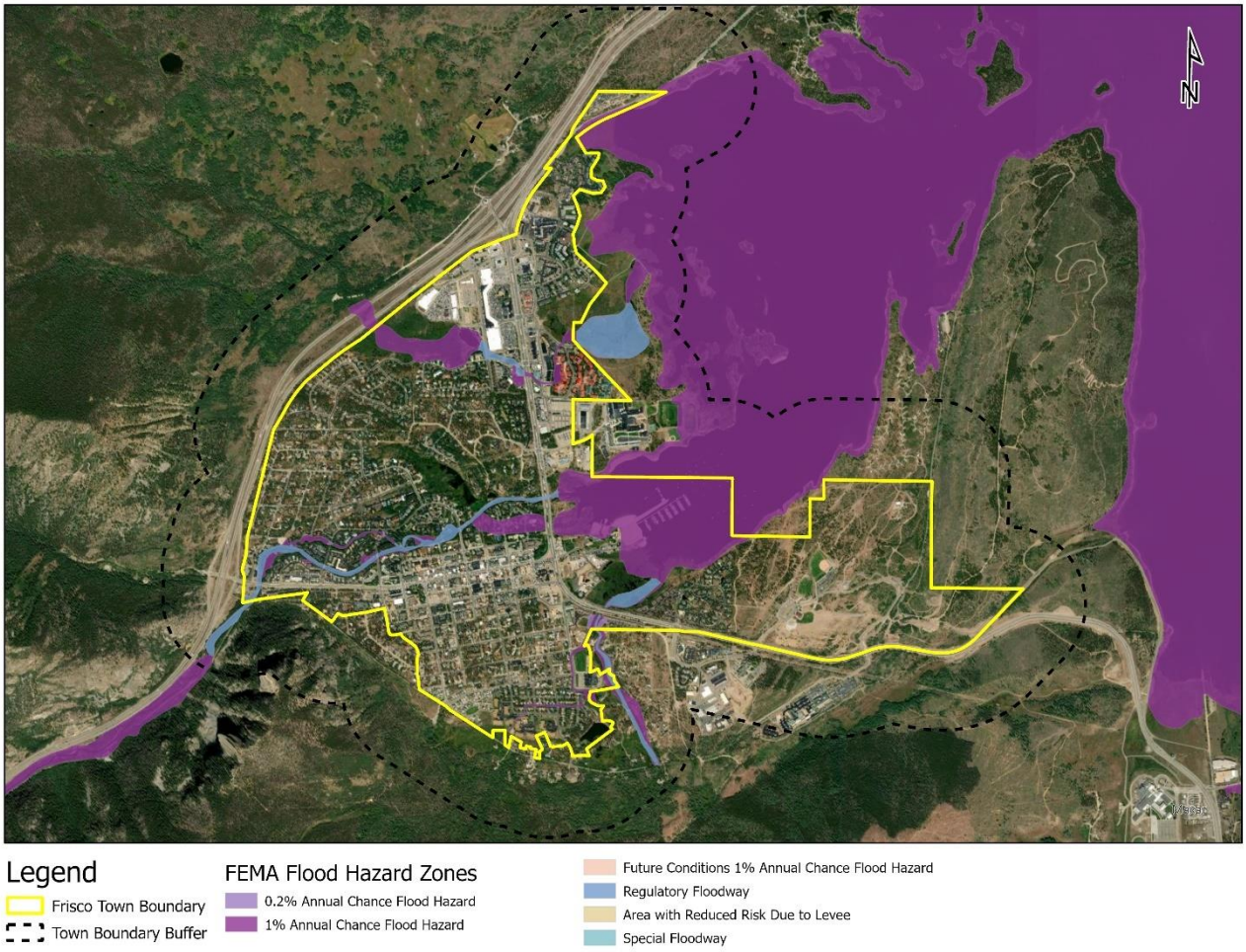
As the community grows, Frisco needs to consider how future development will impact water availability. Increased development can strain existing infrastructure, necessitating upgrades to roads, sewage treatment facilities, and water systems that were originally designed for smaller populations. Additionally, the construction on mountain terrains often requires significant alteration of the landscape, which can increase the risk of erosion of natural waterways, degrading the quality of the water, making it less suitable for drinking, recreation, and wildlife.

Flooding

Frisco is vulnerable to flooding, primarily due to its geographic and climatic factors. The Town experiences a range of conditions that can lead to flooding, especially during the spring and early summer. The greatest risk of flooding is introduced by the Ten Mile Creek, originating in the high alpine areas of the Tenmile Range where steep gradients contribute to rapid runoff during snowmelt and rain events. As the creek descends into the Frisco area, the velocity of water flow increases as the slopes steepen, leading to a higher potential for the creek to overflow its banks when large volumes of water are rapidly introduced into the system. The map below indicates different areas of flood risk.[9]

[9] Federal Emergency Management Agency, nd. FEMA Flood Map Service Center. Available at: https://msc.fema.gov/portal

Figure 5 Frisco Flood Hazard Map



Source: Map was prepared by Spirit Environmental using data from National Hydrography Dataset and National Wetland Inventory

Climate impacts also introduce increased risks of flooding in Frisco. Climate change can alter precipitation patterns, leading to more intense rainfall events or changes in the timing and distribution of precipitation. This can result in an increased risk of flash floods and river flooding in Frisco. Snowpack plays a critical role in Frisco's water supply, and alterations in snowmelt patterns due to warmer temperatures can affect the timing and magnitude of runoff. Rapid snowmelt can contribute to spring flooding, especially if combined with heavy rainfall events. Glaciers in the Rocky Mountains are receding due to climate change and glacial meltwater contributes to streamflow during warm months. As glaciers shrink, the meltwater can lead to higher river levels and potential flooding initially, followed by reduced flows in later years as glaciers reduce in size.[10]

The Town's infrastructure, particularly designed to handle the runoff from Tenmile Creek, plays an important role in mitigating flood risks. Frisco's stormwater management systems, including strategically placed culverts and retention basins, have been developed to effectively manage the water levels during heavy rainfall, minimizing the chances of overflow. Frisco has implemented comprehensive land-use policies and zoning regulations that discourage

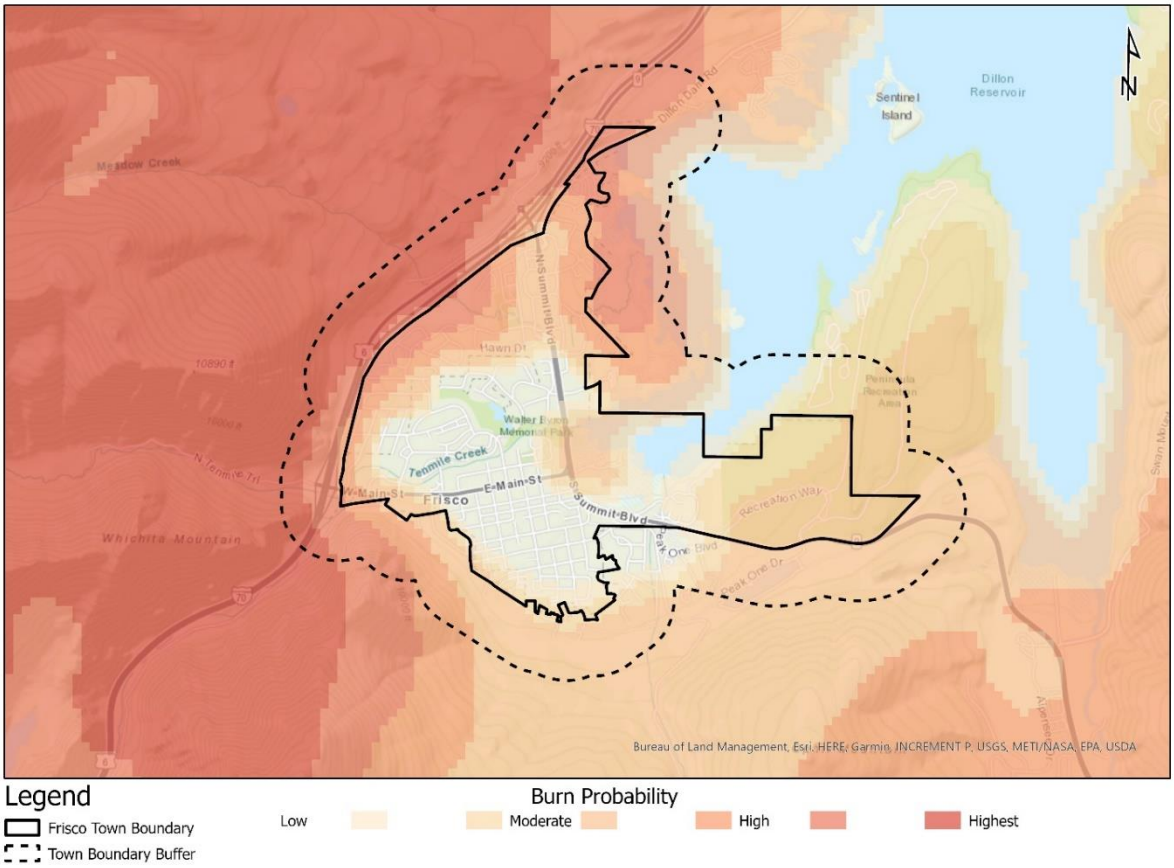
[10] U.S. Global Change Research Program, 2018. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II. Washington, DC: U.S. Global Change Research Program. Available at: https://nca2018.globalchange.gov/

construction in flood-prone areas, particularly along the banks of Tenmile Creek.[11] This ensures that residential and commercial developments are situated in locations with lower flood risk. The Town also actively maintains its natural drainage systems, preserving the integrity of local creeks and streams to handle sudden influxes of water. [12]

Fire Risk

Wildfire is a natural hazard that Frisco has faced historically and will continue to combat with increased risk as the local temperatures rise and the chance of drought increases. To understand the risk of wildfire, several variables must be assessed including burn probability, flame length, and the susceptibility of the community to fire. Surrounded by mountainous terrain characterized by dense forests makes it highly susceptible to wildfires. The surrounding terrain, dominated by coniferous forests, provides ample fuel for fires, with the presence of vegetation serving as potential ignition sources. Steep slopes and rugged terrain can impede firefighting efforts, complicating containment, and control measures. Additionally, the proximity of residential and commercial developments to forested areas increases the risk of wildfires spreading to inhabited areas, heightening the potential for property damage and loss.

Figure 6 Frisco Burn Probability



Source: Map was prepared by Spirit Environmental using data from Colorado State Forest Service

[11] U.S. Global Change Research Program, 2018. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II. Washington, DC: U.S. Global Change Research Program. Available at: https://nca2018.globalchange.gov/

[12] U.S. Global Change Research Program, 2018. Impacts, Risks, and Adaptation in the United States: Fourth

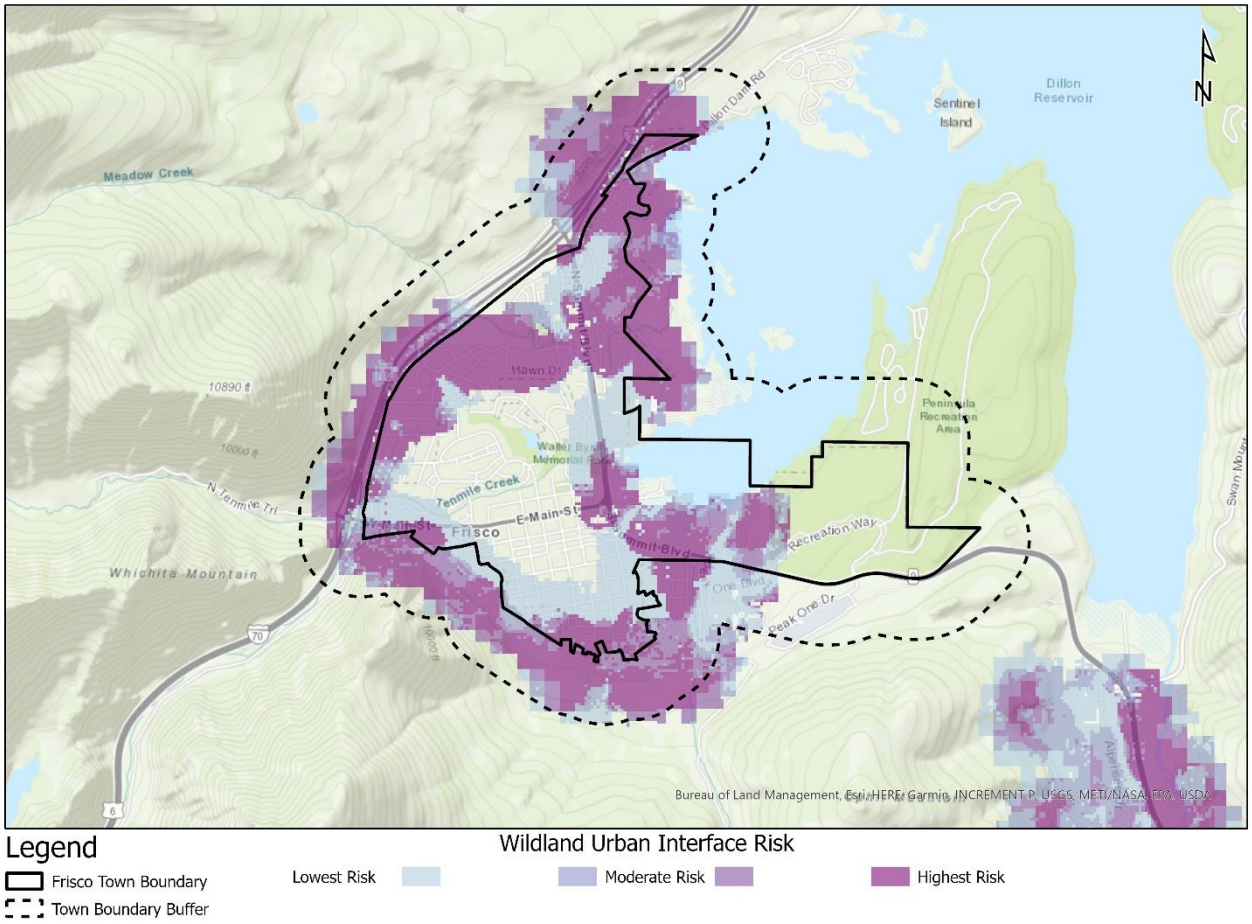
Additionally, Frisco's high elevation and dry, continental characteristics, contribute to the wildfire risk. Warm, dry summers coupled with occasional thunderstorms create conditions conducive to fire ignition and rapid spread. With the buildup of fine fuels like grasses and shrubs, the dry season introduces another layer of wildfire risk. Climate change exacerbates these risks by prolonging the fire season, increasing temperatures, and altering precipitation patterns, creating conditions conducive to more frequent and intense wildfires.

Wildfires pose significant challenges to water management systems due to their impact on storm runoff and water quality. The burning of vegetation eliminates natural barriers that would typically intercept and absorb rainfall, leading to increased storm runoff. Hydrophobic ground surfaces form as a result of the fire, causing water to stay on the surface rather than infiltrate the soil. Additionally, wildfires leave behind debris and surface pollutants which clog intake infrastructure and result in spikes of various contaminants in source waters. These contaminants may include turbidity, coliforms, total organic carbon, iron, manganese, and ammonia, posing risks to water quality and public health. Furthermore, wildfires can impact the quantity of available water by constricting water flow or altering river channels through debris accumulation, highlighting the complex challenges faced in managing water resources in fire-prone areas. Sedimentation, wildfire debris, and chemical contamination impair degrade water quality, reduce water storage capacity, and harm aquatic ecosystems.[13] As discussed in a focus group, the north Tenmile River is particularly susceptible to heavy sedimentation in the event of wildfires due to the slopes and forest characteristics. In response to surface water contamination, the Town has the ability to switch to groundwater supplies to ensure the provision of adequate and safe drinking water.

The western region of Frisco exhibits the highest probability of wildfire burn. This area is characterized by dense forest cover, predominantly comprising USFS land. High forest density increases the fuel load available for potential wildfires, thereby elevating the risk of burn. The connectivity of the landscape is also a factor in burn probabilities, with large, unbroken expanses of fuels to the west of Frisco enhancing the potential for burning. In contrast, the urban center of Frisco shows much lower burn probabilities due to features and materials considered non-burnable including roads, buildings, and irrigated areas. Peninsula Recreation Area and Peak One Park both have areas with moderate burn probabilities combined with lower tree density and higher open grassland producing moderate flame lengths. The intersection of the wildland-urban interface (WUI) with burn probability presents a critical area of focus for wildfire risk management. The WUI, where human developments meet or intermingle with natural vegetation, is especially prevalent in the areas of Frisco that border densely forested areas. Mapped below is a visual representation of the WUI risk within Frisco.

[13] U.S. EPA. (2019, August 13). Wildfires: How Do They Affect Our Water Supplies? Retrieved from Science Matters: https://www.epa.gov/sciencematters/wildfires-how-do-they-affect-our-water-supplies

Figure 7 Frisco Wildland Urban Interface Risk

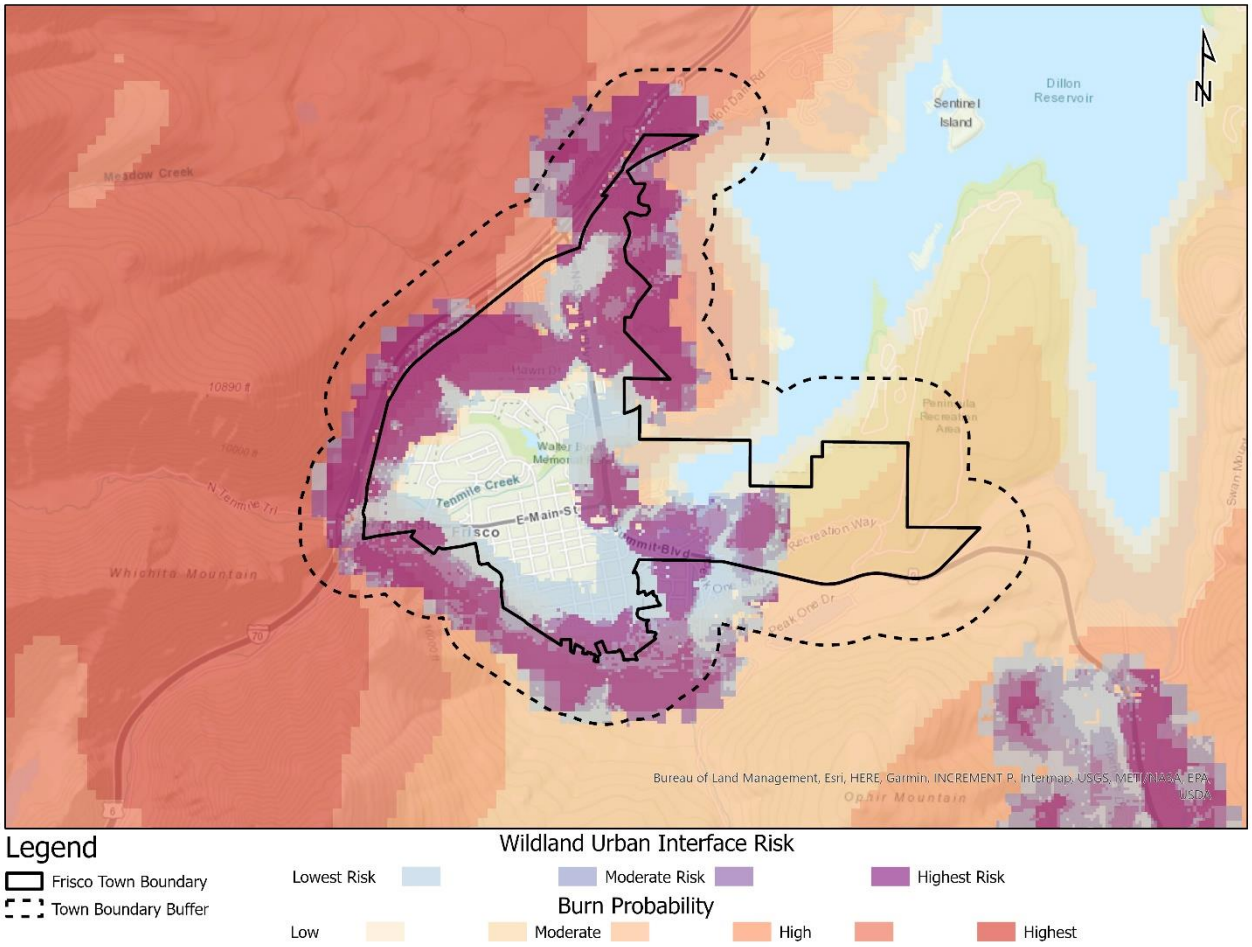


Source: Map was prepared by Spirit Environmental using data from Colorado Forest Atlas Public

These regions are characterized by higher burn probabilities due to their dense forest fuel types and are therefore particularly vulnerable. The proximity of these natural fuel sources to residential and other human structures amplifies the risk of wildfire damage. Furthermore, the connectivity of the landscape, with large contiguous stretches of fine fuels like grasses, increases the potential for fire to spread rapidly, especially in areas where developments are interspersed with natural vegetation. This dynamic underscores the importance of integrating land use planning and fire mitigation strategies in these high-risk areas. Effective management in the WUI of Frisco involves addressing the burn probability in conjunction with the unique challenges posed by human infrastructure and habitation within these high-risk zones. The map below blends both the wildfire risk with WUI risk, demonstrating where the highest risk intersections.[14]

[14] Colorado Forest Atlas Public. (2024). *Wildland Urban Interface Risk*. Retrieved from https://help.coloradoforestatlas.org/public/wildland-urban-interface-risk

Figure 8 Frisco Fire Risk

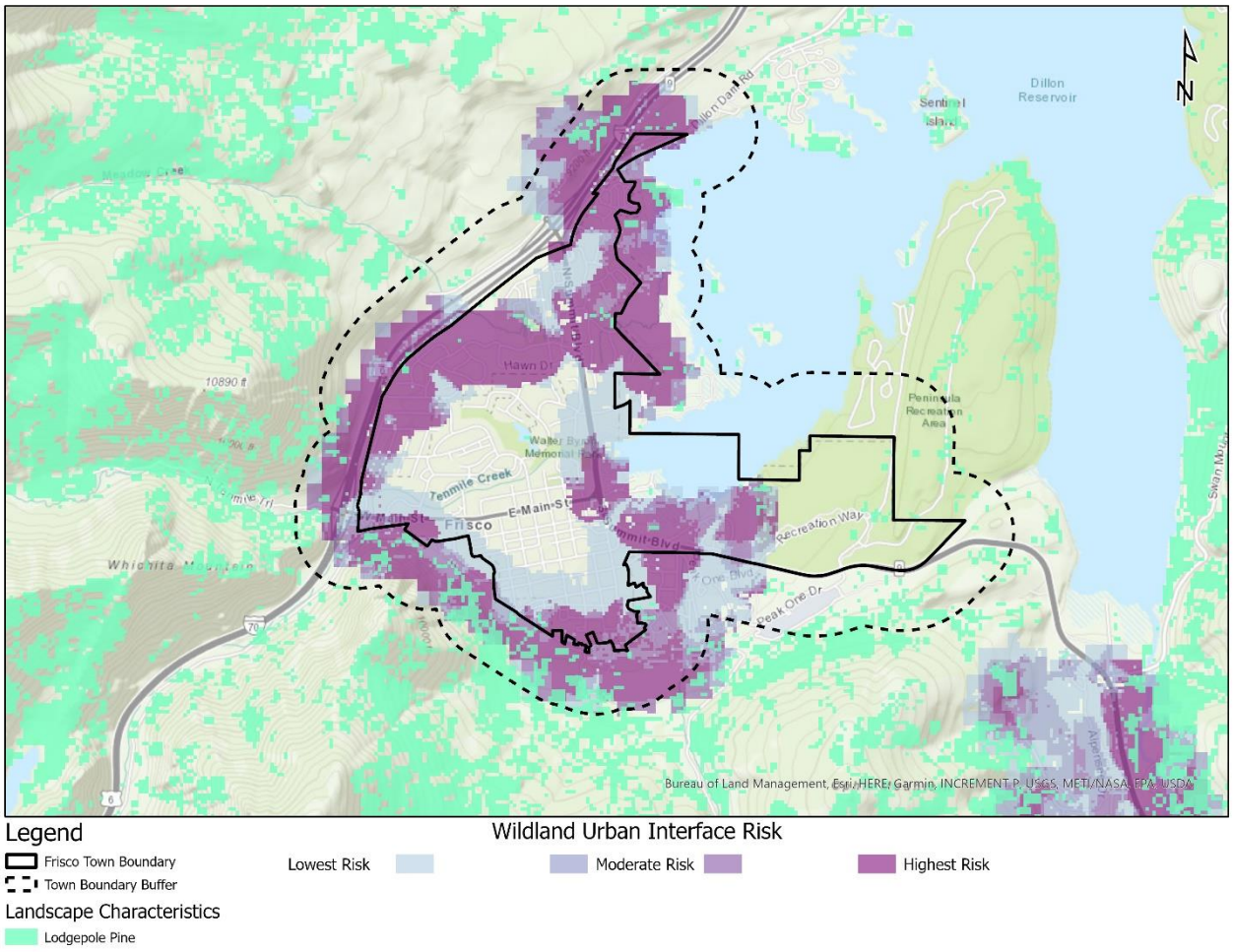


Source: Map was prepared by Spirit Environmental using data from Colorado Forest Atlas Public and the Colorado State Forest Service

Development pressures and Landscape Characteristics

The interplay between urban development and the surrounding environment presents complex challenges, particularly in the context of preserving ecosystems and sensitive species, as well as mitigating natural hazards like wildfires. As Frisco expands, the management of both USFWS land and the WUI will be critical issues, with direct implications for biodiversity and ecosystem health. Development pressures can lead to habitat fragmentation and loss, adversely affecting sensitive species and disrupting natural ecological processes. Moreover, the encroachment of urban areas into wildlands increases the risk of wildfires, both in frequency and intensity, posing significant threats to both natural and urban environments. Frisco's surrounding landscape is characterized by several key features. For example, extensive lodgepole pine communities dominate the region. The lodgepole pine species are adapted to frequent, low-intensity wildfires and rely on fire disturbance for regeneration. However, fire suppression efforts over the past century have disrupted the natural fire regime, leading to fuel accumulation in the forests and creating conditions conducive to more intense and catastrophic wildfires. Understanding and addressing current and anticipated developments in Frisco is essential for sustainable planning, ensuring a balance between development and the preservation of natural landscapes.

Figure 9 Frisco Landscape Characteristics and Fire Risk



Key Opportunities to Address

Working with land management partners and continuing to value and protect high-quality habitat areas will provide important ecological services for the human and non-human inhabitants of Frisco. Additionally, the continued human-induced pressures and the onset of climate impacts present challenges. Discussions with staff highlighted the need to steward resources both in terms of management of high-quality recreation experiences for the community and visitors while protecting vital natural resources. To complement existing efforts and to set the stage for future planning, the following are several potential opportunities for Frisco to consider when thinking about future land use and the natural environment:

- As a Town with attractive recreation opportunities, Frisco is faced with the challenge of managing highly used natural areas while maintaining resource protection. Identifying high-priority recreation areas and ecologically sensitive areas will highlight where recreation and the wildland interface is of the highest concern. Regularly monitoring visitor use patterns, environmental conditions, and ecosystem health in these areas will provide insight into the effectiveness of management strategies. The data can be used to inform adaptive management decisions and adjust management practices as needed to maintain the

balance between recreation and conservation objectives.

- Focus group participants communicated that Frisco has not historically focused on property acquisition, though land is limited. Shifting towards a modest land acquisition approach, Frisco can slowly relieve pressures from the balance of maintaining recreation and natural resources. Targeting areas that expand existing habitats and/or are contiguous with existing highly recreated parcels could present a good starting point.
- Participants mentioned that while Frisco does value cross-collaboration, working in silos can pose issues. Creating and leveraging existing partnerships can create cohesion around value and the pursuit of resiliency. Frisco could consider identifying a champion amongst all governmental departments to rally participation and unify initiatives.
- Traditionally, the Water Department has approached water management to ensure high water quality while incorporating strategies to improve water efficiency. Prioritizing water efficiency measures, including policies, community incentives, and education efforts, will be vital to ensuring water security for Frisco. In addition to a growing population, Frisco is tasked with meeting the water needs of new developments outside its borders as they are annexed into the Town boundary or connected to the Town water service.
- Water management should be considered through the lens of wildfire. As discussed above, wildfire has the potential to substantially impact water quality and ultimately, lead to a full shutdown of the WTP. Planning for high-intensity wildfires in watersheds can help Frisco avoid disruptions to water treatment for the community.
- Water conservation should be considered in context with recreation. Frisco could consider ways to incentivize ski resorts to adopt advanced snowmaking technologies that minimize water consumption.
- Lodgepole pine forests are highly susceptible to wildfires, especially in regions prone to drought and high temperatures. Developers should implement wildfire mitigation measures such as creating defensible space around homes, using fire-resistant building materials, and incorporating firebreaks and access roads to facilitate firefighting efforts. The Town can support these efforts with WUI codes and Firewise designations and resource support.