

THE SEVEN CANYONS TRUST

100 YEARS OF DAYLIGHTING



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TABLE OF CONTENTS

INTRODUCTION	5
Who We Are	
Origins Of Water	
100 Year Events	
CREEK PROFILES	
COMMUNITY	14
This is the Place	
Walkability and Public Health	
Potential for Public Works Projects	
ECOLOGY	20
Flora and Fauna	
Flood Mitigation	
Pollutant Table	
Annual Flow	
Ecological Benefits	
Air Quality and Temperature	
THE ORGANIZATION	26
The Seven Canyons Trust	
Acquisition Strategy	
Land Criteria	
Strategies	
Three Creeks Case Study	
VISUALIZATION	34
Three Creeks Park	
Cross Sections	
CREEKS MAP	
MOVING FORWARD	
Barriers	
APPENDIX	46
Successful Daylighting Precedents	
Glossary	
Contributors	
Bibliography	





INTRODUCTION

The waters of the Salt Lake Valley are dormant. Hidden, channeled, piped, they cannot be enjoyed, seen, or heard, but this wasn't always true. Even when the Mormon pioneers came the creeks were there; seven pure paths from the canyons to the Jordan. It was these very creeks that made this The Place, and they were essential for the growth of the valley. We may live in a desert, but the creeks allowed the pioneers to turn this place into an oasis. Great orchards sprung up across the valley, all fed through irrigation from the creeks. The Marmalade District was coined for its abundance of fruit trees. Even the electricity that lit the city was fed by a hydro-electric power plant in Big Cottonwood Canyon. However, the Mormon Pioneers are relative newcomers.

This valley had been a place of gathering, healing, and celebration for the first people of North America long before the pioneers came. This valley held some of the greatest trout fisheries in North America. Every year when the trout spawned thousands of Native Americans would come to the valley for celebration and fishing, but never depopulating the waters. Unfortunately, everyone saw the bounty of these fisheries and it wasn't long before they were depleted, polluted, and filled with invasive species that pushed the native trout into distant tributaries.

Hot springs once dotted the landscape by the hundreds, perhaps thousands, enough to create a three-mile long hot spring lake. Its great plume of steam could be seen throughout the valley, and was a renowned place of relaxation known throughout the country, said to be capable of rejuvenating both the body and mind. Of course, it was swiftly privatized, downsized, and buried. The great plumes of steam have been replaced with refinery smoke, and the thousands of birds that alighted on the lake have long since departed.

Despite all this, water is still vital for us. We ignore and neglect it, but rely on it to sustain this entire valley, and that is one of the important reasons for us to learn to protect it. When we dump waste and poisons into the creeks it isn't magically washed away. We may not even be able to see the damage it is causing because we have worked so hard to hide our water. It remains though; in the creek beds where it slowly seeps into our aquifer; in the animals that drink the tainted water; and there is no true way to cleanse the waters after the fact. The pollutants are swept away downstream and they become another city's problem, another ecosystem's collapse.

It is time to stop the ignorance, time to take responsibility for our waters and the very life of our valley and beyond. None of these waters are lost. The lifeblood of this valley is merely dormant, hidden beneath our feet but still very real and beautiful. We can revitalize and rehabilitate the valley restoring beauty, health, and balance to our ecosystem.

WHO WE ARE

The Urban Ecology major at the University of Utah enables students to explore the built and natural environments--to be critical observers of the health of our valley, the integrity of our systems, and the potential that our places have. In examining the Wasatch Valley, our oasis in the desert, the hydrology of this place plays a much bigger role than the majority realizes. The water should be celebrated rather than taken for granted, and should be showcased rather than hidden. The journey the water takes from the canyons to the Jordan River should unify the adjacent places; the water should be allowed to prosper.

In the Spring of 2014, the Urban Ecology and Planning Workshop class in the University of Utah department of City and Metropolitan Planning taught by Stephen Goldsmith shared a vision of a replenished Wasatch Valley. The class divided into three groups, each covering one of the three spheres of our society: social, economic, and environmental. The work that we began doing as a class became the work of an organization, the Seven Canyons Trust. This organization is founded on our vision of an enhanced quality of life and an ecologically restored valley. The Trust's mission is stated as follows,

"To uncover the water that once flowed freely from City, Red Butte, Parley's, Emigration, Mill, Little Cottonwood, and Big Cottonwood Creeks: restoring health, beauty, connection, and kinship between the seven creeks, their communities, and the natural environment."

In determining what we wanted our work and our organization to reflect, the group came up with a set of values that we felt represented the course of action we wanted to undertake. The Trust's operations will be carried out with these seven core values ever at heart: transparency, effort, accountability, cooperation, sustainability, diversity, and respect. Our status as a non-profit organization allows us to continue the work we began and to really make a difference in this valley we call home. Our work has inspired a portion of the class to continue on with the project, directing the Seven Canyons Trust in its infancy. The 100 year plan is only the beginning--our work as a society will continue long after. Daylighting the creeks is the initial step toward the revitalized valley our workshop and organization seek.





ORIGINS OF WATER

Here in the Wasatch Front Region we live among deserts, yet we use water as if it will always be available. Because it flows freely through our homes, it keeps our lawns green, it fills our community swimming pools, etc. suggests that the water is also easily accessible. We live next to the Great Salt Lake, one of the largest inland lakes in the world, and we have access to water for recreation known as “The Greatest Snow on Earth®”. However, what we tend to forget is that these mountains store the main source of our usable water, enabling us to live here. Our most personal relation to water and understanding its finite properties is when we are faced with an increase or change in water utility prices. Outside of the United States, usable water is not so easily distributed to people and many must go to great lengths to access only a limited amount of water; a reality that we could face here as well, considering the contemporary discussions on global climate change. Therefore, we must reevaluate our relationship with water.

Our water is connected to all natural things. It flows through the spiritual and physical lives of people everywhere. Water is a primal element that humans used in their earliest rituals, a symbol of renewal and atonement (Blackmore, 2012). Water manifests itself biologically if you consider the makeup of our bodies being 50-75% water. We have searched the stars for signs of water in our quest for survival and other biological life. Geologically, the history of our water-carved mountains and desert canyons is studied in the science of geomorphology.

Although 370 quintillion gallons of water exist on the planet, less than 1% is obtainable fresh water. One billion people have no access to clean water, four billion are without an adequate water supply, and every day four-thousand people die from contaminated water (Blackmore, 2012). Access to water must be a universally recognized human right because of growing pressures of rising populations, and global instability. Here along the Wasatch Front we need to realize the importance of the sources of our water.

The Wasatch Front watershed is an area of elevated land up to 11,500 feet above sea level that stores and supplies water to our streams, rivers, lakes, ponds, wetlands, and other bodies of water (Western Watersheds Project). With the help of gravity, precipitation from rain and snowmelt flows downhill to smaller drainages such as small streams and creeks. In the arid West, these drainages are especially small and may cover thousands of acres, yet collect far less water than those in the East (Western Watersheds Project). The Wasatch Front’s seven canyon creeks

HOW MUCH WATER DO YOU REALLY NEED?



Australian artist Paul Blackmore’s sculpture titled “How Much Water Do You Really Need?” demonstrates that the average person needs one-half to three-quarters of a gallon of water each day for hydration. Water for cooking, water for sanitation, and water for basic survival raise an average person’s water use to three gallons per day. In comparison, the average American uses 100 gallons of water daily, and the average Utahan uses 260 gallons daily under the condition that Utah is the second driest state in this nation next to Nevada.

that feed into the Jordan River are City Creek, Red Butte Creek, Emigration Creek, Parleys Creek, Mill Creek, Big Cottonwood Creek, and Little Cottonwood Creek. When these drainages are blocked by development they become less capable of supplying water. Watershed contamination will affect every area that the contaminated water flows through, ultimately ending up in our municipal water supply. According to Salt Lake City's Department of Public Utilities Water Resources Manager, Laura Briefer, the Wasatch Mountains provide 60% of water supply to approximately 500,000 people in the Salt Lake City service area. Our watershed land ownership is distributed with 62% to the United States Forestry Service, 19% to Salt Lake City, and 19% for private use. Briefer predicts a water supply crisis by the year 2025 for multiple regions in the west to include the Salt Lake Valley, and she believes that by 2030 we will need to be purchasing our water from outside sources in the form of spot water purchases. We can mitigate the impact with investment in water conservation, land use planning, partnership building, greater accessibility, and exchange agreements as well as implementing the 100-year plan to daylight our seven canyon creeks with the Seven Canyons Trust.

100 YEAR EVENTS

A 100 year flood has a one percent chance of happening any given year. Educating ourselves about the 100-year events that take place along these water ways will allow us to implement a plan to mitigate the flooding impact and will prepare us for these events. The flooding events that occurred in 1983 and 1907 serve as a powerful reminder that we must be prepared.

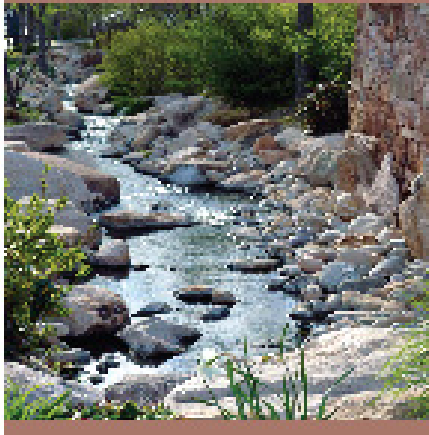
By protecting floodplains throughout the city, and discouraging development within the floodplains we can prepare for these 100-year floods. With facilities such as parks and trails that are compatible with periodic flooding the floodwater will be able to flow freely through these facilities.





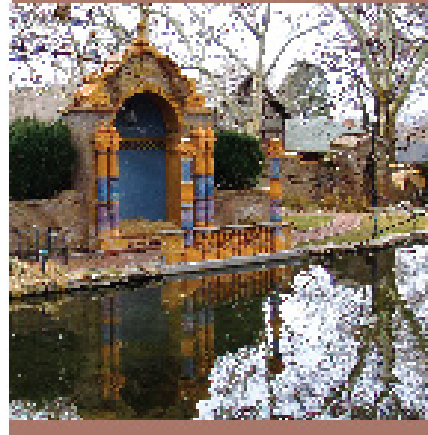
CREEK PROFILES

CITY CREEK



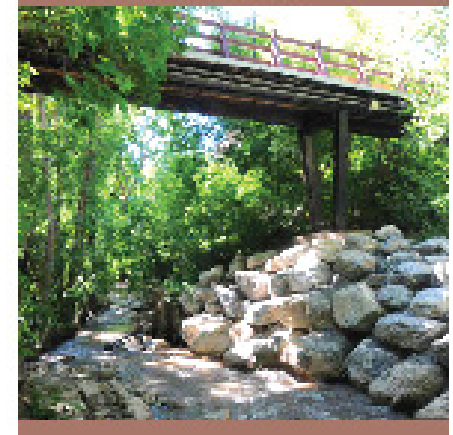
City Creek is often seen as the most austere and serene creek in the valley. It flows from just east of the capitol, leisurely winding its way down the hill, quietly flowing from Memory Grove until it is channeled beneath North Temple. Oddly enough, the City Creek shopping center draws its waters from Red Butte Creek and not from the much closer City Creek. City Creek has a very long history of being modified to suit human's purposes. It was first diverted in 1866 to act as a fire protection system for the city, and has not been left untouched since then. Unfortunately, reckless and excessive use led to extreme damage and pollution, forcing the canyon to be closed from 1952 to 1966. Poor management of City Creek's water also had an even more obvious effect on the city. In 1983 there was record water flow, and due to careless planning City Creek flooded and had to be diverted onto State Street. Seeing kayakers and trout moving down a major thoroughfare in the heart of the city led to demands for better management of the water, and the unfortunate solution was to bury the creek.

RED BUTTE CREEK



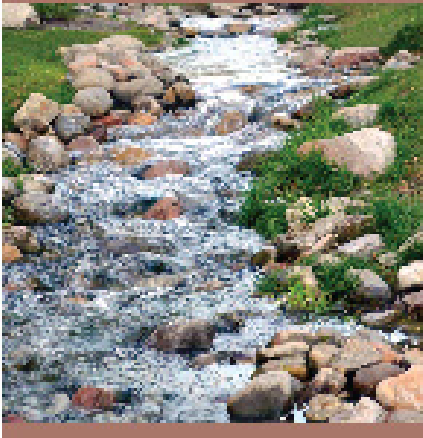
One of the most well known creeks in our valley, Red Butte is used for almost every major water feature across the valley. The waters of Sugar House, Liberty Park, and even the City Creek development in downtown Salt Lake all come from Red Butte. These waters also create the beautiful landscapes of Red Butte Garden; sustaining the native flora and fauna, and serving as a beautiful backdrop for Red Butte concerts. Red Butte Canyon was a major resource for the Mormon Pioneers, used both irrigation and as a sandstone quarry. Many of the buildings made of its sandstone can still be seen today, a constant reminder of the history of our valley. It was not long before the creek was repurposed as a water supply for the United States military, which in fact served to protect the creek and there have been increased preservation efforts for the water even since it was acquired by the military. However, in 1930 Dr. Walter Cottam of the University of Utah began using land around the creek for his botany research; the area became a State Arboretum. It remained an arboretum until 1983 when Ezekiel R. Dumke Jr. and Richard Hildreth raised the funds to turn the area into what we now know as the Red Butte Gardens.

EMIGRATION CREEK



The first canyon the Mormon pioneers ventured through on their way west was Emigration Canyon. These were the first waters of the valley they tasted, and the canyon and its creek have continued to attract visitors and residents for over a century. This is one of the smaller creeks, and perhaps even the most hidden because its waters barely exit the mouth of the canyon before they are forced underground. After being the entryway into the valley for the Mormon Pioneers, Emigration Canyon became a major center of industry for the valley. The Emigration Canyon Railroad consistently carried sandstone into the valley until 1908 when concrete demand overtook the traditional sandstone construction style. The waters themselves were used by Utah's first commercial brewery: Wagener's Brewery. The brewery opened in 1864 at the mouth of Emigration Canyon and used the creek as the basis for all of its brews. It later burned down in 1913 and was replaced by the Hogle Zoo in 1931. While the water is almost immediately buried when it exits the canyon it can still be seen and enjoyed in Sugarhouse Park.

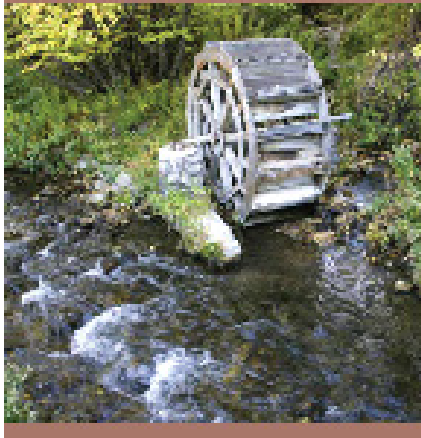
PARLEY'S CREEK



Named after its explorer, Parley P. Pratt, Parley's Creek is rarely even noticed by commuters or tourists that travel alongside it as they journey between Salt Lake and Park City. It has been sidelined by the highway that runs along and sometimes above it, appearing above ground briefly in the dog park just beyond the mouth of the canyon.

While Emigration was the original entryway into the valley Parley's would become the eastern gateway into the valley for those who followed after. Had it not been for Parley P. Pratt it could very well have been called Millcreek because it had over 20 mills along its banks, all powered by the creek. A road was built in the canyon that allowed more and more families easy passage into the valley and was quickly filled with churches, schools, inns, and ranches. Parley's is also one of the better protected creeks, partially because its water is primarily for culinary uses.

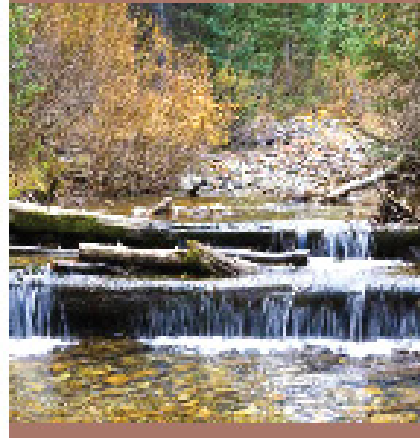
MILL CREEK



Millcreek is one of the most popular and accessible canyons along the Wasatch Mountains. It houses dozens of picnic sites and hiking trails, all carefully maintained and curated. It maintains a semblance of wilderness, though few visitors truly experience the authentic nature because so much of the wilderness has been modified to suit humans.

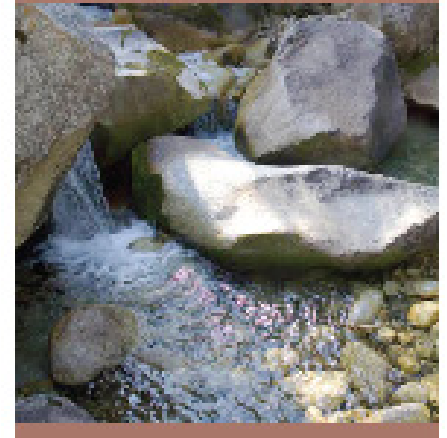
Millcreek is one of the few creeks that remain mostly above ground before reaching the Jordan River. Most of its underground diversions are done to allow roads to pass over the water. Much of its path is through private property and neighborhoods, and, unsurprisingly, is one of the healthiest and most popular creeks in the valley. Unfortunately many property owners seek to separate themselves from the creek by building fences and walls, limiting or completely preventing people from celebrating and enjoying the waters. Regardless, it still serves as an example of the major ecological improvements that can be made by bringing a creek above ground.

DIG COTTONWOOD CREEK



Historically, Big Cottonwood Creek is one of the most important creeks for our valley. Using its water, the Stairs Hydro-Electric Power Plant powered 147 miles of trolley lines that ran throughout Salt Lake City. Trolley cars ferried passengers to nearly any location in Salt Lake, and it was all accomplished cleanly and without the use of coal power plants. Even as far back as the late 1800s we were generating clean electricity and supporting efficient transportation infrastructure, simply through the effective use of our natural resources. Every landowner along the creek would have access to an irrigation channel that could be opened and closed by small water gates. The Salt Lake Water Master was given authority to grant water turns to residents, giving them set amounts of time they could keep their gates closed to irrigate their land before they would have to open their gate and let the next person use the water. It was also the residents' duty to clean and maintain the creek and irrigation canals; they all needed the water, some had their livelihoods depend on it, so they took great care and respected the creek, which is largely forgotten now.

LITTLE COTTONWOOD CREEK



Much like Big Cottonwood and Emigration, Little Cottonwood Creek was a major part of Utah's industries for over a century. From power plants, to ore smelters, and even laundry facilities, Little Cottonwood Creek was vital for the function of dozens of companies. The Murray Steam Laundry company relied on the water to clean up to 150,000 pieces of laundry every week. The creek and artesian wells in the area fed its water tower, keeping it constantly topped up at 240,000 gallons of water.

Sadly, many places where the creek could easily be accessed by foot access is restricted, even on empty lots. Its current path is purely designed by concerns over flooding: stretches of concrete canals with absolutely no cultural amenities possibility for public enjoyment. We have a ignorant and utilitarian relationship with this creek that could so easily be fixed, changing the entire feel and dynamic of the creek for the better.



THIS IS THE PLACE

Here in the Salt Lake Valley, we have strong roots to our culture, history and legacy. The founding of Utah, our oasis on the edge of the desert, was made possible because of our proximity to the snow-catching Central Wasatch Mountains. Utah is the place. The place where the East finally met the West with the completion of the Transcontinental Railroad. Utah is the place where a persecuted group of people sought to build a life based on family, community, and sustainability. The place where native tribes have called home for countless generations. Utah is the place where, years ago, people recreated in the water of the Great Salt Lake at the Saltair and celebrated the natural resources that we have. Throughout history, the reverence and use of water has been both cultural and spiritual. Water is the lifeblood of all places. Water transcends social and cultural barriers connecting generation after generation to the land. Unfortunately, we have blocked the natural flow of water from the seven canyon creeks and many of these social, spiritual and environmental benefits have been lost.

Put simply, the water we consume is hidden from us, but we are a part of the landscape; we are not outside of it. Our bodies need water to live, like we need physical movement; it flows through our bodies and maintains our hydration and overall function. Even as we stand alongside moving water our bodies have a physiological response to it. Our breathing connects with the flow of the water, our heartbeat slows into a rhythm similar to that of the adjacent body of water and we can feel it; the connection is instinctual and biological.

Nevertheless, through technological feats we chose to reroute the water, pipe it in some places and canalize it in others, all causing interruptions to the system as a whole. The entire hydrological system is disconnected from how we use it, causing many of us to assume it will always be available and there will always be enough.

We can look at it like the blood flow in the human body. We see systemic problems when arteries become blocked or plaque begins to build up. Surgeons have come up with symptomatic repairs like stents to increase the flow of blood. We can attempt to do that with our water, but the most effective approach is allowing the water to flow and meander along day-lit corridors. Letting the water travel how it pleases will improve the health of the soils and riparian life, which require clean water to function and thrive. The seven canyon creeks are our lifelines and if we become more conscious of our water, we will consume water differently.

The emerging awareness around the fragility of our water is important. We believe we have wronged the ecology of many ecotones (the place where two ecosystems meet and are in tension and resolve) in the Valley. If we continue to evade

addressing the health of the hydrology we will see drastic changes in the price of water, the price of food, an increase in droughts, less water pressure in our pipes and the water tiers through public utilities will increase. We must restore the water to its creek beds in order to sustain life.

With the growing population and shift in demographics, there is a need to connect socially and physically, as well as increase safety and connectivity across the valley. Our freeways, roads, and highways divide and fragment our social and community units. Interstate-15 splits the valley down the middle, creating an east and west divide, the haves and the have-nots. We must make it a priority to provide all inhabitants of the Salt Lake Valley with equal opportunities.

Building on Utah's strengths of outdoor recreation, education, family values, and our place as the Crossroads of the West we can enhance the lives of all those who interact in the Wasatch Front Region through the Seven Canyons Trust. One particular group that would benefit from the restorative process of daylighting the seven canyon creeks is the children. Those who are now growing up in the 21st century spend an increasing amount of time indoors disconnected from the natural environment. Many children are entertained by sitting in front of the TV, playing video games and being on their computer or phone because parents are afraid of what is outside and many natural areas have restricted access. Young children need to connect with the natural world and engage with their surroundings. We have seen an increase in childhood and adolescent attention disorders and even depression. Richard Louv, an American author and journalist, coined the term Nature Deficit Disorder to help explain what we have observed in our children. Despite having many national and state parks and private recreation facilities, even Utah children and adolescents suffer from Nature Deficit Disorder. Bringing public access to natural settings in many people's backyards will assist in promoting a lifestyle that embraces Utah's unique landscape and natural resources. This is both a social and ecological vision. The Seven Canyons Trust plan is our vision of how we can repair these places to be an urban wild, a migratory path for birds, an improvement to the quality of air, and an ethical ode to the planet and hydrology of the region.



We can utilize water, the blood of the valley, as the fluid that connects us. The more open and transparent our systems can become, we, as a multicultural valley, can connect with one another through the fluidity of the water. As a community we make choices of how we alter our landscape to fit our needs. Utah will be the place where all individuals have access to safe, healing green spaces despite where they reside along the Wasatch Range. The restorative urbanism of daylighting the seven canyon creeks will put Salt Lake City on the forefront of global sustainability efforts and an example of best practices for improving the hydrological cycle, the connectivity of the community and improving the quality of air, in addition to improving the quality of life and continuing the cultural legacy. The Seven Canyons Trust believes in social equity and the celebration of all culture as we move forward in Utah's historical tradition of the Crossroads of the West.



WALKABILITY AND PUBLIC HEALTH

QUALITY OF LIFE

Daylighting the seven canyon creeks will improve the quality of life for people by enabling them to engage in healthy outdoor activities by walking, biking and running. The dynamic interaction between daily exercise, breathing clean air, and green space is truly important within a community. As more and more pedestrians occupy spaces within the city, it is essential to improve the pedestrian environment so they will have less pollution, more green spaces, and cleaner air. Humans also need to walk for a healthy body; “the moment we stop walking, we will start dying” (Smith, 2014). Good walkability within an area will contribute towards an active and healthy lifestyle. Better walkability also increases the quality of life for people who simply walk for pleasure.

REPLACING MOTORIZED TRIPS WITH WALKING

Walking as a means of commuting is considered a moderate physical activity, suitable for achieving recommended activity levels to benefit one’s health. The World Health Organization (WHO) in the Global Strategy On Diet, Physical Activity, and Health, from 2004 concluded that at least 150 minutes of moderate – intensity aerobic physical activity undertaken throughout the week is sufficient in adults aged 18 – 65 years. Trips made by car or motorcycle, which took around five minutes, could have been made on foot in thirty minutes or less (Olabarria, Perez, and Novoa, 2012).

This study was performed in high-density urban zones, where 95% of the population is concentrated in 300 villages with range of 2000 to 1.5 million inhabitants. Some of the results from this study include:

50% of men and women who travel on a working day in Catalonia do not make any of the journeys on foot

Only 22.7% of men and 32.2% of women above 17 years of age achieve recommended levels of physical activities through walking (Olabarria, Perez, and

Novoa). These statistics indicate how only a small percentage of the population walk at a sufficient and healthy level. Their findings also reinforce the potential of walking for transportation as a good source for one’s physical activity and reveal the huge economic benefits that could be gained through improving design, architecture and functionality for the pedestrian experience. As an urban planner, a vision of the future is to have cities with efficient and thorough walkability throughout the urban area. This is a sustainable move forward as it will increase the number of active people, reduce carbon emissions, and establish a green and clean urban community.



POTENTIAL FOR PUBLIC WORKS PROJECTS

Utah has a strong tradition of public works projects. During the Great Depression nearly every county of Utah benefited from President Franklin Delano Roosevelt's New Deal program the Civilian Conservation Corps, CCC. The history of the CCC's works are still present today and have given citizens greater access and enjoyment of nature. The CCC projects provided several thousand young individuals the opportunity to gain employment, education and foster a strong stewardship of the land. Although the CCC is no longer in existence, its traditions are carried on by many programs. Americorps provides grant opportunities for public works projects that include payment for workers, along with educational stipends. By accessing this resource we can provide many people with the opportunity of education, employment and gaining a stronger connection with Utah that can last generations.

No country, however rich, can afford the waste of its human resources. Demoralization caused by vast unemployment is our greatest extravagance. Morally, it is the greatest menace to our social order.
--Franklin Delano Roosevelt

As populations of the Wasatch Region grow its important that we do what we can now to address disenfranchised populations and social inequalities. If we strive to provide as many opportunities as a community to these populations we can strengthen the social ties across the Wasatch and create a stronger future that can continue to grow in diversity and retain those social values that make Utah a welcoming community oriented place. When we look at homeless youth in Salt Lake City alone we can estimate that there are over 1300 hundred individuals with something unique to contribute to society. Homeless populations are unfortunately a strain on the economy, these individuals usually experience and interruption in schooling and frequently access healthcare services and correctional facilities. Through opportunities we hope to provide at the Seven Canyons Trust we can work to give these youth populations the ability to make the most out of life and have opportunities that most youth have. We can provide jobs that enrich these individuals love of Utah as well as potential scholarships through Americorps and other grants opportunities.

One of Utah's strengths is our highly educated workforce. Although this is true we have nearly 31000 unemployed college educated individuals and this figure does not include those educated individuals who are working outside of their skills and specialties. These same opportunities can be translated to our recent college graduates giving them the opportunity to strengthen their skills will addressing financial obligations with the same grant opportunities.

For Utah to continue in the tradition of public works and utilizing humans as the greatest resource, we can create a lasting positive change by preserving and enhancing the health of the valley. Through the works of the Seven Canyons Trust we can build on the strengths of Utah's highly educated workforce to enhance Utah's recreational economy, health and unity of our citizens and quality of life for future generations as we engage in the global movement of restorative urbanism. Correcting mistakes of the past, we can grow as a regional community enhancing the lives of everyone residing and visiting the valley.

Currently, numerous groups are taking the responsibility of protecting and restoring the beautiful and unique landscape of Utah. These individuals and organizations are dedicating themselves to a seemingly uphill battle. Most of these efforts are unknown to residences of the Wasatch Valley. By supporting and creating restorative change in our urban spaces we, at the Seven Canyons Trust, believe that more citizens will understand and enjoy the benefits of green spaces as citizens did at the height of the CCC and their contribution to the National Park System. Fostering this love of place at the state and local level will help Utah move forward in efforts of preserving and restoring our unique landscape. Creating beautiful places across the State of Utah will help bring the benefits of recreational tourism to the citizens across the valley and not just on federal land. If we take action to be a leader in restorative urbanism, we can become a national and global example of how citizens can work together to enhance social equity by providing green corridors that transcend socioeconomic boundaries and opportunities for the underemployed and providing more opportunities for education. We can improve the health of the land and the residents of the Wasatch Region. Public works projects will provide job opportunities across the valley in many different fields from volunteers, scientists, environmentalists, corporate partnerships and anyone invested in the future of our valley. Through such a large-scale, long-term development project we will continue the strong legacy of public works projects and foster a new love for the state of Utah across generations carrying on the works of Roosevelt's new deal.



“Life is best enjoyed when time periods are evenly divided between labor, sleep and recreation...all people should spend one-third of their time in recreation which is rebuilding, voluntary activity, never idleness.”

-Brigham Young

ECOLOGY

FLORA AND FAUNA

The riparian corridor provided by the daylighting of the seven creeks would offer hundreds of different species of both flora and fauna critical habitat within the urbanized city. These corridors are essential to the survival of these species, as 80% of these species require riparian habitat for part of their life cycle. The importance of this habitat is further enhanced with the Great Salt Lake and Jordan River corridor nearby. This habitat of hemisphere significance provides 75% of Utah's migratory bird population the necessary area to rest, stage, and nest.

The moisture and nutrients accumulated by the seven creeks can help support multiple layers of dense vegetation. This vegetation in turn provides habitat and nutrients to the primary consumers, the plant-eating species. Continuing the cycle, the secondary consumers feed off the primary consumers. The riparian habitat provided by the daylighting of the seven creeks will provide the necessary habitat for this cycle to persist and flourish.

The riparian corridor provides inadvertent benefits as well. The tall vegetation creates a canopy that helps to shade the water and, thus, regulate the temperature. This canopy helps insulate the creeks from potentially harmful solar radiation that can reduce the oxygen-carrying capacity of the water negatively affecting fish and aquatic insects. Due to the longitudinal nature of the riparian corridors they also provide a connection between mountains and valley. These natural travel routes provide essential connections for species that travel between habitats in the uplands and the lowlands.

Invasive species are a threat to the riparian corridor. These species brought in to the corridor from outside sources, crowd out native species due to their lack of limiting factors. They outcompete the native species and eventually dominate these corridors if left unchecked. These invasive species, although can provide some of the benefits to the fauna of the area, cannot compare to the benefits to habitat and nutrition that the native species can provide.

SURVEY OF CORRIDOR SPECIES:

Gambel's Oak (*Quercus gambelii*) acorns take a year to mature. Being rich in carbohydrates, fats and proteins, they are on top of the wildlife food list. Tuber-like roots called lignotubers cause the deciduous



Gambel's oak to form dense thickets. This unique feature is embedded in the trunk beneath the bark and just below the soil. A swollen lignotuber houses hundreds of buds ready to transform into leafy sprouts. Underground stems called rhizomes also bear dormant buds ready to sprout after fires or heavy browsing by wildlife.



Fremont's Cottonwoods (*Populus fremontii*) are propagated by flooding of creeks or rivers. It requires wet soil and is an indicator of permanent water and shade. This cottonwood species is extremely fast growing and has been known to grow 30 feet in one year, reaching an ultimate height of up to 90 feet. Indigenous people were known to use the inner bark of this cottonwood species as treatment for vitamin C deficiency. It also could be used to make poultices to reduce inflammation or treat wounds. Twigs from the tree were used in basket weaving, tool making, and musical instruments.

American Beaver (*Castor Canadensis*) are graceful swimmers in the water, beavers can be extremely clumsy on land. Their tails can be used as both a means for locomotion and safety. If a beaver feels threatened, they will often slap their tail against the water to warn both the predator and to alert fellow colony members. Beaver dens create wetlands that provide crucial habitat for a variety of fish,

small mammals, big game, waterfowl, and other birds. These dams also slow the erosion of the riverbanks as human encroachment has channelized and, therefore, sped up the creeks. Plants also benefit from these wetlands, especially native tree species, such as cottonwood, which requires flooding to germinate its seeds. These flood lands can also help filter out anthropogenic pollutants, as water is trapped in these wetland-like areas it is able to filter through the soil and recharge aquifers. They can also slow down the actual river filtering pollutants, recharging aquifers, and slowing down riverbank erosion.

Stellar's Jay (*Cyanocitta stelleri*) creates nests of tiny sticks cemented together by mud. These nests can reach up to 30 feet in some cases, almost as high as a three-story building. These birds cache food in their crops, a small sac in their throat where food is stored for digestion, before flying away to their nests. They will also store nuts in the ground to eat during the winter. The buried treasure is marked with a leaf or other material. However, they often forget where the treasure is buried, which allows the acorns, like on the Gambel's oak, to germinate.

The Bonneville Cutthroat trout (*Oncorhynchus clarki utah*) was thought to be extinct due to extreme over fishing, logging, and many other factors. This trout is also forced to compete with non-native fish species in many areas where creeks were stocked with these fish. This leaves the fish extremely vulnerable to predation, hybridization,



and competing with these non-native fish that lack the limiting factors of the cutthroat and, therefore, are able to survive in large numbers and crowd out the cutthroat. The Bonneville Cutthroat trout is the state fish of Utah, taking the place of the rainbow trout in 1997. It was an important food source for the Mormon pioneers and for all those who inhabited this area before the pioneers.



Russian olive (*Elaeagnus angustifolia*) is an invasive species plaguing these riparian corridors. It can fix nitrogen in its roots, which enables it to grow on bare mineral substrates. This means that the Russian olive can grow in any soil conditions with little to no moisture. It matures extremely fast and has low seedling mortality rates which means that it can crowd out and overstory important riparian species, like Fremont's cottonwood. The Russian olive must be cut down, cut into wood chips, and the stump treated with herbicide in order to eradicate it.

Tamarisk (*tamarix ramosissima*) has become a major invasive plant species in riparian habitats. It consumes large amounts of groundwater due to the density at which its stands grow. This means that tamarisk takes precious water away from the native species that depend on this water to survive, especially in the Great Basin Desert ecosystem in Salt Lake City. A combination of methods can be used to eradicate tamarisk, stem cutting followed with herbicide application and burning stands with herbicide to prevent new shoots.

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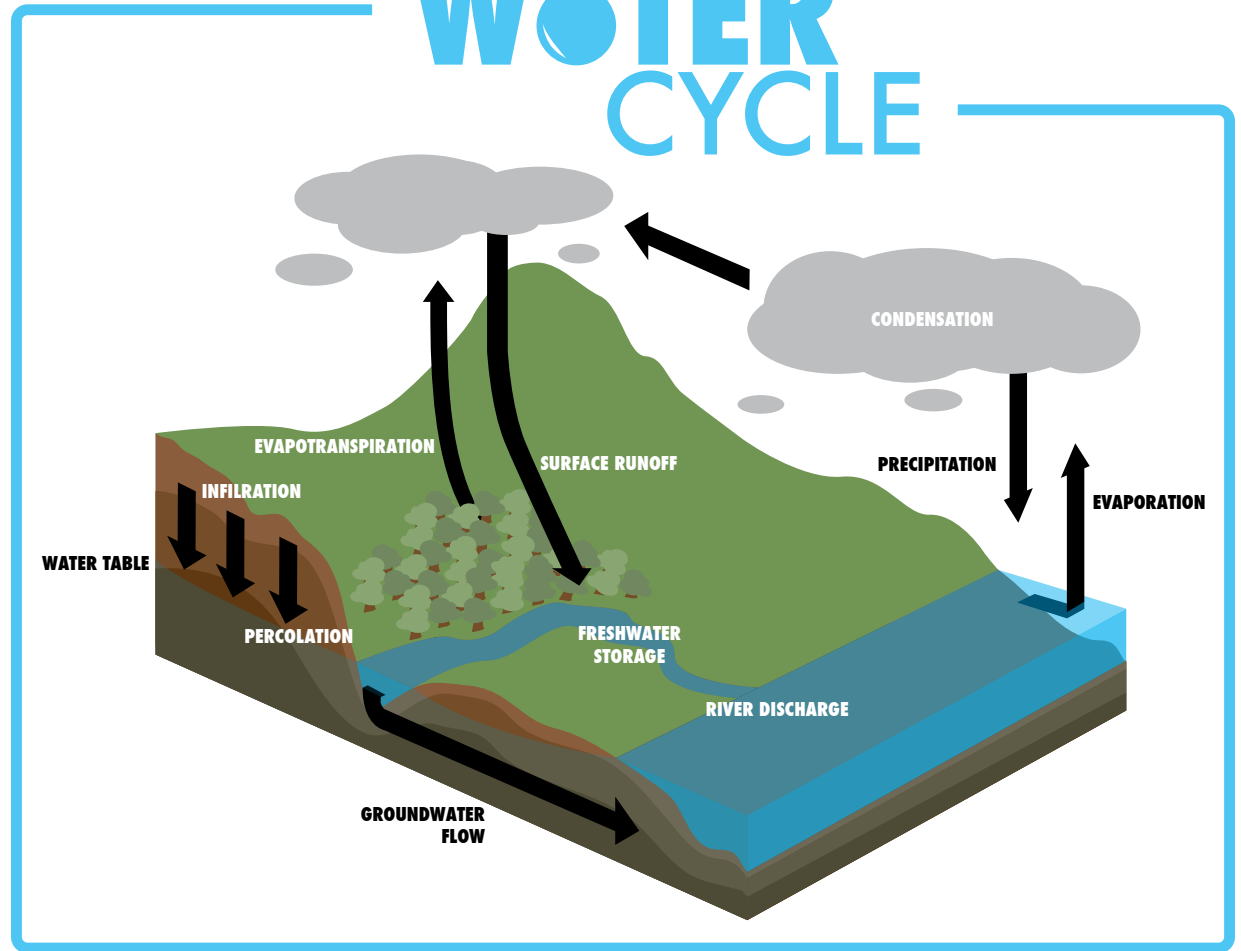


ANNUAL CREEK FLOW

Utah's climate is unique, to say the least. As is Utah's access to clean water. About ninety six percent of the earth's water is salt and almost seventy percent of fresh water is within glaciers. The fact that we can have such purity, right below us, is a true treasure. Water itself is always moving, and through the water cycle it migrates through numerous phases. One drop can travel all over the world and be utilized by all sorts of organisms.

Creeks that are underground aren't allowed to take part in the water cycle. They aren't able to properly evaporate, precipitate or condensate; taking away that much more from a process that aids in ecosystems' survival. Through this cycle, water can filter toxins, nourish life, and cool surrounding temperatures. Our entire valley utilizes these seven creeks, whether that is for drinking or irrigation, and they all connect in one way or another. What spills into one creek can very well taint another downstream. All aspects of the cycle are vital to water quality and, in turn, our quality of life.

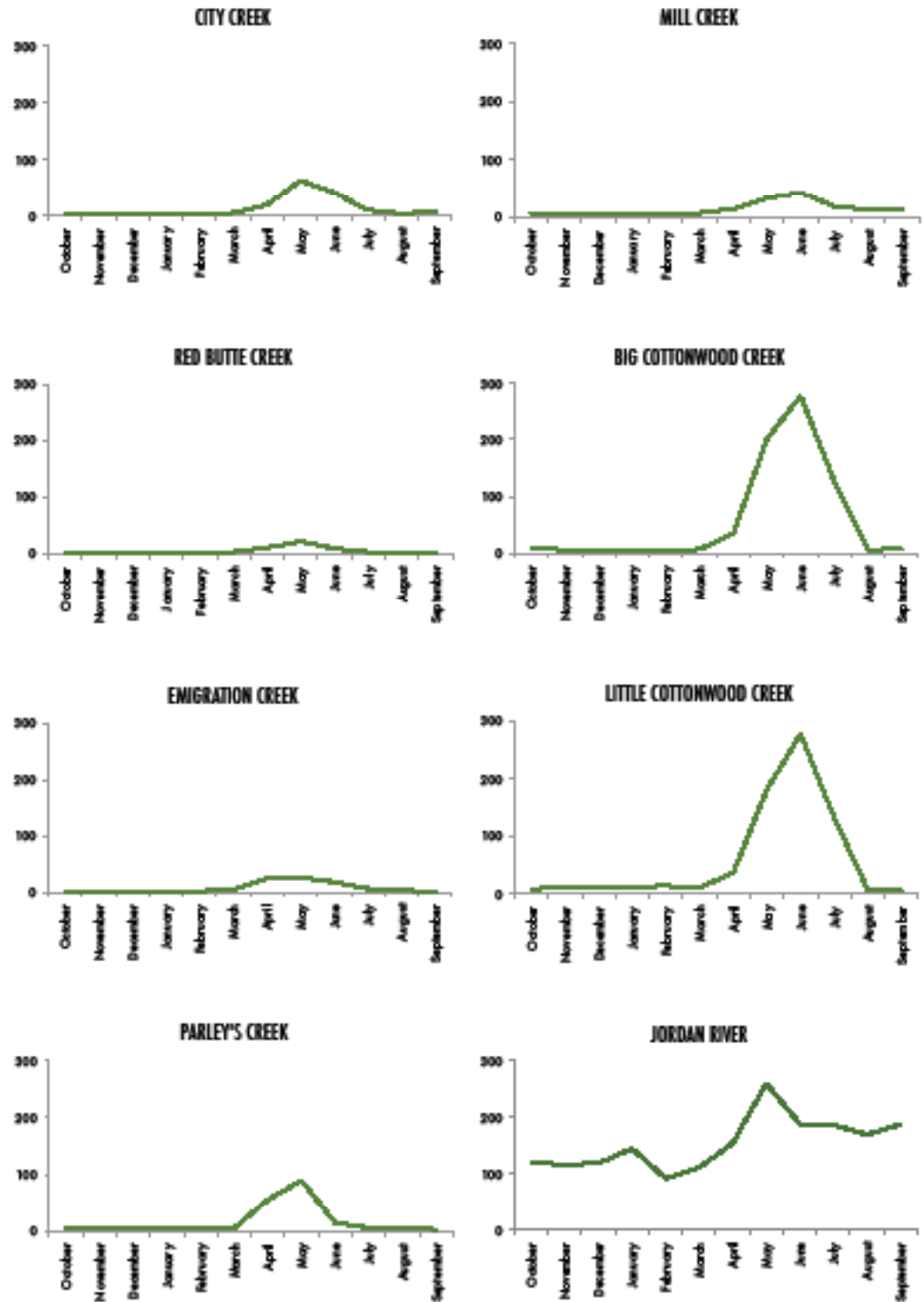
THE WATER CYCLE



THE GREATEST SNOW ON EARTH

Utah, known for its light, cloud-like snow, has the perfect concoction of consistency and abundance to make the stake of the "greatest snow on Earth." This tourist driven industry, along with the red rock canyons of Southern Utah, have made a name for Utah throughout the country's eco-tourism industry. However, more important than the ski industry, is the subsequent snowmelt in the spring that feeds the rapidly growing population of the Wasatch Front, almost 2.5 million and growing. This vital drinking water supply from each of the seven canyon creeks provides not only homo sapiens with clean drinking water but all the other species that inhabit this oasis on the edge of the desert, the cottonwoods and coyotes alike. Putting these creeks in culverts underground has cause

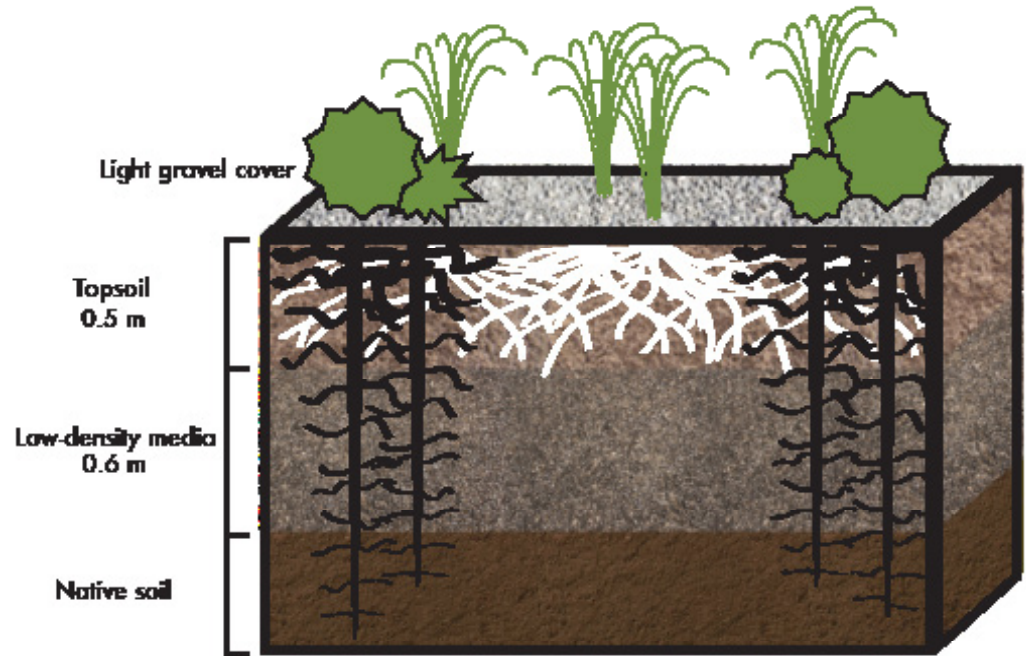
a sense of neglect that does not reflect the importance of these creeks to the past, present, and future of the Bonneville Basin hydrology. Within culverts, this snowmelt is not able to provide many of the ecosystem services that are vital to the sustainability of the ecosystems in the valley. Within culverts, this snowmelt cannot quench the growing population of humans, a new 1.4 million people over the next 30 years. Underground, these streams are crippled, forced into the fast-paced, singular use culture. As anthropogenic climate change begins to heat the southwest, snowpack levels will be dramatically reduced. Reports say that Park City ecosystem will be the same as Salt Lake City's in 100 years. This will have huge effect on the important ecosystem services that the seven canyon creeks provide. As snow melts early, streams are more likely to dry up in the scorching mid-summer heat of the Great Basin desert. With stream levels that are already low in some areas, this will not bode well for Bonneville cutthroat trout that use these streams as routes from the Wasatch Mountains all the way to the Jordan River, nor the shady, native cottonwoods that require a damp soil in order to germinate along the floodplains of the streams. This will cause hardship for the hundreds of species that depend on the river for habitat, water, and nutrient in all forms.



NOTE: Flow rates are in cubic feet per second.

FLOOD MITIGATION

In Salt Lake City, we use surface water for drinking, irrigation, industrial use, and to generate power. It is important that we respect the hydrologic cycle by reducing our impact from urban storm runoff. During storm events, water travels over impermeable surfaces such as roofs, parking lots, streets collecting pollutants, and sediments that can cause irreparable damage to the hydrology of the Wasatch Front. By reducing the amount of runoff and treating storm water on site we are able to achieve four broad resource protection goals. These include flood control, channel protection, ground water recharge, and pollutant removal (EPA). The methods for protecting these resources include the reduction of runoff through rain catchment and green rooftops. The methods for treating storm water on site include the use of permeable pavement and different forms of bio-retention such as bio-swales, rain gardens, and infiltration islands.



The most effective method of preventing untreated urban runoff from entering our streams is to reduce the overall amount of runoff. This can be accomplished through a rain catchment system or a green rooftop. Rain water catchment systems collect storm water from rooftops and store the water for irrigation. Collecting water on site reduces the amount of runoff and reduces the amount of water necessary for irrigation. This is especially important in Northern Utah where over half of the water used within major urban areas is for irrigation and landscaping (Houdeshel). Another viable option for reducing runoff is green rooftops. Amongst many other environmental and aesthetic benefits, green rooftops reduce peak flow runoff during storm events. To see the benefits of green roof tops one has to look no further than the Church of Latter Day Saints Conference Center. This building holds 21,000 people and 1,400 cars underneath the green roof. The conference center utilizes all native plants and won the 2003 Green Roofs for Healthy Cities Award of Excellence in the New Combination category (Greenroofs.com).

Collecting all runoff is not a possibility; however, there are methods of treating urban runoff on site allowing water to reenter the hydrologic cycle. The reduction of impermeable materials allows water to filter back into the groundwater. Where pavement is required, permeable pavement should be considered. Permeable pavement is a material that allows storm water to flow through the negative space inside of the pavement and filter into the groundwater. When installed correctly, permeable pavement has the ability to reduce the total suspended solids (Design Trust). The only limitation of permeable pavement along the Wasatch Front is its use where salt or sand is used for snow maintenance. Using bio-retention methods when impermeable

materials are required in places such as parking lots or roadways will assist in the reintroduction of urban runoff back into the hydrologic cycle. Bio-retention can reduce total suspended solids (TSS) by up to 85% (Houdeshel). The methods of bio-retention that would be most effective for the Wasatch Front include bio swales, rainwater gardens, and infiltration islands. Each of these methods works similarly by collecting runoff in areas that then utilizes soils and plants to remove pollutants from storm water runoff. The surface area of the bio-retention area must be at least 7% of the size of the area that it collects water from. The coupling of different plants in a bio-retention area allows plants to benefit from one another while remaining drought tolerant, assisting in flood control, preventing erosion, and removing pollutants. Some of the native plants that can survive in the xeric climate of Utah that go well together include shrubs, bunchgrasses, trees, and perennial flowering forbs (Houdeshel). The right combination of gravel, topsoil, low density media, and native plants will be the most effective tool we have for treating urban runoff.

POLLUTANT TABLE

POLLUTANT	CAUSES	IMPERATIVE
Dissolved Oxygen	Clearing of land, Destruction of Riparian Zones	A small change in dissolved oxygen concentration can affect the composition of aquatic communities.
Nitrogen	Fertilizers, Livestock Manure, Malfunctioning septic systems, Discharge from sewage facilities, Acid precipitation	Heavy plant growth. Eutrophication
Phosphorous	Logging, Building activities, Overgrazing in riparian zone, Removal of riparian vegetation, Runoff from fertilizers, Poorly functioning septic tanks, Waste management treatment plants.	Causes excess plant growth. Eutrophication
Turbidity	Road building, Overgrazing, Development, Deepening or dredging channels	Suspended solids prevent sunlight from reaching aquatic plants. May reduce the amount of dissolved oxygen in the water. Makes it hard for fish to see their prey. Covers and harms bottom-dwelling plants, animals, and spawning beds.
PH	Acid rain - sulfuric acid (produced by coal burning industries) and nitric acid (produced by automobile engines). Point source pollution - dumping industrial pollutants directly into the water. Mining - may expose rocks to rainwater and produce acidic runoff.	Water with an extremely high or low pH is deadly. May reduce the hatching success of fish eggs.
Temperature	Removal of riparian vegetation Activities that cause a stream to become shallower and wider Discharge from industries such as power plants	Water temperature greatly affects macroinvertebrates and other aquatic organisms. Macroinvertebrates, fish and amphibians are cold-blooded.
Coliform Bacteria	Runoff from woodlands, septic tanks, and sewage plants	Coliforms indicate that disease causing bacteria (viruses or parasites) may be present. The water may be contaminated with sewage or similar wastes.
Escherichia coli (E. coli)	E. coli does not occur naturally in soil and vegetation. It will only enter water from fecal contamination.	E. coli in water is an indication of recent contamination from sewage or animal wastes, which may have many disease-causing organisms.
Nitrates	Fertilizing, runoff from animal feedlots, leaky septic tanks, industrial wastes and wastewater treatment lagoons	Water sources that show nitrate contamination have the potential for other contaminants, such as bacteria and pesticides, which can reach groundwater along with nitrates.
Pharmaceuticals and Personal Care Products	Prescription and over-the-counter drugs, Veterinary drugs, Fragrances, Cosmetics, Sun-screen products, Diagnostic agents, Nutraceuticals (e.g., vitamins)	Feminization of male fish or masculinization of female fish, delayed sexual development in fish, delayed metamorphosis in frogs, embryo mortality, abnormal hormone levels, impaired reproductive systems and immune systems, structural and neurological damage

ECOLOGICAL BENEFITS

The effect that exposed water has on the surrounding environment is subtle, yet important. Through the water cycle, the evaporated molecules being transferred into the atmosphere causes a change in temperature. Water evaporation has been shown to be a highly effective, natural tool for cooling areas around the bodies of water. Utah's air, having a lack of humidity, heat island effect from automobiles, and hot seasons, would benefit greatly from temperature variation of the seven creeks. Water has also proven to soak up radiation. Not only will the daylighted creeks be able to cool the environment, but also take in excess solar rays.

AIR QUALITY AND TEMPERATURE

The effect that exposed water has on the surrounding environment is subtle, yet important. Through the water cycle, the evaporated molecules being transferred into the atmosphere causes a change in temperature. Water evaporation has been shown to be a highly effective, natural tool for cooling areas around the bodies of water. Utah's air, having a lack of humidity, heat island effect from automobiles, and hot seasons, would benefit greatly from temperature variation of the seven creeks. Water has also proven to soak up radiation. Not only will the daylighted creeks be able to cool the environment, but also take in excess solar rays.

The trees that grow in the riparian habitats offer temperature regulation through shading and assistance in air quality. Pollutants can be filtered into carbon compounds, becoming beneficial as opposed to threatening to the environment. Riparian trees also put out oxygen and filter out particles from wind and human activity, creating better air quality overall.

STAIRS PLANT



Until June of 1896 Salt Lake City produced energy from a coal-fired, steam-generated power plant. This process created air pollution that displeased the residents of Salt Lake. With a growing energy demand and a highly popular electric streetcar, something had to be done. Between 1894 and 1896 Robert M. Jones constructed the Stairs Plant in Big Cottonwood Canyon to meet the demand for clean energy. At a total cost of \$325,000 the plant started producing energy in June of 1896. At the time the Stairs Plant was the third largest power plant in the nation and the first long-distance transmission of alternating current in Utah. The plant generated power and transmitted it over a 14-mile line to a substation in Salt Lake City. The greatest benefit of the stairs power plant was the Salt Lake trolley system. This is not the Trax system of today but was in fact over 147 miles of tracks served by dozens of trolleys on nearly every street in Salt Lake. The entirety of that infrastructure was powered by clean, renewable energy, a combination of sustainable energy and efficient transportation that goes unrivaled to this day. The Stairs Plant still functions and produces 1.2 Megawatts per year. In addition to the clean energy, the Stairs Plant also reminds users of Big Cottonwood Canyon how important our watershed is. The Stairs Plant is symbolic of the power of water and the importance of Utah's hydrology.



 STAIRS
SUBSTATION
**Utah Power
& Light Co.**

DANGER
HIGH VOLTAGE



THE ORGANIZATION

THE SEVEN CANYONS TRUST

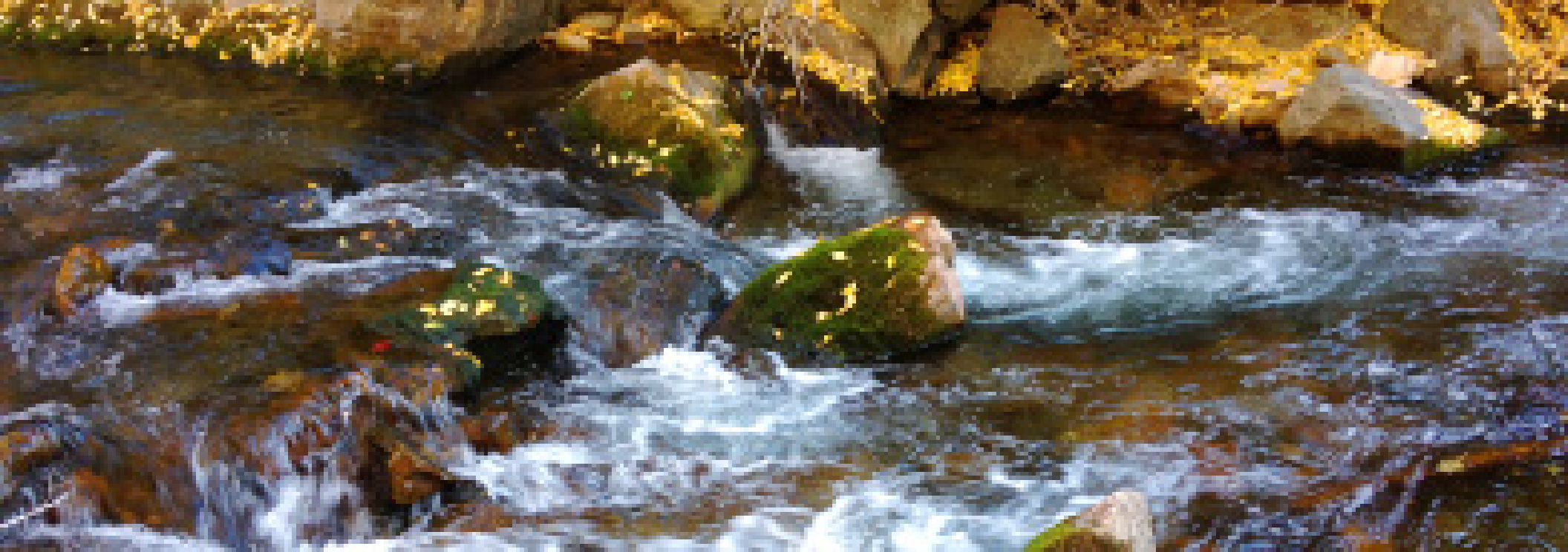
The Seven Canyons Trust is an aspiring 501c3 Non-Profit Organization (tax exempt). This status will allow for tax deductible contributions, anticipating a large part of our initial funding will be awarded this way. Our trust has been established and recognized by the State of Utah; attaining federal recognition is in progress. We will establish our organization both federally and with the State of Utah within the first year of operation. The organization will be structured with a Board of Trustees, as well as officers and employees depending on available funding. All operations will be conducted according to the ultimate end of our mission-- daylighting the seven canyon creeks with public support and environmental soundness. Our website will be our most accessible and complete source of information, and we will strive to keep it as updated and transparent as possible.

MISSION STATEMENT

"To uncover the water that once flowed freely from City, Red Butte, Parley's, Emigration, Mill, Little Cottonwood, and Big Cottonwood Creeks: restoring health, beauty, connection, and kinship between the seven creeks, their communities, and the natural environment."

SEVEN CORE VALUES

TRANSPARENCY	Honesty in all endeavors
EFFORT	Putting forth our best effort
ACCOUNTABILITY	Being accountable to ourselves, our staff, partners, endorsers, and the community
COOPERATION	Building relationships through grassroots outreach
SUSTAINABILITY	Working with an ecological and sustainable mindset
DIVERSITY	Inspire the blending of adjacent communities
RESPECT	Having respect for all citizens, communities, and ecosystems



ACQUISITION STRATEGY

With the Salt Lake Valley's growing population, it is necessary to be conscious of the effect that change has on our ecosystem. There are continuous pressures on the valley to grow and still be a healthy place to live. Throughout this process, it is of the utmost importance that water sources are well taken care of and brought back to their natural state, which is above the ground. Our daylighting strategy is meant to enable decision makers and the public with proper parcel and land information related to our program's specifications. We must begin to address and resolve the tragedy of putting our canyon creeks underground, because if we do not we will quite possibly lose our creeks; the very breath of life that allowed this land to be settled in the first place.

LAND TRUST

A land trust is a tax-exempt, non-profit, public charity acknowledged by the Internal Revenue Service which gives the organization authority to hold conservation easements. Seven Canyons Trust can aid landowners in preserving their land and protecting their hydrological and recreational values along the seven creeks. SCT will utilize educational outreach and community involvement as a non-governmental, non-political organization. We focus on educating the public, creating conservation easements, obtaining donations, and acquisitions of land for preservation, all with the intent of protecting the seven creeks.

CONSERVATION EASEMENTS

A legally binding contract between a landowner and the Seven Canyons Trust, created to protect the land from future development that could damage the riparian zone. Utah law has a number of different conservation easements that can be used to protect specific resources on a particular property. Resources that are protected under Utah conservation easements include: agriculture, historic, ecological, recreational, and scenic. A conservation easement may be purchased by the Trust at full market value, purchased at an agreed discount, or donated by the landowner to the Trust.

LAND CRITERIA

The Seven Canyons Trust seeks to daylight all the underground culverts that connect the seven canyon creeks to the Jordan River. We view the underground culverts as our top priority for this organization in order to begin to heal the hydrology of our valley. Our objective is to begin to acquire land starting at the Jordan River and continue upstream to the mouths of the canyons. By starting in the West we will be able to provide an amenity to the various communities that have not seen the creeks in over a century. This will insure that any future developments acknowledge the creeks and Jordan River as a community asset that demands protection and restoration.

The Seven Canyons Trust understands that we are just beginning the conversation about how to begin to heal the hydrology of our valley. We are passionate about making our communities healthy. It is understood that it will take a creative toolbox to complete our main objective of restoring all seven canyon creeks and create an interconnected trail system joining the Wasatch Mountains to the Jordan River.



TOOLS FOR LAND ACQUISITION

1.) ESTABLISH CONSERVATION EASEMENTS WITH LANDOWNERS

Conservation easements are a great tool to establish and protect public open space. This tool allows us to work with landowners who have an appreciation of the unique resource that flows through their land, understand the heritage behind the creeks, have a desire to protect the creeks, and share their benefit with the public. Each landowner will be able to work with the Trust to tailor the easement to the individual circumstances of the property. This tool is primarily for individuals who would like to remain owners of the land, but also see the public benefit it could provide. Donations will be the main way the Trust establishes easements, however they can be established by purchasing the easement at full market value, an agreed discount, or a tax-deductible donation to the land trust. This is one of the more flexible tools that allows for a conversation to take place with interested landowners and show how both parties can mutually benefit from the transaction.

2.) PURCHASE LAND AND SELL DEVELOPMENT RIGHTS

Our trust will purchase a piece of property, establish a conservation easement and then sell the property after the restoration project is complete while maintaining an easement on the property. This tool will primarily depend on funding and would require a unique situation where the landowner was unwilling to consider establishing a conservation easement. Purchasing the land allows the creek restoration to continue and the establishment of public open space.

3.) BOND PROGRAMS

Municipal bonds are used for local infrastructure projects such as bridges, parks, and trail ways. The bond is formed through a slight increase in property taxes for a set period of time--an average of twenty years. We will work with local governments to establish bond programs that would fund future acquisitions and restoration projects. By creating a bond program the community will be able to pull its resources together and create various projects over the course of 100 years. This will piece together the creeks and put them in a public riparian corridor.

TRANSPARENCY PLANNING

We will also help the community realize these valuable resources and make it a planning priority to protect and restore these natural wonders. We will work with the various city governments to add creek protection and restoration into the community master plans, partner with other like-minded organizations and individuals, and maintain a century-long strategy to further this mission. Our efforts will be straightforward and as transparent as possible to allow for community members to stay involved throughout our planning process. Strategies we will put forth will include public events, volunteer opportunities, and local student stewardship programs.

STRATEGIES

- Organization
- Development
- Resource
- Ecology
- Design
- Outreach
- Events
- Community

SHORT TERM

- Develop name, mission, and strategies for the organization
- Apply to become a land trust and gain incorporation with the State of Utah
- Establish Board of Trustees and Executive Director
- File for 501(c)(3) status
- Develop Creek Master Plan
- Build upon precedents that have worked for similar projects
- Conduct creek analysis to determine ideal development strategy
- Analyze current and future housing needs for the valley
- Begin grant application process
- Reach out to businesses and organizations for contributions
- Establish all fees and sponsor
- Produce land acquisition strategy
- Site visits to better understand the creek environments
- Analyze current environmental conditions
- Document creek status
- Develop creek and land preservation strategies
- Select park location and create local design competition for Al Wei Wei Park
- Research native species of the region to design with nature in mind
- Examine the current status of the creeks
- Research best lighting methods for trails to create land aware of light pollution
- Develop project design standards
- Conduct grass roots community surveys on the website and door to door
- Inform community about Adopt a Creek program
- Attend Moab's Accord meetings to engage stakeholders
- Go scale public with education and art installations, i.e. Ghost Water and The Leonardo da Vinci
- Create Hydro Fest to celebrate water
- Partner with Center for the Living City to create community Jane Jacobs Water Walk through the city
- Host Creek Design Charities
- Post mapping and information to website
- Post temporary educational works and signage
- Establish Adopt a Creek program

MID TERM

- Find organization location
- Hire employees as funding permits
- Acquire project proposals
- Seek conservation-minded developers and designers
- Begin first phases of site development and follow development codes
- Create temporary pathways for pedestrian crossing
- Determine land buffer between waterway and developments
- Obtain grant funding
- Reach out to land owners for land donations
- Commence beginning phases of land acquisition strategy
- Recommend policy and zoning changes necessary for valley rejuvenation
- Act as land and easement reviewer for acquired properties
- Enact land preservation strategies and continue creek health surveys
- Develop with as little environmental impact as possible
- Explore diverse roadway options for pedestrians, cyclists, pet-owners
- Create a Seven Creek Conservancy
- Utilize project design standards on all developments
- Design picnic, viewing points for creeks
- Include mixed-use developments and low-income housing
- Implement connection to Boreasville Showcase Trail and the Jordan River
- Create benchmark report for organizational activities and accomplishments
- Produce a semi-annual organizational newsletter
- Attend planning, water conservation, community meetings
- Reach out to public officials and local municipalities for support
- Continue Hydro Fest and table at applicable events
- Partner with Jordan River Commission for volunteer events and fundraising
- Host gala event to honor donors
- Update website with creek development status
- Create volunteer program for the public to get involved
- Partner with schools to create student creek education program

LONG TERM

- Maintain organization and 100-year daylighting plan
- Maintain data base of collected information as an educational benefit to the community
- Construct final phases of daylighted creeks
- Partner to develop and support businesses and residences near creeks
- Construct public restrooms and facilities
- Solidify funding for entire time-frame of projects
- Final phase land acquisition strategy
- Continue to recommend and fund improvements
- Maintain Seven Canyons Water Conservancy
- Act as advocate for valley's ecological health
- Implement final phases of designs for each creek
- Conduct survey public about daylighting effects on the community and valley ecology
- Create information boards and kiosks about creek and valley history, the water cycle, and the local ice ecology
- Host community trail events
- Creek education workshops
- Creek unveiling press releases and celebrations
- Continue school partnerships
- Create opportunities for local artists to have installations around creeks
- Partner with community organizations to host community film and events

THREE CREEKS CASE STUDY

One of our capstone projects will be Three Creeks Park. Our aim is to not only portray a successful precedence for future daylighting projects, but revive an area that is currently underutilized. The name is derived from the intersection of Red Butte, Emigration, and Parley's Canyon into the Jordan River. This conjoining of the creeks represents our efforts to unify the East and West Sides of the valley.

Currently, where 1300 South, 900 West and the Jordan River converge is a critical riparian ecotone that is neglected and in need of rehabilitation. As is evident in the photographs below, there is debris, pollutants and discarded tires floating in the River creating a hazardous environment for people, plants and animals. We believe this location of three of the seven creeks flowing into the Jordan River deserves to be celebrated as an ecologically healthy habitat.

Some possible resources for this project can come from a corporate sponsor, grants, and private donations to allow us to complete this project and continue with our mission of restoring and daylighting all of the seven canyon creeks. In addition, a portion of land adjacent to the park will be set aside to incorporate our future trailways connecting the surrounding communities to the wildlife and waterways of the Wasatch.



CONCEPTUAL COST ANALYSIS FOR PROPOSED PARK

		QUANTITY	UNIT	\$/UNIT
1 Land (Deferred Through Donations)	\$1,633,500.00	2.50	Acre	\$653,400.00
LAND TOTAL				
1 Excavation/ Demolition	\$144,837.00	108,900	SF/Site	\$1.33
2 Creek Restoration / Final Grading 10 ft.	\$94,500.00	54,000.00	SF	\$1.75
2 Rock Features / Permanent Erosion Control	\$60,500.00	4,033	Cubic Yards	\$15.00
3 Landscaping / Trees / Plantings	\$136,125.00	108,900	SF/Site	\$1.25
4 Trail (Natural / Crushed Granite) 4 ft.	\$54,000.00	21,600	SF	\$2.50
5 Lighting (Every 50 ft of trail)	\$108,000.00	432	EA	\$250.00
6 Bridge (Crossings every 1500 ft)	\$16,000.00	2.00	EA	\$8,000.00
7 Site Furnishings	\$54,450.00	10,890	SF	\$5.00
HARD COST SUBTOTAL				
8 Contractor Fees	\$23,394.42	3.50%	%	\$668,412.00
9 Overhead Expenses / Labor	\$33,420.60	5.00%	%	\$668,412.00
10 Contingency (Hard Costs)	\$20,052.36	3.00%	%	\$668,412.00
CONSTRUCTION MGMT. SUBTOTAL			SF	
HARD COST TOTAL			SF	
10 Architectural & Engineering	\$26,830.06	3.60%	%	\$745,279.38
11 Permit & Gov't Fees	\$9,912.22	1.33%	%	\$745,279.38
12 Property Taxes & Insurance	\$6,807.98	0.91%	%	\$745,279.38
13 Feasibility / Due Diligence	\$3,726.40	0.50%	%	\$745,279.38
14 Contingency (Soft Costs)	\$37,263.97	5.00%	%	\$745,279.38
SOFT COSTS TOTAL			SF	
TOTAL PROJECTED DEVELOPER BUDGET				
	\$2,463,320.00	\$985,328.00	Acre	
		\$456.17	LF of Shoreline	

NOTE: The shoreline of the park is 5400 feet and the park acreage is 2.5.

THREE CREEKS PARK



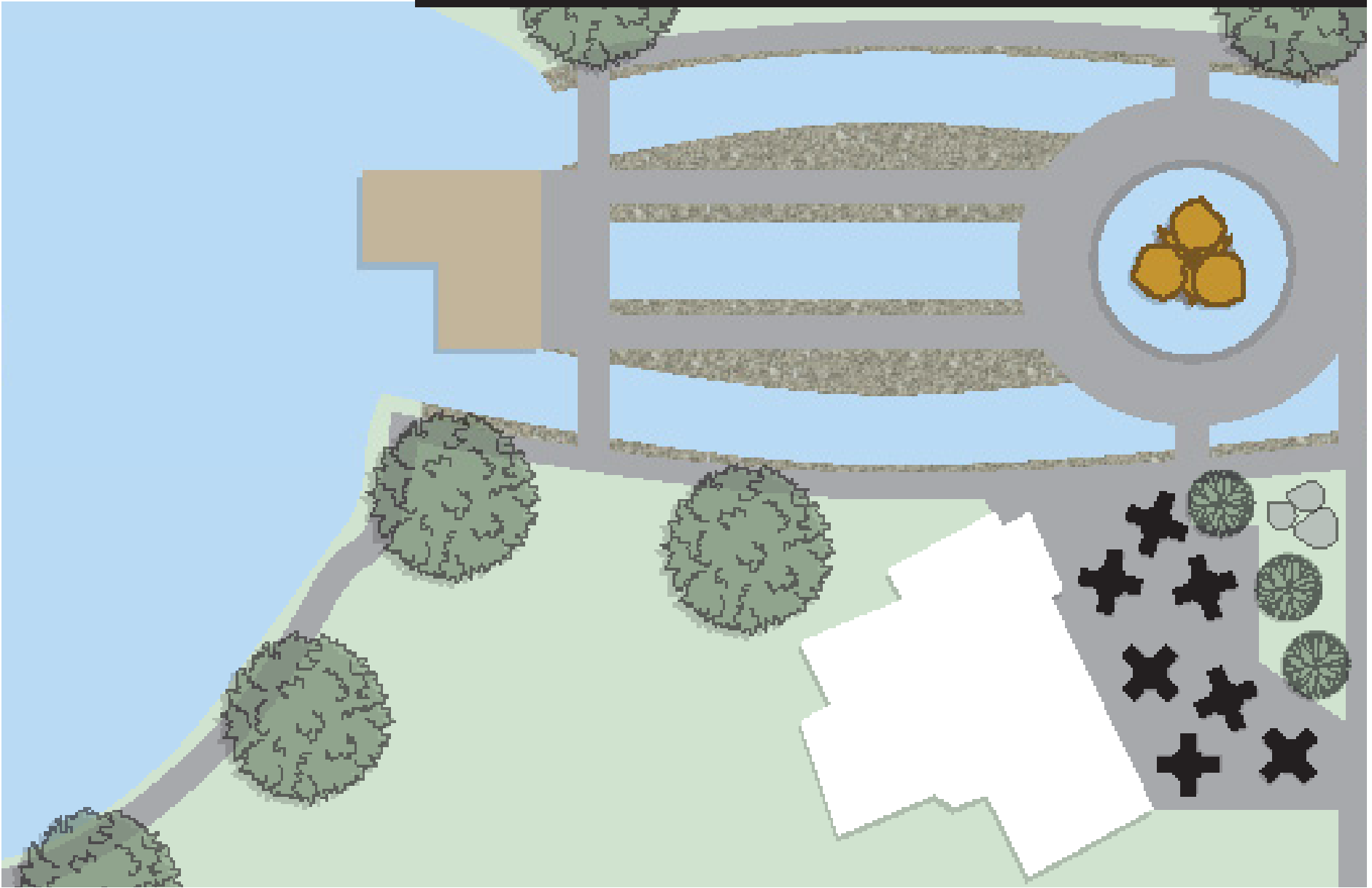
VISUALIZATION



PERSPECTIVE VIEW

THREE CREEKS PARK

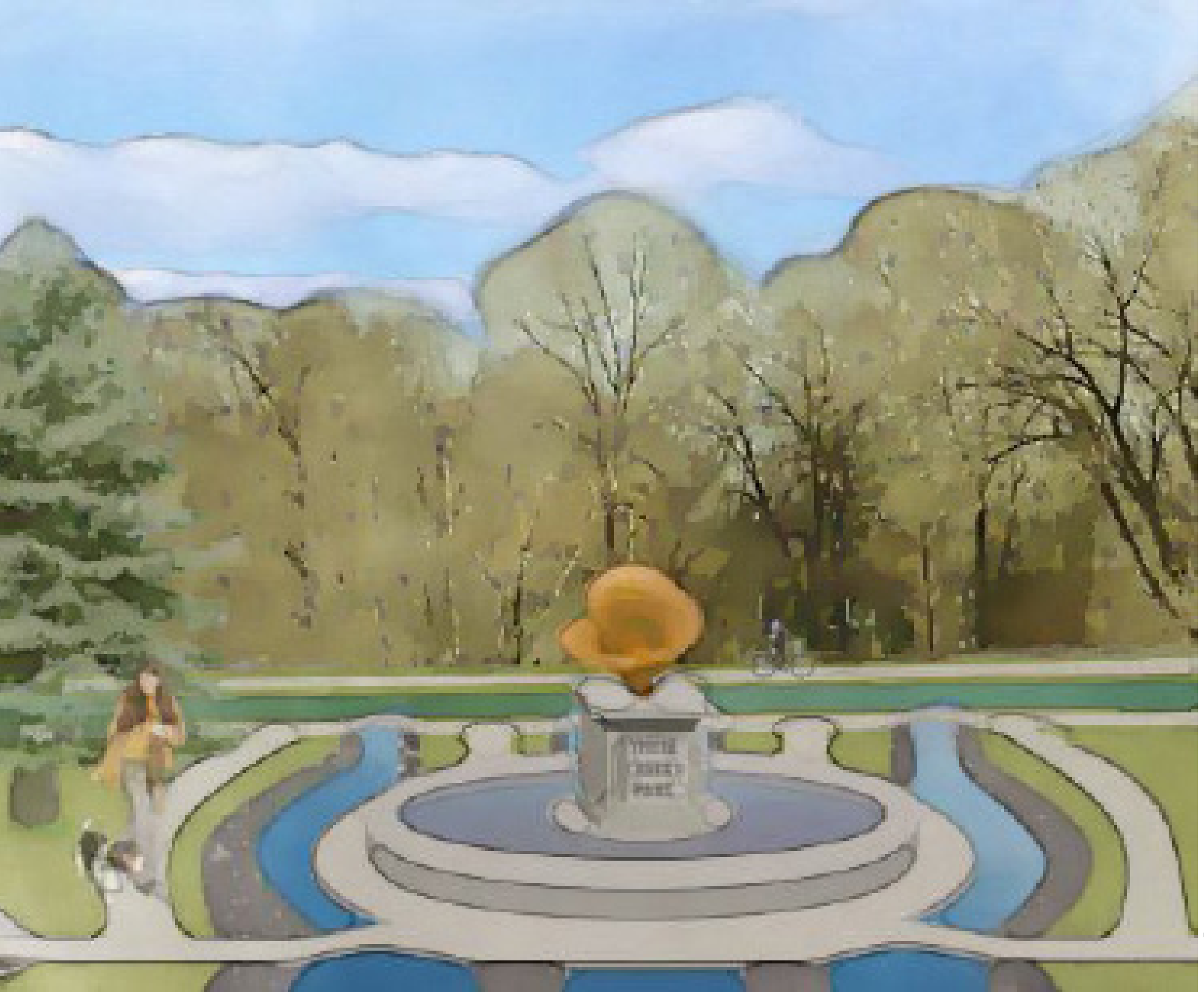




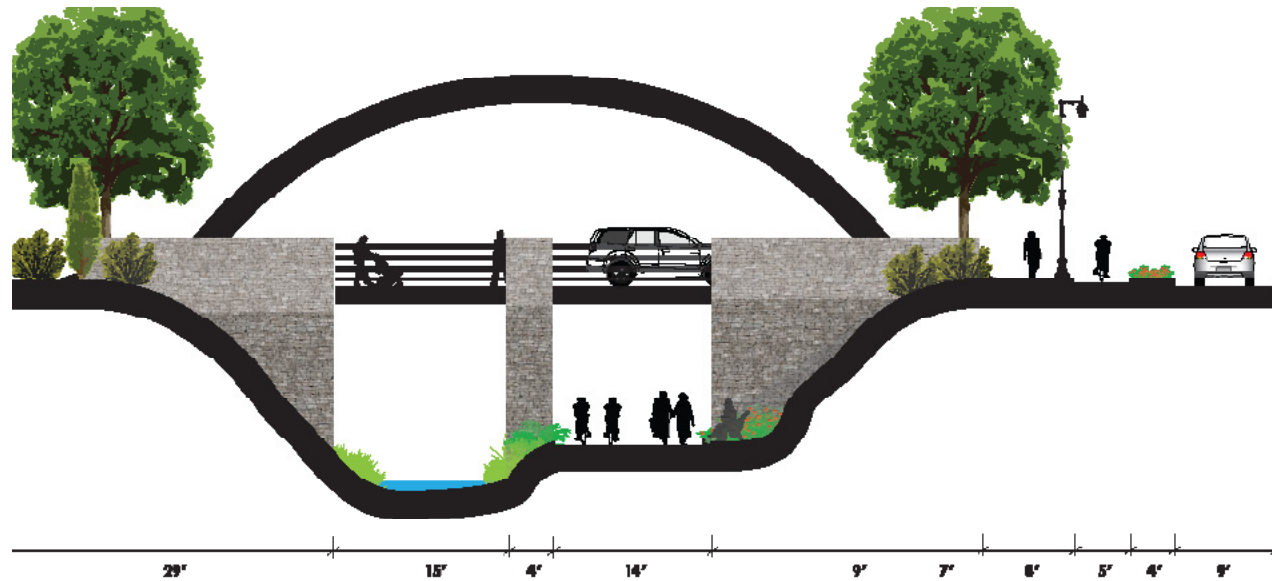
SITE PLAN
THREE CREEKS PARK

THREE CREEKS PARK





CROSS SECTIONS



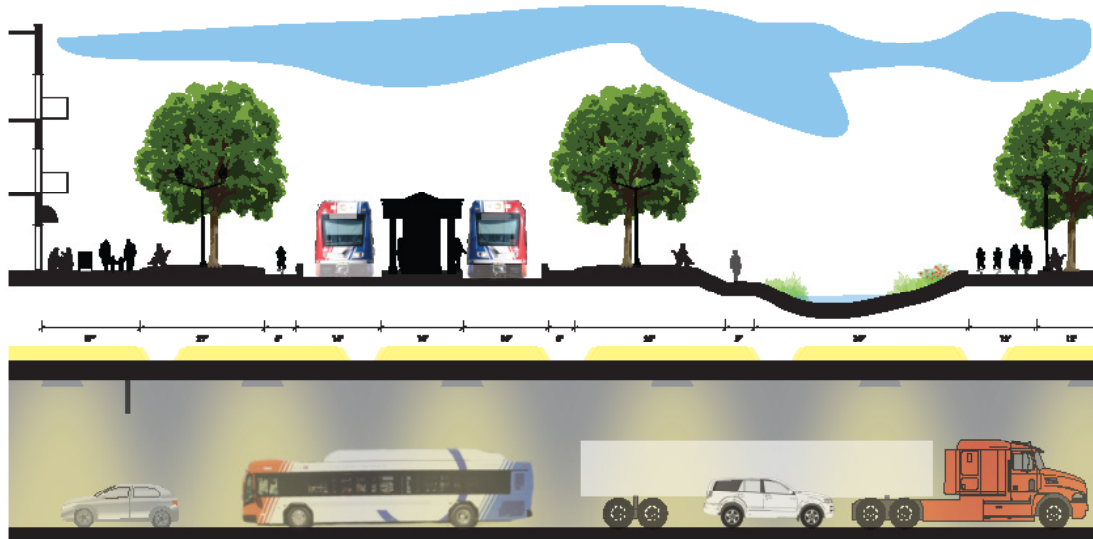
MULTI-MODAL ACCESS

Conceptual automobile bridge over greenway: the creek and multi-use path will pass beneath traffic bridge.

SUGARHOUSE AND PARLEYS RIGHT-OF-WAY

Creek bed runs through median with a pedestrian pathway running adjacent to it. Trees buffer each side of the creek, flanked by two lanes of traffic and two lanes of on-street parking.



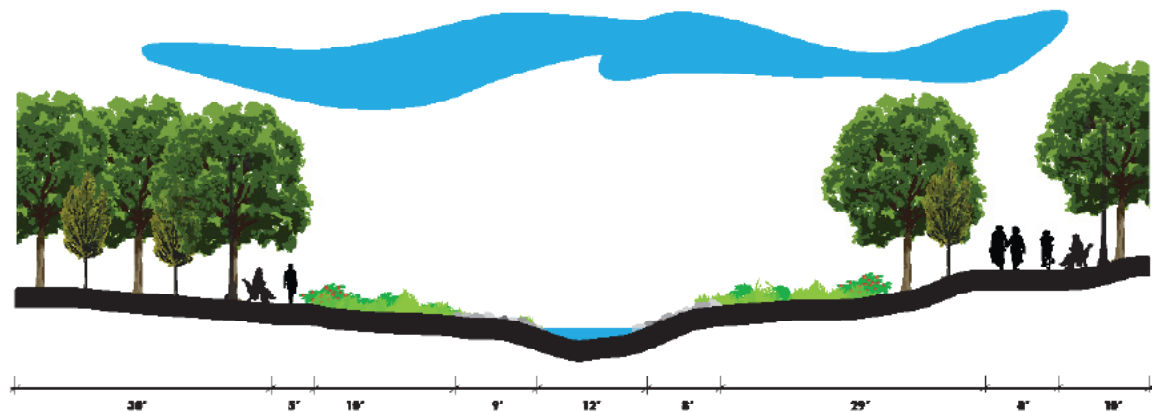


1300 SOUTH TRANSIT AND THREE CREEKS

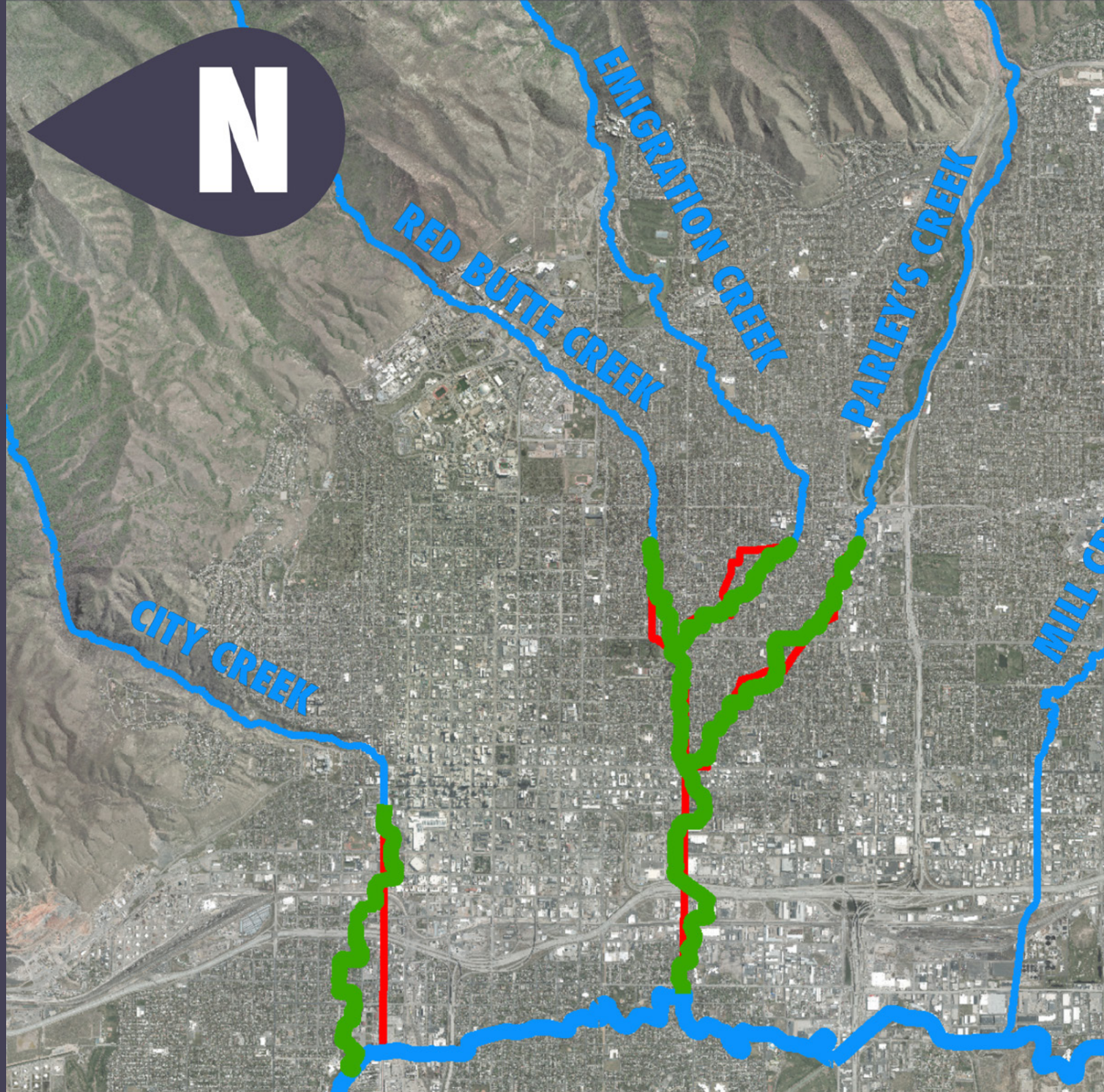
Riparian creek habitat with multi-use path to the right and pedestrian path to the left. Trees buffer each side insulating pedestrian traffic. TRAX lanes and station in the center.

RIARIAN CORRIDOR

Creek flowing through riparian corridor with 100 foot buffer; low impact, multi-use infrastructure and pathways.



CREEKS MAP





LEGEND

-  **CREEKS AND RIVERS**
-  **PROPOSED DAYLIGHT**
-  **CURRENT PIPED**

MOVING FORWARD

POTENTIAL BARRIERS

Throughout our research we have found several barriers that we realize have appropriate concerns, but the Seven Canyons Trust believes the barriers can be mitigated through different strategies. By addressing the problems or issues ahead of time, we hope to prevent actual issues and complete the 100-year plan to daylight the seven canyon creeks in the most fluid way possible.

ENVIRONMENTAL

- Water contamination from surface runoff
- Safety of people recreating along the creeks
- Mixing of groundwater and surface water
- Familial ties to water and water rights
- Technology

SOCIAL

- Takings of private property
- Moving or deconstructing of existing infrastructure
- Education, language
- Allies
- Familial ties to water and water rights
- Freeways (physical and social)
- Political and public resistance
- NIMBY: not natural enough, not enough on the west side

ECONOMIC/POLITICAL

- Lack of Funding
- Access - public/private
- Political and public resistance
- NIMBY: not natural enough, not enough attention to the west side
- Freeways (physical and social)
- Technology
- Familial ties to water and water rights
- Easements

CONCLUSION

As noted in Appendix X, our precedents address many of the barriers explained above through various public, private and public/private partnerships and show successful ways to accomplish them. Through political will, imagination, creativity and restorative urbanism we believe we can achieve restorative results in the hydrology of the valley and the health of the ecosystems, as well as the health of the people who live here.

In moving forward, we hope the plans and ideas presented here inspire and encourage action between everyone in the Salt Lake Valley. By illustrating what flowed through this valley in the past and how essential these waters are to a vibrant community, we hope our vision for the future and examples of daylighting best practices can continue to keep the project's momentum. Through political will, imagination, creativity and restorative urbanism we believe we can achieve restorative results for the hydrology of the valley and the health of the ecosystems, as well as the health of the people who live here. We anxiously await the rehabilitation and daylighting of the seven canyon creeks over the next 100 years.



CASE STUDIES

CASE 1: CHEONGGYECHEON

The riverside environment went from a polluted, ignored, and wasted space to one that is energetic, beautiful, and loved by the residents. The air quality by increased greatly through the creation of a green belt and reduced vehicular traffic. This was achieved through improvements in public transportation and an emphasis on efficient and easy pedestrian travel. The transformation of Cheonggyecheon also benefits the local flora and fauna. The river corridor is capable of supporting the great diversity of local wildlife and offers a safe haven for the natural world within a dense city. Additionally, the surrounding area is now protected from flooding that would previously cause severe damage. These changes have not gone unnoticed; many local businesses have been founded and expanded in the new walkable section of the city, creating a booming commercial district filled with stores and restaurants. The new development attracts over 60,000 people every day, many of whom are tourists, giving a huge boost to the economy of Seoul. More importantly, the rejuvenated area puts many more eyes on the street, making it a safer space for every visitor.

CASE 2: WADI HANIFA

The original path of the Wadi Hanifa was unplanned, in large part because so few people lived near it. Less than half of it was actually protected from development and encroachment, and the rest was poorly maintained. This led to incredibly poor conditions, and made the entire length of the Wadi Hanifa practically unusable, and what little water there flowed was quickly wasted. Through redesigning the area it is now possible for the Wadi Hanifa to support both dense residential use as well as a new ecological system. The area is now heavily vegetated and full of local wildlife. The wadi is now efficiently and responsibly managed, hopefully preventing future droughts and serving as a shining example of daylighting. As with many other daylighting projects, the daylighting of the Wadi Hanifa has revitalized the environment, the local economy, and the quality of life for all who live in the area.

CASE 3: THORNTON CREEK WATER QUALITY CHANNEL

This is a fascinating example of using natural systems to clean and manage water. One of the most important parts of the process is the deep wetland that filters water with a combination of sand, grass, reeds, and rushes. There is also the Rain Water Reuse System, a combination of permeable pavement, wetlands, gardens, green roofs, etc., which all serve to simultaneously minimize water waste and enable passive water cleaning. The beauty of this system is that it takes minimal effort to set up, and once it has been created there is almost no upkeep; no machinery, no pipes, no facilities. These filtration systems also do double duty as wildlife habitats and help reinvigorate the native ecosystem by using native plants. Plazas, bridges, and sidewalks were also integrated into the design, making the places we use the most also incredibly useful for the environment, and providing even greater accessibility and walkability. The project also focused on mixed use development and created hundreds of diverse homes, over 50,000 square feet of stores, restaurants and movie theaters. This daylighting project goes far beyond the water, enhancing the local economy and culture, and ensuring the sustainability of the area for years to come.

CASE 4: SAN LUIS OBISPO CREEK

Before daylighting, flooding was quite common in this area. The accumulation of pollutants and sediments had raised the creekbed drastically, greatly reducing its capacity, and making flooding a dangerous possibility even in light rain. The creek posed further danger to visitors due to erosion; the sides and bed of the creek were so weakened that they at great risk of collapse. The daylighting project deepened the creekbed and greatly strengthened the banks, preventing both flooding and collapse. New accessible walkways were created as well, and business growth was fostered. This was all done to create a new downtown community that would bring people together and highlight the importance of the creek for San Luis Obispo. People can now enjoy a quiet walk along the creek, duck into their favorite coffee shop, and relax, all the while surrounded by the beauty and calm of the creek.

CASE 5: THE DELL AT THE UNIVERSITY OF VIRGINIA CHARLOTTESVILLE

The Dell was originally a site characterized by neglect and misuse. It was poorly maintained, both in terms of the landscape and the facilities used to divert and control the water. Daylighting the area has accomplished a nearly unbelievable transformation, creating a beautiful and healthy stream completely unlike its former self. A 1,200 foot long section of piped water was brought above ground, allowing the creation of more branches from the original stream and providing for greater and diverse wildlife habitats. The parking lot, previously an impassable barrier to water that would collect pollutants and exhaust particles from cars has been reinvented as a small wetland. This wetland, along with increased stream capacity, allows the water to clean and manage itself without the need for drastic human intervention. This prevents flooding and filters out sediments and pollutants, increasing downstream water quality. The new Dell has become a popular attraction, bringing in around 10,000 users every year; this includes members of the university, nearby residents, and thousands of tourists. While the Dell is now a popular recreation area it has also become a powerful educational tool. Students can gain first hand knowledge of ecology, native plants and animals, and hydrology, and see a powerful example of these elements carefully blended with the human landscape. These changes all make the Dell, and the University itself, much more in balance with local human and natural ecosystems.

CASE 6: SAW MILL RIVER

In the past the Saw Mill River was diverted and forced into a poorly planned and unnatural course. A narrow path and several sharp turns greatly reduced its ability to control flooding. These two aspects became a major focus of the Saw Mill River daylighting project. People saw the need for increased flood protection and unsurprisingly a large part of the solution was widening and correcting the path of the river. The project did not solely focus on the river itself though. Much of the surrounding area was redesigned with a focus on green infrastructure and efficient transportation. Roadways were rerouted and split to separate sides of river to reduce congestion and increase access. Major emphasis was also put on walkability in the surrounding area for both social and economic reasons. Local businesses are busier, pollution is reduced, and residents are happier, healthier, and safer.

SUCCESSFUL DAYLIGHTING PRECEDENTS

CHEONGGYEcheon RIVER

LOCATION	Seoul, Korea
SIZE	5 miles
BEGAN	July 2003
COMPLETED	September 2005
INSPIRATION	Restoring historical water, ideology shift to transportation infrastructure
COST	\$281 Million



HISTORIC



PRE-CONSTRUCTION



DAYLIGHTED

WADI HANIFA

LOCATION	Riyadh, Saudi Arabia
SIZE	75 miles
BEGAN	2000
COMPLETED	2010
INSPIRATION	Water restoration
COST	\$1 Billion



HISTORIC



PRE-CONSTRUCTION



DAYLIGHTED

THORNTON CREEK

LOCATION	Seattle, Washington
SIZE	5 acres
BEGAN	2007
COMPLETED	2009
INSPIRATION	Community building, environmental education, and ecological restoration
COST	\$14.7 Million



HISTORIC



PRE-CONSTRUCTION



DAYLIGHTED

SAN LUIS OBISPO CREEK

LOCATION	San Luis Obispo, California
SIZE	600 feet
BEGAN	1999
COMPLETED	Early 21st Century
INSPIRATION	Flood relief and creation of downtown amenity
COST	\$100,000



PRE-CONSTRUCTION



MID-CONSTRUCTION



DAYLIGHTED

MEADOW CREEK

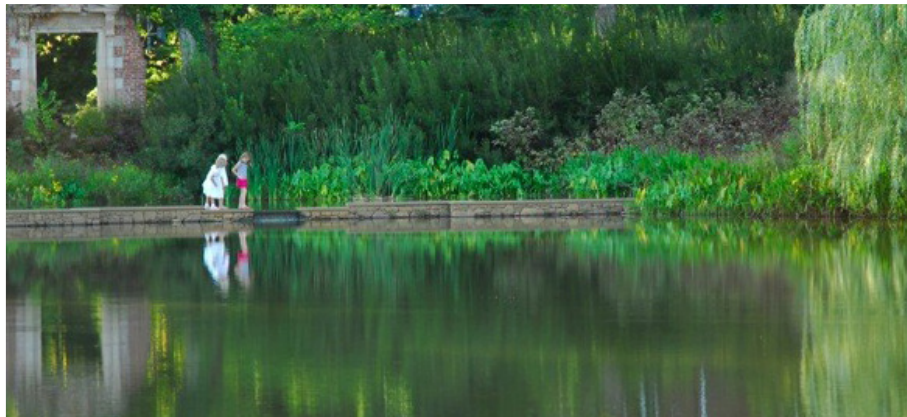
LOCATION	The Dell at University of Virginia
SIZE	11 acres
BEGAN	End of 20th Century
COMPLETED	2004
INSPIRATION	Need for beautiful retention pond, and resettling native habitats
COST	\$130 Million



HISTORIC



PRE-CONSTRUCTION



DAYLIGHTED

SAW MILL CREEK

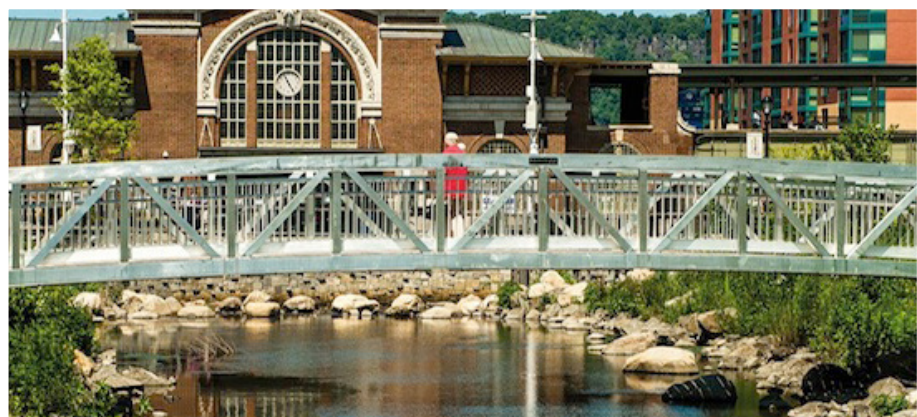
LOCATION	Yonkers, New York
SIZE	Half Mile
BEGAN	2005
COMPLETED	2011
INSPIRATION	Flood mitigation
COST	Daylighting costed \$34 million as part of \$3.1 billion larger project



HISTORIC



PRE-CONSTRUCTION



DAYLIGHTED



GLOSSARY

BIORETENTION: A process where water is strained cleaned of contaminants as the water passes through natural filters such as sand, soil, grass, and gravel. This filtration system leaves the water far cleaner than it started, allowing it to safely reenter our aquifer without additional chemical treatment.

BIOSWALE: This is bioretention in action; a bioswale is a physical landscape element that removes pollution and contaminants simply by catching water and then slowly draining and simultaneously filtering it. Bioswales also have the added benefit of preventing flooding by capturing large volumes of water during heavy rain and spring snow-melt.

CATCHMENT: Simply an area or place that catches surface water and drains it to a single point, such as a basin or gully.

DAYLIGHTING: Daylighting is the act of taking creeks that were once hidden or concealed and restoring them to their natural places above ground. This is done carefully and consciously to repair the natural ecosystems that were damaged when the creeks were first buried.

EASEMENT: A temporary relief from a specific part of a zoning ordinance. A reduced setback for a house or permission to build on a steeper slope would be examples of easements. Ecotone The place where two different ecosystems meet, simultaneously putting them in conflict and resolve.

LAND TRUST: A land trust is a non-profit organization dedicated to conserving and preserving land. As the Seven Canyons Trust we are actively working to preserve and daylight the seven creeks of the Salt Lake Valley.

PERMEABLE/IMPERMEABLE BARRIER: A permeable barrier is a material that allows water to pass through it, often as part of a bioretention system, such as gravel, sand, or permeable asphalt. An impermeable barrier prevents water from passing through, such as concrete and most kinds of asphalt.

URBAN ECOLOGY: This is the study of how humans interact with their built and natural environments. Great effort is put towards understanding the personal relationships between people and their cities, and how the two affect and react to each other.

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Visit our website: sevencanyonstrust.org

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