TOWN OF SILVER CITY
COMMUNITY FORESTRY PLAN
OCTOBER 2013

Gough Park, Silver City, NM **Photo by Michael Sauber**

Prepared by Denise Smith
Office of Sustainability
Community Development Department

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INTRODUCTION

The urban forest (or community forest, used interchangeably) consists of the trees along our streets, the landscaping around our homes and institutions, the vegetation in commercial and industrial areas, the multi-layered forests in our natural areas and the plants in our parks. Community forests include all of the related landscape vegetation on both public and private property, along with the watersheds, wildlife, soils and microbes within the urban environment. Trees, due to their large size, spreading canopies, and sometimes showy flowers, are the most visible component of the community forest, and are an integral part of a community's infrastructure. Silver City's urban trees contribute to increased quality of life, providing innumerable benefits for Silver City and its residents, such as protection from the sun and wind, cleaner air, visual and sound barriers, increased property values, and overall aesthetics.

Purpose of Community Forest Management: The purpose of this Community Forest Management Plan is to provide guidance to conserve the Town's community forest through planning, proper maintenance, and community education. Community forests are created, managed, and sustained by people. People make decisions regarding tree removal, tree retention, tree replacement, and tree maintenance. People can affect the landscape by imposing landscape-changing impacts in the community forest that are comparable to natural disasters in a wild land forest. Like natural disasters, some of these have positive effects, while others are primarily negative. Educating people to make decisions regarding the community forest, or trees in their own yard, based on sound and reliable information results in a healthier and safer community forest with more positive human impacts than negative.

Background: The Town of Silver City is a small rural town of about 10,000 that has retained much of its mining town roots and southwestern charm. The Town provides opportunities for a high quality of life in a climate that encourages outdoor activities in parks and along established trails, shopping in historic downtown and recreation in the nearby Gila National Forest. The Town has natural and manmade parks, streetscapes, and other forested open spaces throughout the Town. Trees that comprise the community forest may be the most visible landscape features of the Town, but the most often overlooked by its citizens.

The Town of Silver City is located in Grant County, in southwestern New Mexico. It is a high desert community not far from Arizona to the east and Mexico to the south. Historically, the valley served as an Apache campsite, prior to the arrival of the Spanish. The Spanish settlement known as San Vicente de la Ciénega (St. Vincent of the Marsh) was further expanded with a wave of American prospectors in the 1860s, and Silver City was founded in the summer of 1870 shortly after the discovery of silver ore deposits. The nearby copper mining operations of Freeport McMoran, Inc. are still an important part of the local economy, with tourism a growing source of economic stability.

The Town covers approximately 10.7 square miles (mi^2). The Town's climate is described as a cold semi-arid steppe climate at 5,950 feet in elevation, which heavily influences the types of trees that may be successfully grown here. The average temperatures vary between 87.5° F in July and 51° F in January. The area has low humidity with an average annual rainfall of about 16 inches per year. Along with climate, soil type and depth is also an important factor determining success of tree establishment and growth in the Silver City area. Soils are often shallow and

rocky, with diminished soil porosity and percolation. The topography is hilly, with exposed slopes that are vulnerable to erosion, resulting in exposed bedrock in some areas.

San Vicente arroyo (also known as The Big Ditch) runs from north to south through the downtown area, fed by two main tributaries – Pinos Altos Creek and Silva Creek (Figure 1). The riparian areas along these creeks provide most of the urban forest within city limits. The Big Ditch was formed by enormous floods in the late 1800's and early 1900's that turned Main Street in downtown Silver City into a 54-foot-deep channel. What used to be Main Street became the Big Ditch, and Bullard Street one block west of the arroyo became the main business arterial through town. The flooding was the result of the loss of trees from the surrounding hillsides that were harvested for smelting ore, creating steam power, town expansion and railroad construction, coupled with uncontrolled grazing by domestic livestock (mules, horses, sheep and cattle) resulting in widespread loss of plant cover. The hillsides and the watershed have healed somewhat since then, but the potential for catastrophic floods still exists, especially if the vegetative cover is lost through wildfire.

Figure 1: Tributaries to San Vicente Arroyo, Silver City, NM

The riparian corridors through town provide resting, breeding and feeding places for many bird species and for reptiles and amphibians, as well as some small fish (Figure 2). Occasionally bear wander into town to access food and water, and large cats such as mountain lions and bobcats use these corridors to access prey, including house pets. Vegetation in parks, residential yards and community open spaces contributes to the food source and habitat of songbirds, important

pollinators such as bees and butterflies, and small animals. The piñon-juniper-oak complex interspersed with open grasslands on the hillsides attract many deer, which have become a nuisance to residents in town and the surrounding area, browsing vegetable and flower gardens, and creating hazardous road conditions.

Figure 2: Big Ditch Park, Silver City, NM

B. SILVER CITY'S COMMUNITY FOREST

Most of the trees that compose the urban forest in Silver City are privately owned by residents and businesses, ranging from parking lots to back yards, and trees within the wildland-urban interface between the community and adjacent forest lands. Town-owned trees include park, museum and Visitor's Center trees, a few street trees in historic downtown, riparian trees in a short section of the Big Ditch that runs through downtown and trees in designated Open Space lands such as Boston Hill.

Most of the street and park trees that were purposely planted over the years are cultivars. Cultivars offer predictability in form and behavior, and are bred for certain features such as fall color, flower quality, disease resistance, or the ability to withstand difficult growing conditions. A large percentage of the community forest consists of voluntary Siberian elm (not purposely planted), a non-native species that grows vigorously with little care for the conditions it is growing in. If allowed, Siberian elm grows anywhere and everywhere. Tree-of-heaven, another invasive non-native trees species, is also beginning to out-compete native trees. Native trees, such as cottonwood, box elder and New Mexico locust, are mostly found in the riparian areas along the streams, but also grow in upland areas like residential lawns when irrigated. Piñon-juniper-oak woodland complex dominates the upland hillsides.

Benefits of the Community Forest. The urban forest is an integral part of a community's infrastructure, and trees often dominate the landscape or at least are the most visible part of it. Urban trees contribute to increased quality of life for this community and its residents. The tourism economy recognizes the trees, especially the parks, as an attraction for visitor's to enjoy, and the real estate market is enhanced by home buyers interested in the aesthetic value of the trees on local property. Some of the residents of this small community enjoy the trees through recreational activities, including hiking and birding, and family get-togethers and community events in the parks. However, many of the residents are not aware of the many services that trees provide, and would not likely become aware unless something drastic started happening to the trees.

The trees in the community forest:

- provide shade and wind break - reduce cooling costs and energy needs from solar shading in the summer and provide barriers to cold winds in the winter;
- decrease soil erosion and manage stormwater through rainfall interception and tempered release into waterways, recharging groundwater;
- improve air quality - reduce air pollution through leaf uptake of pollutants;
- provide carbon sequestration which serves to offset carbon emissions and reduce greenhouse gases;
- increase property values - healthy trees can increase a parcel's value up to 15%, affecting home prices and municipal taxes;
- create visual and sound buffers - trees absorb noise;
- draw business and tourism from both aesthetics and recreational value;
- improve mental and physical health - less crime in treed areas; and
- provide wildlife shelter and food (habitat).

Tree New Mexico at www.treenm.com provides the following additional information and statistics. Hard, paved surfaces such as streets, roof tops, parking lots, etc. cause "the heat island effect", warming our cities by as much as 10 degrees, while trees provide shade that helps mitigate this effect. Trees save 10 to 30 percent of total summer air conditioning when placed on the west and south side of a building, and trees save 10 to 25 percent of winter heating costs by allowing sun through leafless branches or blocking winter wind. Trees use water to grow but produce clean water for the environment through evapotranspiration (the sum of evaporation and plant transpiration). A fully grown tree may release several hundred gallons of water through its leaves on a hot, dry summer day. Trees make the soil more porous, which can help absorb stormwater and recharge the aquifer. Statistically, 100 mature trees catch about 250,000 gallons of rainwater per year, decreasing polluted runoff and soil erosion. Trees absorb atmospheric carbon to grow and reproduce during photosynthesis, which reduces the greenhouse effect. The average person in the US generates approximately 2.3 tons of CO^2 every year. An average healthy tree stores about 13 pounds of carbon annually – or 2.6 tons per acre each year. Three hundred trees can counter balance the amount of air pollution one person produces in a lifetime. And finally, trees mitigate the levels of particulate matter (dust and vehicle emissions) – air pollution – that causes diseases in children and adults.

Establishment and Maintenance Costs. There are costs associated with growing healthy trees as well. All plants need some level of care, especially to get established. Survival is greatly enhanced by selecting the right plants for the right places and by watering. There are clean-up costs after storms and when trees or tree parts fail, and there are costs to remove and dispose of trees when they die. Other costs come from infrastructure damage (e.g., damage to sidewalks and building foundations). Costs to maintain trees in and around power lines are reflected in electric rates. Messy fruits may need to be cleaned up, and some people react to the allergenic properties of some trees.

These establishment and maintenance costs are the main factors influencing the Town's management decisions concerning trees. Maintenance of existing trees takes precedence over planting new trees, since any new trees require additional resources of time and labor to maintain.

Current Urban Forest Management. If the urban forest is defined as the individual landscape trees and total forest canopy cover within the Town, then the primary stewards of this resource are the private property owners, including residential and commercial landowners. Therefore, the greatest challenge, as well as the greatest opportunity for protecting and enhancing the Town's urban forest, lies with educating and working with citizens.

However, the responsibility for a significant portion of the current and future urban forest lies directly with the Town of Silver City on its publicly-owned lands. Currently, tree management is decentralized, meaning there is no single department or staff position that has direct, comprehensive, and ultimate legislative or management responsibilities for public trees. Several municipal departments directly and indirectly affect urban forest management, including the Public Works Department, the Community Development Department, the Office of Sustainability, the Utilities Department, the Floodplain Manager, the Fire Department, the Town Manager, and the Mayor and Town Council. Other Town entities, such as advisory committees and volunteer groups have direct and indirect influences on the quality and quantity of the urban forest. The urban forest is further impacted by the local utility companies with overhead lines, primarily Public Service of New Mexico (PNM).

These entities all affect management of trees, but their reasons for doing so are not necessarily compatible and the desired outcomes may be at odds with each other; consequences and side effects are not always anticipated.

Responsible Parties

1. Public Works Department – The Public Works Department (PWD) has the most influence on publicly-owned trees in the Town. The Parks Division of the PWD has equipment inventory and knowledgeable staff for public tree maintenance. Staff is responsible for tree management on public rights-of-way and other public properties including street trees, trees in city parks, cemeteries and greenways. This PWD cleans streets of leaves and other tree debris. Tree pruning and removal, stump removal, leaf collection, and woody debris disposal are all duties assigned to PWD, as well as other activities that can affect trees such as mowing and weed eating, and snow and ice removal.

Additionally, the PWD affects public trees through the repair and maintenance of sidewalks, curbs and driveways, and is concerned with damage from trees and tree roots. Property owners are responsible for the maintenance of the sidewalk and the street trees adjacent to their property.

The PWD has no responsibility on designated Open Space property, such as Boston Hill and San Vicente Open Space, and has no directives or funds for maintenance of these properties. Creating an Open Space Division with defined responsibilities would help protect these resources and increase control over what happens there.

2. Community Development Department –The Community Development Department (CDD) has the most influence on privately-owned trees in the Town. CDD enforces the adopted land use and zoning regulations included in the *Town of Silver City 2004 Comprehensive Plan.* The CDD staff advise private property owners to remove weeds and other debris in yards that could be safety hazards, and inspects construction sites to monitor compliance with Town regulations, including tree preservation. They have the ability to levy fines for violations.

3. Office of Sustainability – The Office of Sustainability (OS) obtained a grant for this Community Forestry Plan, and will seek future funding to support plan implementation. The OS is working to enhance sustainability throughout the community by promoting recycling and reducing solid waste, improving energy efficiency and increasing the use of renewable energy resources. The OS is committed to protecting Silver City's community forest through supporting those that plant and maintain trees, contributing to improved local air quality, sequestering carbon and reducing greenhouse gas emissions, and reducing energy needs for cooling by providing summer shade.

4. The Utility Department has responsibility for installing and maintaining water and sewer lines in all public right of ways up to the property line of each residence or business. They are therefore primarily concerned with the impact of tree roots on sewer lines.

5. The Floodplain Manager assists in surveillance of downed trees in the floodplain, and sometimes uses contractual services for the removal of large downed trees that could endanger trail users, obstruct flow and increase flood risk.

6. Silver City Fire Department - The Fire Chief is responsible for identifying fire danger posed by dry vegetation, including dead and dying trees from prolonged drought and/or disease. Restrictions on activities that could start fires are periodically instated, such as no open burning of yard waste, tree limbs, and weeds. The Fire Department has the ability to levy fines for violations.

Silver City and Grant County Fire and Rescue are concerned with the interface of the urban forest with human habitations, especially where structures are located in or near natural areas. Increased fire hazards result from increased development in forested areas. A Community Wildfire Protection Plan is currently being developed that will include recommendations to alleviate risks from urban wildfires.

7. Mayor and Town Council - The Town of Silver City operates under the Council-Manager form of government. The Town Council is the legislative body of the Town and is empowered by the charter to make Town policy. The Council is composed of the mayor, elected at-large, and four council members elected by proportional districts on a non-partisan basis. These elected officials are key to the growth and success of the Town's urban forestry program. As the ultimate policy-making group and representatives of the citizens, the mayor and council can have direct influence over the current and future management of the urban forest. They can approve new and improved tree ordinances, support increases in program funding, support additional staffing levels, and generally make urban forestry issues a priority for the Town. The town manager is tasked with implementing policy as set by Council.

8. Public Service of New Mexico (PNM) provides electric power to the Silver City area and is responsible for maintaining power lines free from tree interference. PNM will prune trees on residential or commercial property that are deemed unsafe to the power line.

PNM also provides funds and technical assistance through their tree replacement program to remove and replace incompatible trees under power lines. They provide educational materials including a brochure on minimum planting distance from power lines (25 feet for tall growth trees and 15 feet for medium growth trees) and appropriate tree species under power lines. PNM also sponsors the "Tree New Mexico" grant program for tree planting projects and tree give-aways. A tree give-away is scheduled for the Town of Silver City on November 9, 2013 , where 200 trees will be given to the public and proper planting procedures will be demonstrated by Tree New Mexico.

Policies and Plans

Although the Town does not have any specific policies or regulations concerning trees, there are several programs and plans that address trees.

1. Town of Silver City Comprehensive Plan (2004) – One of the key principles in the Plan is to "preserve the quality of the natural environment, open space, water and other resources", and to "maintain and enhance community facilities and provide park, open space and recreational opportunities to serve the entire community." Also, the plan seeks to protect Silver City's "small town" feel and character, and shape new growth to promote walkable and livable neighborhoods and districts. Recommendations for streetscape improvements include landscaping and street trees, and transportation recommendations include right-of-way development that includes trees whose roots will not damage adjacent sidewalks. The criteria for site grading and clearing include minimizing the clearing of mature trees on newly developed land.

2. Land Use Code (2010) – The Land Use Code is intended to implement the planning policies adopted by the Council for the Town of Silver City as reflected in the 2004 Comprehensive Plan.

The Land Use Code has very few direct references to trees. *Land Use Code Section 5.5 - Natural Resource Protection* addresses hazard areas and slope conditions but has no mention of trees. *Land Use Code Section 10 – Landscaping and Buffering* establishes standards for new development to protect and enhance the Town's appearance by the installation of appropriate landscaping and screening materials; to maintain and increase the value of land; and to encourage the use of native vegetation and xeriscaping techniques to conserve water usage. For example, new development regulations include landscaping requirements that include tree planting.

3. Silver City Greenways Plan and Big Ditch Master Plan – These plans, recently adopted by the Town in 2013, recognize the Big Ditch Park as a historic, cultural, and economic asset to the Town. One of the goals of the master plan is to protect and enhance the health of the riparian corridors. The Silver City Greenways Plan includes approximately 10 miles of planned pathways along the riparian corridors, including segments of Silva Creek, Pinos Altos Creek and San Vicente Creek including "The Big Ditch" through downtown Silver City.

4. Sustainability 2030 Plan - The Sustainability Plan recommends that the Town conserve and protect its urban forest resources, including trees on public and private lands, to maximize the multi-value benefits and to decrease threat of catastrophic wildfire. The urban forest management goal is to implement this Community Forestry Plan, with specific objectives and recommended actions that are expanded in this plan.

Nonprofit Organizations/Volunteers

1. Silver City Main Street Project (Main Street) was established in 1986 to promote downtown revitalization and historic preservation. Main Street was responsible for planting many of the existing trees in the downtown area in early and middle 1990's, at the museum, along a portion of 6th Street, and at a couple of street corners along Bullard Street.

They are currently in the process of implementing the Silver City Greenways Plan and Big Ditch Master Plan, which involves user-friendly trails through the riparian forest along the creeks in town.

Main Street is also responsible for basic pruning and care of "landscape" trees in the downtown area through a maintenance contract.

2. Wellness Coalition – The Wellness Coalition provides labor to maintain trails on Open Space lands through the Youth Conservation Corps (YCC). The YCC has done maintenance on Boston Hill Open Space area for the last three years, and will continue as long as grant funding is provided. The crews re-naturalize paths through the switchbacks, scatter debris and build drainage features to shed water. The crews also built the emergency access gate (angle iron swinging gate) on Bypass Road at the Boston Hill trail head. A YCC crew recently built a retaining wall and wheel-chair accessible trail into the Big Ditch Park from Hudson Street and plan to build a handicapped accessible trail into the park from the Lions Club building on Bullard Street. Wellness crews have built reroutes through trail

areas with boundary disputes, and flagged wires so people wouldn't run into them.

The Wellness Coalition is also responsible for organizing AmeriCorps projects, where a crew recently filled over 200 bags with trash from the Big Ditch Park area during San Vicente Clean-Up Days.

3. Grant County Community Health Council and Western New Mexico University's Natural Sciences Department Fruit Tree Mapping Project – This project was inspired by an edibles map of downtown Silver City created by local anti-hunger activist, Marcus Woodard (Figure 3). He shared the same concern as many Grant County residents that locally grown food was going to waste; most apparent to him was the fruit left unpicked on communally accessible trees.

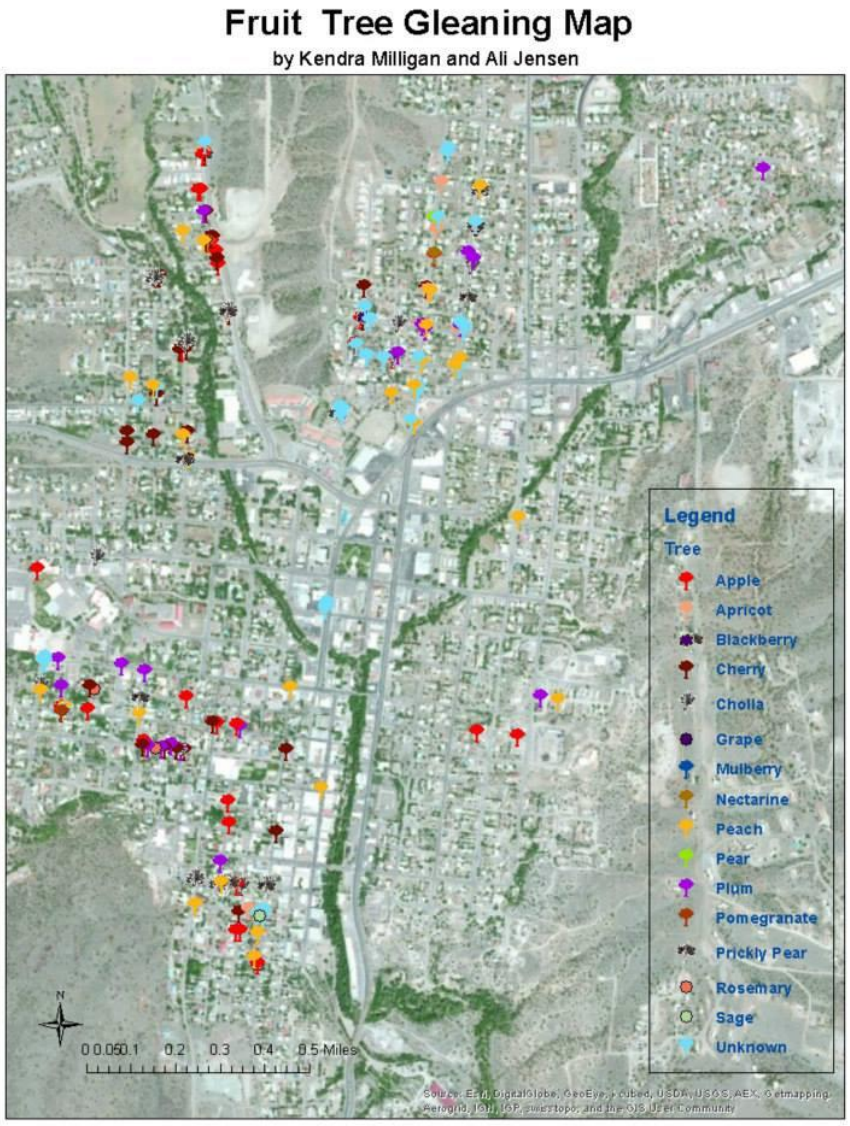

Figure 3: 2013 Fruit Gleaning Map

The project was spearheaded by Health Kids, Healthy Communities Program with Grant County Community Health Council. A foot-survey of fruit trees was conducted in Silver City from mid-March to mid-April of 2013, with priority given to the downtown area for comparison to Woodard's originally mapped area. Before an early frost hampered efforts to continue the foot survey, over 769 fruit trees and edibles were mapped, of which 231 were communally located. The Health Council will continue the mapping effort in the Spring of 2014.

4. Aldo Leopold High School Students – The students conduct annual projects that include erosion control, wetland enhancement, trail building and maintenance in San Vicente Arroyo. Some of these students also helped conduct the tree inventory of Big Ditch Park and the Golf Course.

5. Grant County 4-H: The Grant County 4-H recently planted trees and improved landscaping in Penny Park in Silver City that was funded through a PNM Foundation grant, turning an abandoned community garden into a pollinator garden.

C. ANALYSIS

Tree Inventory/Methods

A tree inventory was done on Town-owned properties, with individual trees counted in the twelve parks, at the Visitor's Center, Town Pool, Recreation Center, Museum, Library, Golf Course and a few street trees. Canopy cover inventory was done on each of those properties, as well as designated Open Space lands, and the Town as a whole. Trees were identified to genus level, and sometimes species. Diameter at breast height (DBH) was measured with a caliper, and documented as one of six size classes (0-4", 4-8", 8-12", 12-16", 16-20", >20"). All were categorized as native or non-native. See Appendix A for the entire individual tree inventory results.

The Town does not employ a certified professional arborist so most of the inventory was conducted by employees in the Office of Sustainability with backgrounds in ecology and wildlife biology. Six students from the Aldo Leopold High School (ALHS) and their teacher conducted the survey of the trees in Big Ditch Park, a thickly vegetation riparian area in downtown Silver City, and four ALHS students conducted an inventory on the Golf Course.

A trained arborist would be needed to assess the age, health, structure, and overall condition of trees, so this was not done during the inventory, although dead and dying trees were noted as they could be a safety hazard as well as a source of disease or pests. A retired arborist volunteered time with a portion of the inventory, and it is clear that services of a trained arborist would greatly increase the knowledge base of the Town concerning the health and status of the trees in the urban forest.

The estimation of percent canopy cover in Town of Silver City Parks was performed using a point counting method called iTree Canopy (http://www.itreetools.org/canopy/survey.php?). The boundaries of each property or park were imposed on a Google Earth image and points randomly

assigned by the program were identified and classified into a user-defined class such as tree, non-tree, building, etc. One hundred to two hundred fifty random points were accumulated to determine percent canopy cover. The number of points was determined by the size of the area and a criterion of achieving a standard error of less than 5 percent. In addition the program provides an estimate of area based on the boundaries defined by the user. The following information is from their website: The concept and prototype of this program were developed by David J. Nowak, Jeffrey T. Walton and Eric J. Greenfield (USDA Forest Service). The current version of this program was developed and adapted to i-Tree by David Ellingsworth, Mike Binkley, and Scott Maco (The Davey Tree Expert Company).

Tree Inventory/Results

The individual tree data collected during the inventory is divided into three areas – parks, open space and street trees. Individual tree inventory was done for street trees and park trees, only canopy cover was measured in the open space areas. While open space areas are generally vegetated with native piñon-juniper-oak woodlands with some open grasslands, the parks have a higher percentage of non-native trees than native.

There were a total of 4,339 trees counted in the individual tree inventory of Town-owned property, with 25% native and 75% nonnative (including ornamentals). Siberian elm was the dominant species, numbering 1,718 out of 4,339, or 40% of the total trees inventoried. Tree of Heaven was the next dominant species, numbering 1,136 out of 4,339, or 26%. There were 27 genera identified, with 13 native genera, and 14 non-native genera. The native species included cottonwood, ash, juniper, sycamore and others. Many of the non-native genera other than Siberian elm and Tree of Heaven are ornamental or cultivars that were planted in the parks, such as mulberry, poplar and ornamental plum. Although tree age was not determined in the inventory, 259 trees were greater than 20" DBH and could be considered legacy trees.

The Town of Silver City has an overall canopy cover of 8.1% (+/- 2.44). Of the 6,848 acres (10.7 mi^2) comprising the Town of Silver City, 1,235 acres (1.93 mi^2) have canopy cover and 5,613 acres (8.77 mi^2) are buildings, streets and land with no tree cover. The historic downtown area has the most tree cover, compared to the more recently developed commercial and residential neighborhoods that extend out away from downtown. Appendix B has a full list of canopy cover estimates.

The individual tree inventory covered approximately 253 acres, only 4% of the total acreage of the Town. It follows that 96% of land in Town is privately owned by residents, businesses, etc. Therefore the tree inventory results do not reflect the Town as a whole.

Silver City's Parks: The parks in the inventory include the grounds at the museum, swimming pool, recreation center, library and the golf course as well as the traditional park areas. These 18 properties are planted with upland trees that are a mixture of ornamental and native trees. The trees on these properties are regularly trimmed and irrigated, and are fertilized when needed, except in Hidden Park and natural areas around the swimming pool.

The naturally vegetated areas around the swimming pool and in Hidden Park are piñon-juniper-oak complex that could use additional attention, especially Hidden Park where dead and dying piñon and juniper trees could pose a safety and fire hazard. Hidden Park is north of downtown in a subdivision neighborhood, providing a wildland-urban interface. The trees in Hidden park need to be thinned and the dead and dying trees need to be removed to reduce the threat of injury to park users and the threat of wildfire that could spread to the surrounding neighborhood.

The Big Ditch Park, the riparian area along San Vicente Creek through downtown, is mostly natural vegetation with some ornamental plantings at park entry points. The ornamental trees are irrigated, but the rest of the riparian area derives its water from the creek, which flows intermittently depending on rainfall and stormwater runoff. Basic pruning and care of "landscaping" trees is done by MainStreet through a maintenance contract, while emergency pruning and tree removal has often been handled by Public Works directly. Regular cleanup, pruning and maintenance of the less-developed stretches of the arroyo has been done by Youth Conservation Corps and AmeriCorps members, in cooperation with the Town through the Wellness Coalition's various grants and programs.

A team of six students and one teacher from the Aldo Leopold High School conducted the inventory of the trees in the Big Ditch Park and four students inventoried the golf course, and they provided written reports summarizing the data and analysis. A retired arborist provided tree identification when needed, and talked to the students about diseases and treatments. The students were already experienced in doing tree inventory in the Gila National Forest, and this experience provided them an opportunity to increase their knowledge and help with a Town project.

Open Space: There are two designated open space areas owned by the Town – Boston Hill (576 acres) and San Vicente Open Space (140 acres). These lands are a reservoir of native vegetation, with piñon-juniper-oak woodlands and some open grasslands. Although these lands are used recreationally, they are not formally managed by the Town, as explained earlier in the responsibilities section.

1. Boston Hill: A team from the Abandoned Mine Lands Program under the NMEMNR Minerals Management Division is conducting a community planning and design process on Boston Hill to safeguard the abandoned mines. The team will provide a plan that protects the trees and other native plants and the rugged character of the area, while increasing safety from mine shafts and unstable tailings piles for the many recreationists. Installations may include bat compatible closures of the many open mine pits and caves.

2. San Vicente Open Space lies south of town, vegetated mostly with piñon-juniper-oak and open grasslands, with a narrow riparian corridor along San Vicente Creek. About 15 years ago, this area was fenced with funding from the Fish and Wildlife Service, Partners for Fish and Wildlife Program to prevent damage from unauthorized off-road vehicles. However, it has been difficult for the Town to maintain the fences from vandalism and destruction.

The NM Environment Department has been conducting wetlands restoration in the creek area the last few years, with Aldo Leopold High School students putting in 100s of hours

fixing trails, building stream stabilization structures, installing and reading piezometers, and conducting vegetation surveys.

Street Trees: There are only a few street trees that are maintained by the Town of Silver City. The majority of the trees that occur adjacent to streets are privately owned. There were trees planted along a three-block portion of Sixth Street adjacent to the Sixth Street School playground, and a few on the east side of Bullard at Spring Street and at College Avenue in early and middle 1990's. Other trees planted along Bullard have died and have not been replaced. Although Bullard is the main street through downtown Silver City, the infrastructure layout of the street, sidewalks and buildings leaves no room to plant trees.

Tree Inventory/Conclusions

Canopy cover could be increased to maximize the many values provided by trees. However, without additional funding the Parks Division would not be able to increase the number of trees it is maintaining.

Except in open space areas, a high percentage of trees in Silver City are non-native, with Siberian elm the dominant species (40% of all trees). Tree of Heaven is 26% of the total trees that were inventoried. A program to systematically remove these trees is not practical nor is it desirable, since these trees generally provide the same benefits as native trees. In addition, the growing conditions including climate and hydrology are more favorable to non-native species, especially Siberian elm, which makes it difficult to establish and maintain native trees. Site specific removal could be accomplished in areas where replacement trees would have a high probability of survival, which generally means where irrigation is possible.

Despite the fact that Silver City's community forest is largely absent of native trees except in the open space areas, the urban forest is an integral part of the Town that must be maintained even more intensively, perhaps, than many other Town natural assets. Species diversity of 27 genera is low, especially when 40% of the total is one species, Siberian elm, and 26% is Tree of Heaven. Species diversity helps ensure no single pathogen or insect can decimate an entire population, so low species diversity should be considered a threat.

Tree Inventory/Analysis

Strengths

- Silver City has an good climate for growing drought-tolerant vegetation
- Tree maintenance is supervised by a person knowledgeable in tree management, with an experienced crew of six employees.
- The urban forest provides high quality recreation experiences.
- Developed parks are generally well-stocked with trees.
- Many park and open space areas have beautiful, large, mature trees.
- Residents appreciate natural resources, trees and vegetation and value the abundant opportunities to enjoy them.
- Many residents take great pride in their yards and gardens.

Weaknesses

- There is a low diversity of tree species on publicly-owned land. The diversity of species on private lands is not known, but could be higher.
- Several entities are involved in the management of the urban forest, but their reasons for doing so are not necessarily compatible and the desired outcomes may be at odds with each other; consequences and side effects are not always anticipated.
- There are no ordinances or regulations specific to maintenance or protection of trees.
- There is no line item in any Town budget specific to tree resource management.
- The Public Works Department (PWD) has no responsibility on designated Open Space property so these areas where native trees thrive lack tree management.
- Information about the overall quality and quantity of the urban forest is not available.
- Management of trees on private property, except for rights-of-way, is unregulated.
- Available resources in the PWPD (both personnel and fiscal) limit their ability to plant new trees that would increase labor for an already stressed department.

Opportunities

- Trees and vegetation can establish regional and neighborhood character and community identity.
- There are areas available for additional trees in many parts of the Town.
- There is an opportunity to increase public knowledge and interest in the urban forest.
- Property owners can be effective stewards of trees on their property.
- Partnerships with volunteers can help to plant trees.

Threats

- Trees are cut or topped to create private views or to reduce maintenance costs.
- Invasive non-native plants such as Siberian elm and Tree-of-Heaven are prevalent in public and private natural areas, decreasing species diversity.
- Prolonged drought, and increased disease or pests could quickly wipe out large segments of the urban forest, especially areas that lack species diversity.
- Some property owners provide poor or inappropriate maintenance of trees.
- Some natural areas are at high-risk for wildfires that could affect homes and businesses, especially adjacent to the thickly vegetated riparian areas, and in the wildland-urban interface typical in the extra-territorial zone.
- Inappropriate uses such as illegal camping, dumping and disposing of yard debris, in and near the floodplain and riparian areas, threatens and disturbs both flora and fauna and could increase flood risk.
- Room for street trees in the right-of-way is limited by the need to accommodate other elements, especially in the downtown area.
- Funding to manage town-owned trees is limited.

Issues

- Predominantly private ownership of the creeks and riparian areas makes it very difficult for the Town to manage erosion control, prevent wildcat dumping, and protect the riparian resources that exist in these areas.

- Some low-income property owners may find care and maintenance of trees to be an economic burden.
- Developing the amount of "defensible space" needed around buildings to reduce the risk of wildfires in urban-wildland interface areas may conflict with the need to retain canopy cover, as well as the opportunity to encourage "green" vegetation that could reduce fire risk.
- Native tree species are desirable but not necessarily appropriate as street trees. Although they are adapted to the local climate, they are not necessarily adapted to the harsh conditions found along city streets.
- The cost of street area landscape maintenance is increasing and funds are decreasing or non-existent. Since funding for a proactive program is not available, maintenance is largely reactive.
- The cost of maintaining street trees and repairing unintended damage to sidewalks and drain pipes is a burden for some property owners as well as the Town.
- Tree canopy could block access to sunlight, becoming a solar rights issue.

D. RECOMMENDATIONS AND ACTIONS

This section provides recommendations that address the identified weakness, threats and issues facing the Town of Silver City's urban forest. This section is divided into 3 areas – 1) Identify Tree Resources in Urban Forest, 2) Urban Forest Management and 3) Urban Forest Community Framework.

Tree Resource goals address the need to document what we have, and to maintain, protect and increase tree resources. The Urban Forest Management section reflects maintenance and management goals to promote health, longevity and to maximize benefits. Goals in the Community Framework section address education and safety as well as providing public recreational opportunities.

Implementation of all of the following goals is dependent on availability of personnel and funding. Since the current Town budget does not include these resources, specific completion dates are not included in the plan at this time. Implementation funds will likely be sought through applicable grants.

Section 1: Identify Tree Resources in Urban Forest

Goal #1: Characterize, inventory, and document the health and condition of trees in Silver City's Urban Forest.

Rationale: A fundamental requirement for effective resource management is a thorough understanding of the resource itself. This is accomplished through inventory and analysis and is essential for implementation of all resource management tools from cost/benefit analysis to workload management. An inventory of the urban forest needs to be comprehensive, dynamic, and available to all managers of Town trees.

Objective 1: Develop a dynamic inventory process that can be easily updated and maintained. Repeat inventory on a regular basis, at least every 5 years would be ideal.

Action 1: Complete inventory of Town-owned trees to include tree health and condition, identifying diseased and hazard trees.
Action 2: Establish baselines and monitoring procedures to assess, quantify and track trends and changes in the urban forest on a periodic basis.
Action 3: Characterize the urban forest according to different land use types and neighborhoods to see how it is distributed. Economically disadvantaged neighborhoods often have fewer trees than more wealthy areas and people in poorer areas usually lack the resources to care for trees and vegetation. Areas zoned commercial may have fewer trees, providing an opportunity for increasing canopy cover.
Action 4: Make and maintain a list of all tree species in Silver City.
Action 5: Map the extent of invasive non-native trees (Siberian elm and Tree-of-Heaven) to develop benchmarks for future evaluations and to prioritize removal and restoration projects.
Action 6: Identify areas of greatest opportunity and need as priorities for improving the urban forest
Action 7: Identify and catalog landmark and heritage trees.

Objective 2: Define the economic and environmental benefits derived from the ecological services provided by a healthy urban forest in Silver City.

Action 1: Determine the economic benefits of the Town's trees, such as canopy cover, increased home value, carbon sink and increased health benefits.
Action 2: Use the information to educate the public and Town policy makers.

Section 2: Urban Forest Management

Goal #2: Maintain and manage the urban forest to promote health, longevity and to maximize benefits.

Rationale: Community trees and forests are valuable because trees provide many goods and services. Trees maintained on a regular cycle are healthier, live longer and reduce the Town's liability from hazards such as dead limbs. The many benefits provided by trees increase as the tree population and overall canopy coverage increase. Species diversity helps ensure no single pathogen or insect can decimate an entire population. A range of tree ages helps ensure continuity and sustainability of the forest.

Objective 1: Promote health and longevity of Silver City's urban forest.

Action 1: Establish and train maintenance crew in best management practices (BMPs) such as trimming, mulching, irrigation, removal of hazard trees, and replacement with a diversity of drought-tolerant native trees. Town maintenance practices should be consistent with the most current industry standards.

Action 2: Develop a Community Forest Management and Maintenance Plan for all Town-owned trees based on the BMPs. Develop a plan for each developed park that includes tree replacement and additional tree plantings.
Action 3: Monitor Community Forest health to plan and accomplish management activities.
Action 4: Maintain a library for tree management and a clearinghouse for tree education and advice.
Action 5: Decrease wildfire risk by removing fuels in appropriate areas.
Action 6: Prepare plans and educate staff and the public on how to address diseases and pest outbreaks that may threaten the urban forest.
Action 7: Continue to revise and update Town BMPs for tree and forest maintenance on an ongoing basis.

Objective 2: Explore adding an Open Space Division to PWPD to manage trees on designated Open Space lands.

Objective 3: Maximize benefits provided by trees.

Action 1: Determine the most strategic locations for new or replacement tree plantings and give them highest priority for planting in the short-term.
Action 2: Focus planting efforts in tree deficient areas in order to distribute the urban forest equitably throughout the city.

Objective 4: Model good stewardship of trees on Town-owned property, be the leader in preserving, restoring and enhancing the urban forest.

Action 1: Demonstrate sustainable urban forestry practices on all Town projects.
Action 2: Utilize new technology such as structural soils and pervious pavement to improve growing conditions for trees in harsh environments such as urban streets and industrial areas.
Action 3: Provide good examples of sustainability, such as forest restoration or tree friendly public works approaches that enhance trees and the general condition of the forest.

Goal #3: Coordinate urban forest management activities between Town departments

Rationale: Urban forestry in the Town of Silver City involves many departments and links to outside entities. Jurisdictional boundaries can sometimes be difficult to determine. Multiple departments each with its own primary mission also manage trees. It is important that Town departments have effective processes in place to communicate with one another regarding common urban forestry issues ranging from budget development to maintenance practices.

Objective 1: Coordinate the roles, responsibilities, policies and projects of Town departments and partners for planning and managing the urban forest.

Action 1: Consider developing a tree ordinance that defines the policies, and roles and responsibilities of Town departments for planning and managing the urban forest.
Action 2: Integrate urban forest management planning with other Town efforts affecting vegetation, open spaces and sustainable development.
Action 3: Coordinate city-wide plans for wildfires, floods, stormwater, and sustainability to ensure that urban forest goals for different departments are compatible.
Action 4: Encourage all Town departments to consider tree planting in their developments, capital improvements and operation programs and long-range plans.

Goal #4: Identify specific budget line items for tree resources in appropriate departments.

Rationale: The proactive and professional management of any public infrastructure component requires a sufficient level of funding to maintain the component to industry and community standards, and the urban forest is no different. However, the urban forest is often viewed as a luxury and not a vital component of the urban infrastructure. But this view only acknowledges the aesthetic value of trees and ignores the tremendous benefits they provide.

Objective 1: Ensure adequate staff and resources to manage the tree resource.

Action 1: Work toward establishing stable funding and adequate resources and staff to maintain, preserve, restore and increase all aspects of the urban forest.
Action 2: Explore opportunities to add a budget category in PWPD specific to tree management.

Goal #5: Ensure public safety from potential wildfires.

Rationale: Some residential areas are at risk for wildfires, both natural and human caused. Management can improve the condition of the natural area and improve public safety.

Objective 1: Adopt an Urban Wildfire Hazard Plan.

Action 1: Remove dead and/or decaying trees that pose hazards to the general public, especially in high use areas and along trails.
Action 2. Continue enforcement of land use codes that decrease wildfire risk, such as no camping on urban public lands.

Section 3: Community Framework

Goal #6: Increase public awareness and understanding about the value and benefits of the urban forest and promote proper care for the urban forest.

Rationale: Sustainable urban forests require community involvement**.** For citizens to become active in caring for, enhancing and advocating for the urban forest, they much first be made aware of the benefits and value it provides. Knowledgeable residents provide better care and act as stewards for trees in their neighborhood. They also need to understand the challenges facing

the urban forest and the actions they can undertake personally, or as groups, to enhance forest vitality.

Objective 1: Educate residents about the importance and benefits of trees

Action 1: Educate and increase awareness of all citizens on importance of trees, including reducing the urban heat island effect, enhancing recreational opportunities, improving quality-of-life, improving air quality, saving energy, and mitigating and adapting to climate change
Action 2: Initiate multi-media awareness campaigns about the benefits of the urban forest for target audiences and provide them with appropriate and easy to understand information. Develop a variety of resources to educate homeowners about the urban forest.
Action 3: Involve community in inventories and assessments, including school students and interested citizens.

Objective 2: Educate residents about the management and care of the trees, including businesses and schools.

Action 1: Develop and complete a tree care pamphlet to inform residents about tree values and management, including tree planting, preservation and care. Distribute to all households and businesses.
Action 2: Implement urban forest restoration demonstration projects on Town-owned lands
Action 3: Educate property owners about their responsibilities for the care of street trees.

Objective 3: Explore incentives to encourage residents to both plant new trees and preserve existing ones and practice good stewardship through BMPs.

Action 1: Research private and/or public funding that could be used to implement projects that engage the community in active stewardship of the urban forest.
Action 2: Encourage tree planting on private property.
Action 3: Identify special trees throughout the community and mark their historic, biological or other noteworthy traits with signs or other means.
Action 4: Explore community assistance programs that encourage low income property owners to plant and care for trees on their land.

Objective 4: Maintain strong partnerships with non-profit groups and develop new alliances that expand and improve the urban forest.

Action 1: Work with Gila Conservation Education Coalition to develop community service opportunities with schools and other institutions for urban forest stewardship projects.
Action 2: Continue to work with Tree New Mexico to distribute trees and educate the public.

Action 3: Include other entities such as Silver City Public Schools, etc. when considering new tree planting opportunities.

APPENDIX A

Individual Tree Inventory
of
Town-owned Trees

Penny Park Tree Inventory with Tree DBH Classes								Date of Inventory	8/7/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total each Species**	**Notes**
Siberian elm	non-native	10	17	13	14	8	17	79	Dead Siberian elm >20" in playground near slide
Cottonwood	native					1	4	5	
Ash	native			1	1			2	Small elm needs to be removed on south side, outside fence
Pine	non-native	2						2	
Juniper	native			1				1	
Sycamore	native	3						3	
Desert Willow	native	6						6	
Tree of Heaven	non-native	2						2	
Ponderosa	native	1						1	1 dying Ponderosa, south side
Chaste (Vitex agnes-castus)	non-native	2						2	
		26	17	15	15	9	21	**TOTAL TREES 103**	
Size Class % of total		25%	17%	15%	15%	9%	20%		
TOTAL Native	18	17%							
TOTAL non-native	85	83%							
Canopy Cover	45%								

Skate Park Tree Inventory with Tree DBH Classes								Date of Inventory	8/7/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Siberian elm	non-native			1	3		2	6	
Cottonwood	Native	4	1	3				8	
Pine	native	5						5	
Ash	native	5						5	North side of park smooth gray bark pinnate, compound leaves
locust	native	1						1	multi-stemmed
Desert Willow	native	3						3	
TOTAL For Size Class		18	1	4	3	0	2	**TOTAL TREES 28**	
Size Class % of total		64%	4%	14%	11%	0%	7%		
TOTAL Native	22	79%							
TOTAL non-native	6	21%							
Canopy Cover	19%								

Hidden Park Tree Inventory with Tree DBH Classes								Date of Inventory	4/29/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Siberian elm	non-native	22						22	Many stressed and dying trees, and some dead, esp. pinon – fire hazard
Pinon	native	38	57	5	7	6	4	117	
Juniper	native	74	38	13	8	10	9	152	Many of the smaller diameter trees were multi-stemmed
Oak	native			2	1			3	
TOTAL For Size Class		134	95	20	16	16	13	**TOTAL TREES 294**	
Size Class % of total		46%	32%	7%	5%	5%	4%		
TOTAL Native	272	93%							
TOTAL Non-native	22	7%							
Canopy Cover	33%								

Gough Park Tree Inventory with Tree DBH Classes								Date of Inventory	7/29/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Mulberry	non-native						8	8	
Locust	native		1				1	2	
Velvet Ash	native		1					1	
Pine	non-native				1	1		2	
Weeping Willow	non-native						3	3	
Sycamore	native						2	2	
Apricot	non-native					1		1	
Plum	non-native			2		2		4	multi-stemmed
Spruce Englemann	native						1	1	
TOTAL For Size Class		0	2	2	1	4	15	**TOTAL TREES 24**	
Size Class % of total		0%	8%	8%	4%	17%	63%		
TOTAL Native	6	25%							
TOTAL Non-native	18	75%							
Canopy Cover	**37%**								

Noble Park Tree Inventory with Tree DBH Classes								Date of Inventory	7/29/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Siberian elm	non-native				2	2	4	8	
Chaste (Arbor Vitae)	non-native	4						4	multi-stemmed
Tree of Heaven	non-native			1				1	
Hackberry	non-native			1				1	
Cedar	non-native						2	2	
TOTAL For Size Class		5	0	2	2	2	6	**TOTAL TREES 16**	
Size Class % of total		29%	0%	12%	12%	12%	35%		
TOTAL Native	0	0%							
TOTAL Non-native	16	100%							
Canopy Cover	**61%**								

Ybarra Park Tree Inventory with Tree DBH Classes								Date of Inventory	7/29/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Siberian elm	non-native		2	1				3	
Mulberry	non-native			5				5	
Tree of Heaven	non-native		2					2	
Locust	native			5				5	
TOTAL For Size Class		0	4	11	0	0	0	**TOTAL TREES 15**	
Size Class % of total		0%	27%	73%	0%	0%	0%		
TOTAL Native	5	33%							
TOTAL Non-native	10	67%							
Canopy Cover	**21%**								

Spring Park Tree Inventory with Tree DBH Classes								Date of Inventory	7/29/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Mulberry	non-native			3				3	
TOTAL For Size Class		0	0	3	0	0	0	**TOTAL TREES 3**	
Size Class % of total		0%	0%	100%	0%	0%	0%		
TOTAL Native	0	0%							
TOTAL Non-native	3	100%							
Canopy Cover	**4%**								

Pope Park Tree Inventory with Tree DBH Classes								Date of Inventory	7/30/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Cottonwood	native						1	1	
Cypress	native						4	4	
TOTAL For Size Class		0	0	0	0	0	5	**TOTAL TREES 5**	
Size Class % of total		0%	0%	0%	0%	0%	100%		
TOTAL Native	5	100%							
TOTAL Non-native	0	0%							
Canopy Cover	**62%**								

Virginia Street Park Tree Inventory with Tree DBH Classes								Date of Inventory	8/7/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**notes**
Weeping Willow	non-native						1	1	
Honey Locust	non-native			1				1	
Cottonwood	native						1	1	
Sycamore	native				1			1	
TOTAL For Size Class		0	0	1	1	0	2	**TOTAL TREES 4**	
Size Class % of total		0%	0%	25%	25%	0%	50%		
TOTAL Native	1	25%							
TOTAL Non-native	3	75%							
Canopy Cover	**22%**								

Silva Creek Botanical Gardens Tree Inventory with Tree DBH Classes								Date of Inventory	8/7/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Siberian elm	non-native		2	6	4	1	7	20	
Hackberry	non-native	1						1	multi-stemmed
Alder	native	1						1	
Juniper	native	2	3					5	
Sycamore	native	1						1	
Velvet Ash	native	4						4	multi-stemmed
Desert Willow	native	2						2	
Gambel Oak	native	1						1	
Oak	native	2						2	
TOTAL For Size Class		14	5	6	4	1	7	**TOTAL TREES 37**	
Size Class % of total		38%	14%	16%	11%	3%	19%		
TOTAL Native	16	43%							
TOTAL Non-native	21	57%							
Canopy Cover	**60%**								

La Capilla Park Tree Inventory with Tree DBH Classes								Date Inventory	8/7/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Siberian elm	non-native		2	2	1			5	dying off (1 dead)
Mulberry	non-native			1				1	
Tree of Heaven	non-native		1					1	
TOTAL For Size Class		0	3	3	1	0	0	**TOTAL TREES 7**	
Size Class % of total		0%	43%	43%	14%	0%	0%		
TOTAL Native	0	0%							
TOTAL Non-native	7	100%							
Canopy Cover	**<1%**								

Silver City Museum Tree Inventory with Tree DBH Classes								Date Inventory	10/15/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Poplar (Silver leaf)	non-native						2	2	Legacy tree sw corner
Pine	non-native					1	1	2	
Siberian elm	non-native						1	1	
Sycamore	native			1		1		2	
TOTAL For Size Class		0	0	1		2	4	**TOTAL TREES 7**	
Size Class % of total		0%	0%	14%	0%	29%	57%		
TOTAL Native	2	29%							
TOTAL Non-native	5	71%							
Canopy Cover	41%								

Silver City Library Tree Inventory with Tree DBH Classes								Date Inventory	10/15/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Juniper	native						1	1	Legacy tree nw corner
Sycamore	native				1			1	
Pine	non-native			1		1	1	3	
TOTAL For Size Class		0	0	1	1	1	2	**TOTAL TREES 5**	
Size Class % of total		0%	0%	20%	20%	20%	40%		
TOTAL Native	2	40%							
TOTAL Non-native	3	60%							
Canopy Cover	13%								

Recreation Center Tree Inventory with Tree DBH Classes								Date of Inventory	8/7/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Weeping Willow	non-native	1		1				2	
Honey Locust	non-native	1						1	
Plum	non-native	6						6	
Siberian elm	non-native						3	3	
TOTAL For Size Class		8	0	1	0	0	3	**TOTAL TREES 12**	
Size Class % of total		67%	0%	8%	0%	0%	25%		
TOTAL Native	0	0%							
TOTAL Non-native	12	100%							
Canopy Cover	5%								

Swimming Pool Tree Inventory with Tree DBH Classes								Date Inventory	8/7/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Siberian elm	non-native	6		10	2	1	1	20	Dead one on North side
Tree of Heaven	non-native		2					2	
Ash	native	2	3	2				7	
Pine	native	1	4	4	3	1		13	
Juniper	native		1	4	1	3		9	
Desert Willow	native							0	
TOTAL For Size Class		9	10	20	6	5	1	**TOTAL TREES 51**	
Size Class % of total		18%	20%	39%	12%	10%	2%		
TOTAL Native	29	57%							
TOTAL non-native	22	43%							
Canopy Cover	20.4%								

Visitor's Center Tree Inventory with Tree DBH Classes								Date Inventory	10/15/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Cedar	non-native		1	1	1	1		4	
Tree of Heaven	non-native	2						2	
Ash	non-native	14	7	2				23	
Pine	non-native	9	9					18	
Bradford Pear	non-native	3						3	
Plum	non-native	2						2	
Locust	non-native	16						16	
Siberian elm	non-native	2	9	6	5		1	23	
TOTAL For Size Class		48	26	9	6	1	1	**TOTAL TREES 91**	
Size Class % of total		53%	29%	10%	6%	1%	1%		
TOTAL Native	0	0%							
TOTAL non-native	91	100%							
Canopy Cover	13%								

Big Ditch Park Tree Inventory with Tree DBH Classes (Btwn College and Bullard)								Date Inventory	4/26/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
									Most trees in smaller diameter class are multi-stemmed
Cottonwood	native	18	14	14	1	14	37	98	
Box Elder	native	94	66	17	5	3	1	186	
Alligator Juniper	native	1					1	2	
NM Locust	native	15			1		1	17	
Velvet Ash	native		5					5	
Arizona Cypress	native		1					1	
Ash	native	4	1					5	
Mulberry	non-native		4	2				6	
Silverleaf Poplar	non-native	1		2	1	1		5	
Weeping Willow	non-native	2				1	1	4	
Ornamental Pine	non-native	7	1					8	
Lombardy Poplar	non-native		3					3	
Tree of Heaven	non-native	269	206	20	5	1		501	
Syberian Elm	non-native	134	108	73	45	20	13	393	
Red Bud	non-native	9	2					11	
Total for Size Class		554	411	128	58	40	54	**TOTAL TREES 1,245**	
Size Class % of total		44%	33%	10%	5%	3%	5%		
TOTAL Native	314	25%							
TOTAL Non-Native	931	75%							
Canopy Cover	83.8%								

Street Tree Inventory with Tree DBH Classes 6th St. between Arizona St. and Cooper St.								Date Inventory	10/14/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Bradford Pear	non-native	14	1					15	
Fruitless Plums	non-native	3	6	3				12	
TOTAL For Size Class		17	7	3	0	0	0	**TOTAL TREES 27**	
Size Class % of total		63%	26%	11%	0%	0%	0%		
TOTAL Native	0	0%							
TOTAL Non-native	27	100%							

Street Tree Inventory with Tree DBH Classes Bullard Street between College Ave and San Vicente Street								Date Inventory	10/14/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
Arizona Ash	Native		4						
Fruitless Plums	non-native			3					
TOTAL For Size Class		0	4	3	0	0	0	**TOTAL TREES 7**	
Size Class % of total		0%	57%	43%	0%	0%	0%		
TOTAL Native	4	57%							
TOTAL Non-native	3	43%							

Golf Course Tree Inventory with Tree DBH Classes								Date Inventory	10/19/2013
Species	**Native or Non-native**	**DBH 0.1 - 4"**	**DBH 4.1 - 8"**	**DBH 8.1 - 12"**	**DBH 12.1 - 16"**	**DBH 16.1 - 20"**	**DBH >20"**	**Total for Species**	**Notes**
									Most trees in smaller diameter class are multi-stemmed
Ash	native	20	0	3	5	2	1	31	
Cottonwood	native	17	22	24	12	22	26	123	
Juniper	native	19	12	16	11	22	12	92	
Sycamore	native	0	0	4	1	0	0	5	
Black Willow	native	10	11	23	22	27	54	147	
Pine	non-native	0	22	49	30	26	6	133	
Apple	non-native	0	0	0	1	0	0	1	
Cypress	non-native	0	0	1	2	0	1	4	
Siberian elm	non-native	623	266	122	54	46	20	1,131	
Ornamental Plum	non-native	3	0	0	0	0	0	3	
Poplar	non-native	6	8	20	5	7	2	48	
Russian olive	non-native	0	2	3	2	3	0	10	
Tree of Heaven	non-native	620	8	0	0	0	0	628	
Weeping Willow	non-native	0	0	0	0	0	1	1	
Total for Size Class		1,318	351	265	145	155	123	**TOTAL TREES 2,357**	
Size Class % of total		56%	15%	11%	6%	7%	5%		
TOTAL Native	398	17%							
TOTAL Non-Native	1,959	83%							
Canopy Cover	15%								

APPENDIX B

Canopy Cover Inventory

Canopy Cover Estimation by iTree			http://www.itreetools.org/canopy/survey.php?					
Number	Name	% Cover	Std Error	# Points	Acres Tree	Acres Non-tree	Acres Other	Total Acres
0	Big Ditch	83.8	3.7	100	3.33	0.64		3.97
1	Spring Street	4	2	100	0.01	0.33		0.34
2	Noble Park	61	4.88	100	0.23	0.15		0.38
3	Ybarra Park	21	4.07	100	0.05	0.2		0.25
4	Swimming pool	20.4	4.04	100	1.2	2.47	0.9 pool 1.38 tennis	5.95
5	Hidden Park	33	4.7	100	1.45	2.95		4.40
6	Cherry Hills	0				0.23		0.23
7	Scott Park	0				41		41.00
8	Golf Course	15	3.57	100	25.6	134.4		160.00
9	Skate	19	3.92	100	0.16	0.68		0.84
10	Penny Park	45	4.97	100	0.86	1.05		1.91
11	Ben Altamirano	0				24.4		24.40
12	La Capilla	<1.0		100		0.69		0.69
13	Pope St	62	4.85	100	0.17	0.1		0.27
14	Visitors Ctr	13	3.67	100	0.21	1.02	0.11 bldg & carport	1.34
15	Johnny Banks	3	1.73	100	0.02	0.63		0.65
16	Rec Ctr (&Bldg)	5	2.24	100	0.07	1.07	0.23 bldg	1.37
18	Gough Park	37.0	4.83	100	0.88	1.5		2.38
19	Virginia St	22	4.14	100	0.18	0.62		0.80
20	Silva Creek Botanical	60	4.9	100	0.75	0.5		0.80
21	SC Museum	41	4.92	100	0.33	0.08	0.39 bldgs	0.80
22	SC Library	13	3.36	100	0.06	0.03	0.4 bldgs	0.13
							Total Acres	252.9
Open Space								
A	Boston Hill	8	2.83	100	44.8	531.2		576.00
B	San Vicente Arroyo	10	3	100	12.8	128		140.80
Town of Silver City Total Area		18.1	2.44	250	1.93 mi²	8.77 mi²		10.70 mi²
					1235.2 ac	5,612.8 ac		6,848.0 ac

Town of Silver City
Community Forestry Demonstration Project
October 2013

The Office of Sustainability worked with the Parks Division of the Public Works Department to design and implement a community forestry demonstration project that uses stormwater harvesting for a portion of the irrigation.

The original plan outlined in the grant application was to partner with Main Street Organization to implement part of their Silver City Downtown Action Plan and Greenways Pathways Plan by planting trees along several finger streets that run from Bullard Street, the main street through town, a short distance to the Big Ditch Park. However, soon after the grant funding was awarded, the Manager of the Silver City Main Street Project moved on to a different job, and the position was left vacant for several months. In addition, the building owners along the finger streets where tree planting was planned voiced concern about damage to their buildings from irrigation water and tree roots. An alternative was sought that would meet the requirements of the grant of utilizing stormwater and planting trees.

The Office of Sustainability worked with the Parks Division of the Public Works Department and the Community Development Department to find a suitable location. The decision was made to enhance an undeveloped Town-owned park that functions as a detention basin collecting stormwater from a 22.0 mi² area. This plan was coordinated with and approved by the NM Energy, Minerals and Natural Resources Department in July, 2013.

Fig 1: Aerial of Johnny Banks Park Project Area at 600 Gold Street, Silver City, NM

The project area shown in Figure 2 is known as Johnny Banks Park. Prior to project implementation, the detention basin was mostly bare dirt with a few scattered weeds, located in an economically depressed area of Town known as Brewer Hill (Figures 2, 3 and 4).

Fig. 2: Johnny Banks Park Detention Basin During a Rainstorm on July 16, 2013

Fig. 3: Street Runoff Flowing Into Detention Basin on July 16, 2013

Fig. 4: A close up view of stormwater in the detention basin on July 16, 2013

A landscape and irrigation contractor was hired to work with the Parks Manager to develop and implement a plan to plant trees and grasses in the 150' x 80' area, and provide supplemental irrigation. The Town installed a water meter next to an existing fire hydrant to supply the irrigation water.

The contractor installed an irrigation system with underground plumbing to irrigate nine 24" box Arizona Sycamore trees with drip irrigation and a grassed area with spray irrigation. The area was graded and approximately 100 cubic yards of local topsoil was spread. Then the area was broadcast seeded with 120 pounds of ornamental turf- type tall fescue and perennial rye grasses. Finally, a mixture of aged compost and steer manure (225 cubic feet) was distributed over the approximately 12,000 square foot area as mulch. See Figure 5 for a plan view drawing of the project. The Town will pay for the irrigation water and the Public Works and Parks Department will maintain the trees and the new infrastructure.

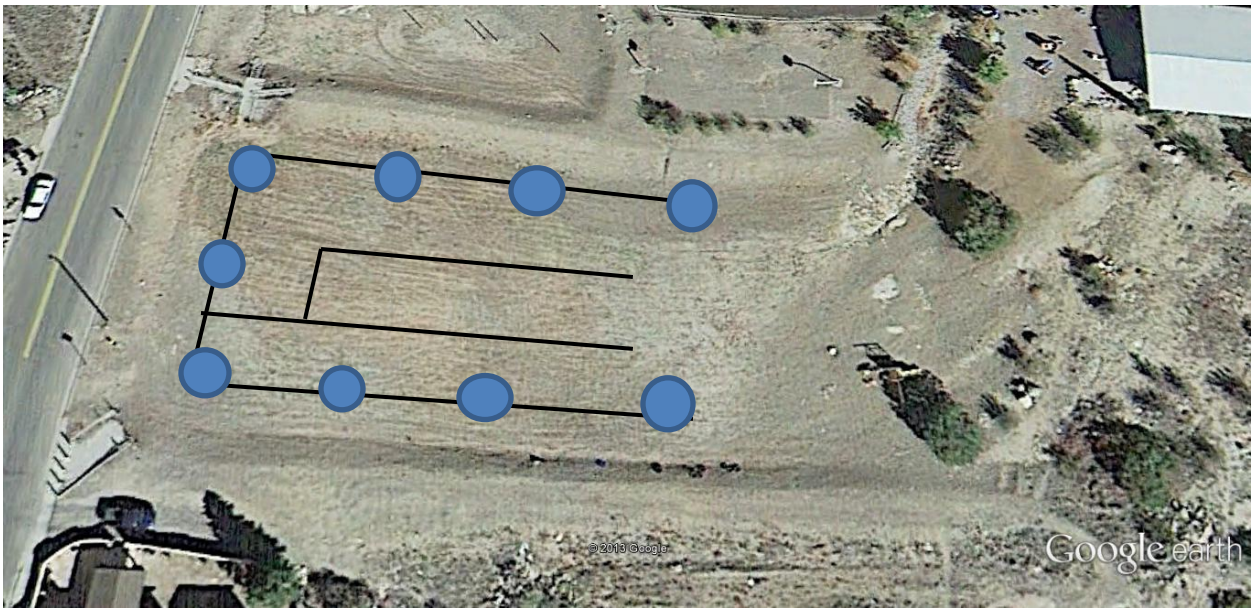

Fig. 5: Plan View of Irrigation System and Tree Location

The Arizona sycamore trees will grow into large, beautiful trees that will provide abundant shade in a previously unattractive location. Stormwater runoff will provide a portion of the irrigation water needed to keep these trees alive and healthy. The grass cover will not only provide a nice place to play and sit, it will provide soil erosion control and help retain soil moisture.

Fig. 6: Photo of completed project area after morning irrigation October 29, 2013

Fig. 7: The Arizona Sycamore trees appear healthy after one week in the ground, October 29, 2013.