2019
IES Wheat Ridge Greenbelt Improvement Project

Final Report

December 2019

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Appendices are available on the IES website, www.i4es.org, and on request at Solutions@i4es.org.

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Executive Summary

The 2019 IES Wheat Ridge Greenbelt Improvement Project took place along the Clear Creek Greenbelt Trail in the City of Wheat Ridge in the spring of 2019. This project built on long-standing partnerships among IES, the Wheat Ridge Parks and Recreation Department (WRPRD), and the Kullerstrand Elementary School TRAILS (Teaching Responsibility and Independence with Learning Supports) program to address needed planting projects in the Greenbelt. This year's Greenbelt project improved native riparian and grassland habitats along Clear Creek through an environmental education program with local children and community members.

This report includes information on the development, implementation, and evaluation of the project. The report describes the project goals, activities, and outcomes to evaluate its success and provide information on implementing similar projects in the future. Included in this report are recommendations to improve the project and future programs.

While IES continued its partnerships with the Kullerstrand TRAILS program, the Wheat Ridge Summer Sun Camp program, and WRPRD, IES added new components that improved our understanding of the planting program and increased its outreach in the community, including a summer evaluation of current and past planting sites to allow for needed adjustments in planting and maintenance. IES conducted an introductory workshop with the Summer Sun Camp to provide the campers with some context for the visits they would make along the trail to care for the plants. A local troop of Daisy Scouts joined the maintenance program to help water plants and learn about the Greenbelt.

The project successfully met all its stated objectives through two project workshops and two planting days. A total of 126 native trees, shrubs, and perennial forbs were planted in riparian and grassland habitat areas. From Kullerstrand, 35 TRAILS and general education students participated, along with 14 staff and parent volunteers. From IES, a total of 17 volunteers assisted with the event, including Tree Stewards, IES Tree Project Team members, and IES Board members. While there were some challenges in implementing the project, IES met its stated project objectives and plans to provide an additional two years of maintenance to the site to ensure that the plants successfully establish at the site.

Chapter 1: Introduction and Overview

Introduction

This report reviews the development, implementation, and evaluation of the 2019 Wheat Ridge Greenbelt Improvement Project. The Institute for Environmental Solutions (IES) implemented this project in Wheat Ridge, Colorado along the Clear Creek Trail west of the trail entrance at Kipling south of 44th Avenue. The project was designed to address important ecological concerns in the Clear Creek area, including stormwater runoff, erosion, increased native canopy cover, and invasive weed removal using tree-planting initiatives and routine plant maintenance. Students from Wheat Ridge's Kullerstrand Elementary School participated in environmental workshops and planting days. Throughout the project, students learned how to properly use tools to plant, investigated life cycles along the Greenbelt, and practiced valuable social interaction skills with peers and adult community volunteers. During the remainder of the growing season, IES volunteer Tree Stewards and Wheat Ridge Summer Sun Camp children cared for IES plants to maintain high survival rates.

The Institute for Environmental Solutions

IES delivers scientific solutions to improve health and the environment. IES's vision is to create efficient ways of dealing with complex environmental problems. IES strives to prevent waste and its unwanted side effects, provide opportunities to optimize environmental improvements, and reduce energy consumption and greenhouse gas emissions through a unique multi-disciplinary approach. By engaging a broad spectrum of participants while tackling these problems on a project basis, IES develops sound, cost-effective solutions.

The IES Tree Project

The IES Tree Project's mission is to improve the environmental quality of Colorado cities using tree science. The Tree Project helps communities, businesses, and individuals achieve multiple environmental improvement goals using one tool, native trees. Tree Project Graduate Interns and Associates work on several initiatives to optimize the environmental, social, and economic benefits of urban trees. These initiatives include developing and implementing community tree-planting programs, estimating climate change mitigation through carbon sequestration, developing workshops that describe the benefits of urban forestry, conducting research on tree science, and engaging the community to achieve a greater understanding of urban forestry benefits.

The IES Tree Project goals are to:

- Improve the urban environment through strategic tree planting.
- Facilitate collaboration among many community groups and individuals to find solutions to urban environmental challenges with trees.
- Advance urban forestry science through increased collaboration with academic researchers and local experts.

The IES Tree Project has completed 14 planting programs since IES's beginning in 2004.

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FLN students plant bands along trail property to expand the spiral design planted in 2016

Tree Project Initiatives

The first planting program, *Trees for Healthy Kids and Community Project*, was held in Golden, CO in the 2010-2011 school year to mitigate noise and air pollution. IES partnered with Mitchell Elementary School and the City of Golden to plant 40 trees on school property. In 2011 and 2012, IES partnered with the City of Broomfield to complete the *Trees for Healthy Community and Economy Project*. IES planted trees at Broomfield's new civic center to bolster the community economy.

Sheridan Projects

Since 2015, IES has worked in Sheridan, Colorado in collaboration with the City of Sheridan, Sheridan School District No. 2, Fort Logan Northgate, and the South Suburban Parks and Recreation Department. The goals of projects implemented in Sheridan are to mitigate stormwater run-off and erosion along the community Quincy Trail, remove invasive weed species, and construct a new community space to create a welcoming outdoor area for Sheridan residents to enjoy. Students from Fort Logan Northgate School's Leadership Class have been integral participants in these projects. Sixth through eighth graders participate in planting and community space building days, provide routine plant maintenance, and attend workshops to advance their environmental stewardship and learn effective community leadership.

Wheat Ridge Projects

Since 2013, IES has led multiple projects in Wheat Ridge and has partnered with the City of Wheat Ridge to plan and implement each project. Below is a list of IES's Wheat Ridge projects and their associated goals and purposes.

Project Name	Goals and Purpose
2013 Revive the Greenbelt! Project	Restore plant and wildlife habitats along Wheat Ridge Greenbelt, manage stormwater runoff and pollution to Clear Creek.
2014 Preserve the Greenbelt Project	Engage students in ecological education, increase native canopy cover by planting over 200 new native trees and shrubs along Clear Creek.
2015 Growing the Greenbelt Project	Engage students in ecological education, increase native canopy cover by planting over 140 new native trees and shrubs along Clear Creek.
2016-2018 Greenbelt Restoration and Environmental Education Network (GREEN) Project	Teach students with social emotional disabilities about local ecology while increasing native canopy cover and decreasing stormwater runoff and erosion along the Wheat Ridge Greenbelt through the planting of 449 native plants.

The 2019 IES Greenbelt Improvement Project builds on previous IES Wheat Ridge goals to improve the cherished Greenbelt for all Wheat Ridge residents. This report details this project in all phases, including planning, implementation, and evaluation.

Wheat Ridge High School students planted trees along the Greenbelt

Chapter 2: IES Greenbelt Improvement Project

The IES 2019 Greenbelt Improvement Project continues IES's work to restore native trees and plants along the Clear Creek Trail in Wheat Ridge. The project builds on IES's relationship with Kullerstrand Elementary to provide students with serious emotional disabilities the opportunity to participate in a hands-on environmental education program. Students in Kullerstrand's Teaching Responsibility and Independence with Learning Supports (TRAILS) program participated in workshops and planting days, planting native trees, shrubs, and forbs to reduce stormwater runoff, erosion, and invasive species along Clear Creek.

The 2019 Greenbelt Improvement Project is the seventh year of collaboration with the City of Wheat Ridge. Continued support from Wheat Ridge Parks and Recreation (WRPRD), Kullerstrand Elementary School, and Wheat Ridge Summer Sun Camp made the success of the 2019 project possible.

Project Goals and Objectives

The goals of the 2019 IES Greenbelt Improvement Project included:

- Improve the ecological health and quality of riparian and grassland habitats along Clear Creek.
- Encourage environmental stewardship among local Wheat Ridge children by teaching Colorado ecology and how to care for and improve the community using tree science.
- Provide routine tree maintenance to all new plants for 3 years following planting to increase survival rates.

To accomplish the goals for the 2019 Greenbelt Improvement Project, IES developed the following objectives:

1. Restore ecological health of riparian and grassland ecosystems by removing invasive species and planting 100 native trees, shrubs, perennials, and grasses.
2. Provide a hands-on naturalist program for disadvantaged TRAILS students and children in the community to restore and care for the Wheat Ridge Greenbelt.
3. Care for new plants to ensure high survival rates by implementing a 3-year maintenance program.
4. Evaluate the success of the program and document the program in a final report and video.

These objectives were created to address the environmental concerns of the 2019 Greenbelt site, while providing educational opportunities for the TRAILS students.

Kullerstrand Workshops and Planting Days

IES engaged thirty-five Kullerstrand TRAILS students and their general education partners during two workshops and two planting days to provide in-class educational lessons and hands-on activities. IES Environmental Education Coordinator Carrie Martin-Haley led Workshop 1, which included lessons on tools and safety, planting instructions, and the creation of nature journals. Speaking notes for workshop rotations can be found in Appendix A. TRAILS students applied the information they learned at the first workshop during Planting Day 1 when they worked in the riparian section of the trail to plant native trees and shrubs. Planting Day 1 focused on larger trees and shrubs. Students participated in an educational nature walk that tied in the theme of life cycles introduced in Workshop 1. On Planting Day 2, students focused on the grassland section of the 2019 site to plant smaller native shrubs and flowers and participated in a

Kullerstrand students on Planting Day 1

life cycle-based scavenger hunt. Carrie Martin-Haley led Workshop 2, which bookended the planting days. During Workshop 2, students wrote thank you cards to project sponsors, mapped the planting area, and completed their nature journals. Speaking notes for Workshop 2 can be found in Appendix A.

2019 Greenbelt Planting Design

The 2019 Greenbelt planting design was developed by Tree Project Manager, Sabrina Kleinman. The design organized the planting of 126 native trees, shrubs, perennials, and grasses in the grassland and riparian sections of 2019 planting site. Native species included three-leaf sumac, yellow prairie coneflower, lanceleaf coreopsis, chokecherry, American plum, and plains cottonwood. Table 1 shows a breakdown of the planted species. The riparian section of the 2019 site included larger trees and fewer small plants, while the grassland focused on a larger quantity of shrubs and flowers. The 2019 Greenbelt Design Plan and Project Plan can be found in Appendix B.

Table 1. Species Planted in 2019 Greenbelt Improvement Project

Species	Scientific Name	Number Planted
Three-leaf sumac	Rhus trilobata	20
Yellow prairie coneflower	Ratibida columnifera	30
Lanceleaf coreopsis	Coreopsis lanceolata	30
Chokecherry	Prunus virginiana	20
American plum	Prunus americana	20
Plains cottonwood	Populus deltoides	6

Maintenance Program

To ensure the success of the 2019 Greenbelt Improvement Project, IES implemented a maintenance program to care for the project sites for three years after planting. IES continued its partnership with the Wheat Ridge Summer Sun Camp to advance the Tree Ambassadors Program. Thirty-nine Summer Sun campers participated in the Tree Ambassadors Program twice a week to water, weed, and mulch the plantings. Once a month, the Tree Ambassadors worked with Susan Bennett, WRPRD Environmental Interpreter, to assess growth and plant health by measuring the trees. This year IES began working with Daisy Girl Scout Troop 67337 in the Greenbelt. The Daisy Girl Scouts managed a small site and met once a week during the summer months to care for their assigned plants.

IES continued its volunteer-based Tree Stewards program. Dedicated Tree Stewards weeded, watered, mulched, and monitored plant health. Tree Stewards conducted evaluations of their assigned plants, which IES used to determine

plant survival and health as it pertains to the success of the project. Tree Stewards evaluations can be found in Appendix C.

Project Donors and Sponsors

IES is grateful for all the support its donors and sponsors have provided towards the success of the 2019 Greenbelt Improvement Project. The project was made possible through generous funding from:

- Patagonia Denver
- Colorado Tree Coalition
- National Environmental Education Fund (NEEF) Every Day Event Grant with support from Toyota
- Wheat Ridge Outside Agency

Tree Ambassadors volunteering their time to weed along the Greenbelt

Chapter 3: Project Organization

Community-Based Project Partners

The 2019 IES Greenbelt Improvement Project was accomplished through strong partnerships with and contributions from the Wheat Ridge Parks and Recreation Department (WRPRD) and Kullerstrand Elementary Teaching Responsibility and Independence with Learning Supports (TRAILS) program.

Kullerstrand Elementary TRAILS students participated in both planting events along the Greenbelt in 2019

IES began its partnership with WRPRD in 2012 with the *2012-2013 IES Wheat Ridge Preserve the Greenbelt* project. This partnership has been vital in the implementation of all IES's Wheat Ridge projects throughout the years. IES and WRPRD, collaboratively through IES initiatives, have planted and maintained over 1,000 new plants and trees in the Wheat Ridge Greenbelt. WRPRD owns the Greenbelt and provides needed materials, such as water for the water tanks along the trail and mulch to aid in plant establishment at the site. Wheat Ridge Parks and Recreation also administers the Summer Sun Camp program, which is organized by the Wheat Ridge Recreation Center. This program has teamed with IES for the past three years to provide critical plant maintenance to new plants during the hot summer months.

Kullerstrand Elementary initially worked with IES in 2014 with the *Preserve the Greenbelt* Project. After that project, Kullerstrand approached IES about developing a planting program for its TRAILS students, which resulted in the *Greenbelt Restoration and Environmental Education Network (GREEN)* Project. The GREEN Project ran from 2016 to 2018. This partnership allowed the Tree Project to expand its environmental education focus by providing a unique outdoor experience to a group of students who do not often participate in outdoor activities. Through this partnership the TRAILS students continue to learn about local ecology and planting while practicing social interaction skills with their general education peers and local community volunteers.

Tree Stewards discussed site maintenance during the Tree Stewards Training in early summer 2019

The Tree Project Steering Committee

The Steering Committee for the Tree Project is a group of professionals in a variety of fields who are passionate about the Tree Project's work. These dedicated volunteers help the IES Tree Project develop ideas for projects and problem-solve issues that arise. The Steering Committee meets quarterly to provide valuable feedback to the Tree Project team. Steering Committee meeting agendas can be found in Appendix D.

Maintenance

Three groups have been instrumental to IES's three-year maintenance program to water, weed, and mulch new IES planting sites, which contributes to high survival rates of plantings.

IES led the Tree Ambassador program with the Wheat Ridge Recreation Center's Summer Sun Camp for the past four years. Campers range in age from 6 to 14 years and visit the Greenbelt twice a week to water and weed an assigned planting site for the duration of the summer. IES celebrates the Sun Campers' work at the end of each summer with an awards ceremony where the campers receive an official Tree Ambassador certificate and a small thank-you gift from IES and WRPRD.

A Daisy Scout works in the Greenbelt to water plants during the summer

The Tree Stewards are community volunteers who visit assigned planting sites one to two times each week in the Greenbelt from April through October, depending on weather. The Tree Stewards water, weed, and mulch their sites and communicate with IES when they have concerns about their plants. As part of the 2019 Greenbelt Improvement Project, IES hosted a training opportunity on June 8 to review proper techniques and discuss common site concerns along the Greenbelt. This training program addressed some common issues raised by the Stewards over the years about plant maintenance and watering.

A small group of Daisy Girl Scouts from Troop 67337 volunteered to water a portion of the Greenbelt during the summer of 2019. These young scouts ranged from 6 to 8 years old and were eager to learn about how to improve the local environment.

Collaborative Funding

The 2019 Greenbelt Improvement Project was funded by generous grants provided by:

- NEEF Every Day Events with support from Toyota $7,858.48
- Patagonia Denver $3,000
- Wheat Ridge Outside Agency $1,800
- Colorado Tree Coalition $1,500
- Target $100 in gift cards

In-kind contributions from project partners also helped make this year's project possible. Tree Project team members tracked in-kind contributions from the Tree Stewards, Tree Ambassadors, team members, and other community volunteers for this project. These contributions have provided valuable time from hardworking volunteers, and are crucial to the success of all Tree Project programs. Over 100 hours of in-kind contributions were logged during the project, in addition to the time contributed by the dedicated Tree Project team members.

Project Plan

The 2019 Greenbelt Improvement Project Plan was developed by Sabrina Kleinman, IES Tree Project Manager. The Project Plan can be found in Appendix B.

There are six major components to the project plan:

- Establish project objectives and schedule
- Plan and implement classroom workshops
- Plan and implement planting days
- Implement Tree Stewards and Tree Ambassadors programs
- Perform community outreach
- Evaluate success of the project and write Final Report

Summer Sun Camp children participated in a kick-off workshop on June 4 to prepare the campers for expectations during the planting days

Project Timeline

The 2019 Greenbelt Improvement Project began in August 2018 with meetings with WRPRD to discuss project location and planting needs along the Greenbelt. Workshops with Kullerstrand TRAILS students took place on April 2, 2019 and May 7, 2019. Planting days were implemented on April 19, 2019 and May 3, 2019. The Tree Ambassador program kicked off with the Summer Sun Campers on June 4, 2019 and their first watering day of the year was on June 7, 2019. Summer Sun Campers continued watering through the beginning of August. The Tree Stewards continued regular maintenance at their sites through early November.

Chapter 4: Community Collaboration

Susan Bennett, WRPRD Environmental Interpreter, led a workshop rotation to teach students how to use a nature journal

The success of the 2019 Greenbelt Improvement Project depended on valuable support and feedback from IES stakeholders. The partnerships among IES, Wheat Ridge Parks and Recreation (WRPRD), Kullerstrand Elementary, and the Wheat Ridge Summer Sun Camp have grown and expanded since 2012 and were vital in developing and implementing this year's planting and educational project in Wheat Ridge.

Importance of Partnership between IES and Wheat Ridge Parks and Recreation

The partnership between IES and WRPRD was essential for the success of the project. This year is the eighth year of partnership with WRPRD. WRPRD is the property owner of the IES 2019 planting sites. WRPRD staff provided feedback and guidance during the planning, implementation, and evaluation phases of the project, approved all planting plans, assisted during planting days, and supported site maintenance activities. WRPRD selected the planting site and provided important information on site conditions. Susan Bennett, WRPRD Environmental Interpreter, played a critical role in this year's project. Ms. Bennett led a rotation during each of the two workshops with Kullerstrand students, teaching students to create and use nature journals to document their observations.

During the Planting Day 1, Ms. Bennett led students on a nature walk to provide interactive education about the life cycle stages. The theme of life cycles was a common thread that ran throughout the project. On the Planting Day 2, Ms. Bennett conducted a scavenger hunt to find examples of life cycles in the Greenbelt. Both activities required the use of the nature journals. Ms. Bennett's activities increased students' engagement and provided a unique way to learn about the Greenbelt's natural habitats. Robin Rice, WRPRD Forestry Technician, arranged the plant order and delivery for both planting days and coordinated WRPRD staff. The WRPRD staff provided assistance during both planting days by handing out plants, assisting in planting the larger trees with students, and planting additional flowers that students were unable to complete during their time at the site. Margaret Paget, WRPRD Forestry and Open Space Supervisor, helped IES with evaluations, strategically chose the planting sites, and provided planting recommendations.

Importance of Partnership between IES and Kullerstrand

This year is the fifth year of partnership with Kullerstrand Elementary, and the fourth year with the TRAILS students. Kullerstrand provided input and guidance for the two workshops that IES planned and implemented for the TRAILS students and their general education peers. The TRAILS teachers provided information on curriculum standards and reviewed workshop lessons and activities. Kullerstrand staff members managed

Students participated in a standards-based mapping activity that matched Kullerstrand curriculum

student behavior during all project activities, including two planting days at the Greenbelt. Kullerstrand TRAILS staff members developed the schedule for the project events and offered feedback and input to account for testing, school events, and other schedule concerns. After all project events were completed, Kullerstrand staff members provided critical feedback to IES to improve future programs.

Importance of Partnership Between IES and Wheat Ridge Summer Sun Camp

The Summer Sun Camp is a summer day camp program run by Wheat Ridge Parks and Recreation and is a crucial part of the IES maintenance program to care for newly planted sites during the summer. This project is the third year of partnership between IES and the Summer Sun Camp. Youth aged 5 to 14 years work as Tree Ambassadors twice weekly for the summer from June 2019 to August 2019.

The Sun Campers provided essential maintenance to ensure high plant survival rates by watering, weeding, and measuring trees to track growth. This partnership provided opportunities to get campers outdoors twice weekly and give back to their community on a regular basis. IES held a Tree Ambassador celebration at the end of summer to reward hard work by campers.

Tree Ambassadors from the Summer Sun camp weeded in the Greenbelt during the summer of 2019

Community Outreach: T-shirts, Videos, Newsletters, and Social Media

IES used a variety of ways to engage community members for the project. Videographer Jesse Johnson captured both workshops and the planting days and filmed a maintenance session with the Sun Campers. The professionally edited video is distributed to all stakeholders, uploaded to the IES website, and available on the IES YouTube channel.

IES maintained its presence in the community through social media, including Facebook, LinkedIn, Instagram, and Twitter. IES posted information in community newsletters and at the Kipling trailhead to inform residents and recruit volunteers for the Tree Steward program.

Chapter 5: Project Design and Events

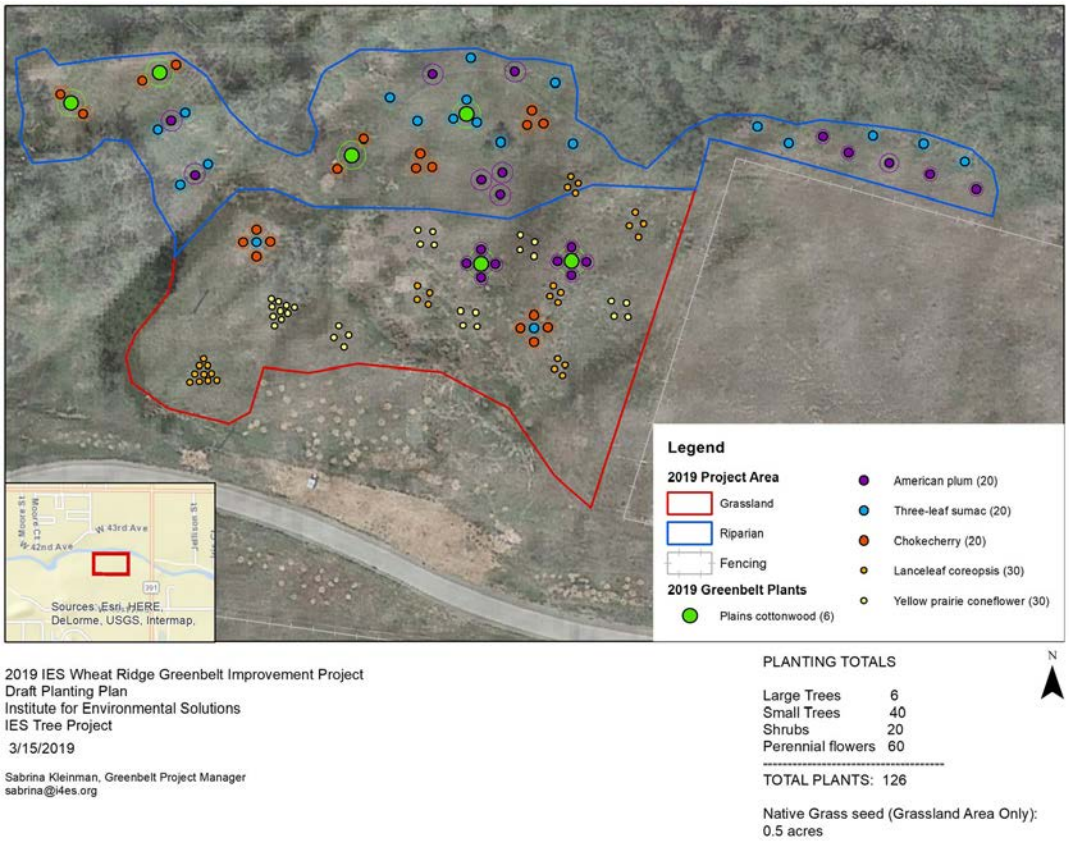
Project Planning

On August 2, 2018, representatives from IES and Wheat Ridge Parks and Recreation Department (WRPRD) met at the Kipling trailhead to review IES planting sites and determine the site and planting needs for the upcoming project. The group discussed areas of concern such as homeless camps in the Greenbelt near Clear Creek, the possibility that certain types of plants might draw deer closer to Kipling Street, soil quality, and how to maintain access for WRPRD vehicles. The group decided, after examining the sites, that clustering plants into groups together led to higher survival rates and should be used in the 2019 planting plan. Meeting notes from this site visit can be found in Appendix E.

Based on the results of this meeting, Tree Project Manager Sabrina Kleinman drew up the 2019 Greenbelt Improvement Project Plan. This plan detailed project milestones and tasks and an estimated timeline for accomplishing each task. Sabrina developed a planting plan, which mapped out where IES planned to plant each species. The Project Plan and Planting Plan can be found in Appendix B.

Planting Design

Sabrina Kleinman worked with WRPRD to develop the planting design based on site meetings and discussions. The planting design divided the area into a riparian corridor along Clear Creek and an adjacent segment of grassland habitat and indicated plant species that were most suitable for each type of habitat. The design included several cottonwood, American plum, and chokecherry trees, as well as shrubs and perennial forbs totaling 126 plants.



The 2019 Greenbelt Improvement Planting Design Plan

Stakeholder Meetings

Initial planning meeting with Kullerstrand Elementary staff members

IES met with staff members to plan the project on November 15, 2018, at Kullerstrand Elementary School. John Kelly, Carrie Martin-Haley, and Kelly O'Toole from IES, Susan Bennett from WRPRD, School Psychologist Jane Reuteler and TRAILS K-2 teacher Sarah Dahlberg from Kullerstrand attended the meeting. Attendees discussed potential topics for workshops and agreed that the theme of life cycles would tie in well with the school curriculum. The TRAILS teaching team asked IES to incorporate team-building, life-skills, and community connections in the upcoming project to complement their efforts to build social and emotional competencies with the students.

The team discussed project logistics, deciding that Fridays were better for planting days. The teachers suggested that IES include larger plants on planting days when possible, as the older students were more motivated by the challenge. The group scheduled workshop and planting dates with the understanding that the number of planting days might change based on available funding. The meeting agenda can be found in Appendix E.

Planting events planning meeting with WRPRD

On January 14, 2019, IES met with Wheat Ridge Parks and Recreation Department staff members to discuss the planting days, including the proposed planting design, numbers of plants and species selection, station locations in the planting area, student activities, and IES and WRPRD responsibilities. WRPRD agreed to order the plants from the Colorado State Forest Service Nursery and store them until the planting days. Attendees discussed curriculum for the classroom workshops, how WRPRD would participate in those workshops, and project funding. The meeting agenda is in Appendix E. The Memorandum of Understanding (MOU) that outlines roles and responsibilities of all stakeholders is in Appendix F.

Workshop planning meeting with Kullerstrand staff

On February 14, IES met again with Kullerstrand staff members to finalize plans for the two workshops. In attendance were Jane Reuteler, TRAILS teacher Bob Livingston, and Sarah Dahlberg from Kullerstrand, and Sabrina Kleinman and Carol Lyons from IES. This meeting confirmed the workshop topics and planting dates and times, and arranged student t-shirts and transportation. The meeting agenda is in Appendix E.

Maintenance planning meeting with WRPRD

On March 19, IES met with WRPRD staff members to discuss participation of the Wheat Ridge Summer Sun Campers as Tree Ambassadors. Sabrina Kleinman and Carrie Martin-Haley attended from IES; WRPRD Environmental Interpreter Susan Bennett and Beth June, WRPRD Recreation Coordinator, attended from Wheat Ridge. The group discussed plans for the Wheat Ridge Summer Sun Campers to maintain a site in the Greenbelt for the Tree Ambassadors Program. To introduce IES to the campers and their families, WRPRD asked that IES attend the camp registration open house in May. IES and WRPRD planned a training session with the Sun Camp staff members to explain roles and responsibilities during maintenance visits and scheduled a hands-on workshop with the campers to introduce them to the project and how it benefits the Greenbelt. The agenda for this meeting is in Appendix E.

Workshop 1

IES staff members and volunteers organized the first workshop at Kullerstrand Elementary, which was composed of three educational, standards-based stations. The stations were: Tools and Safety, led by Carrie Martin-Haley; the Life Cycle of a Tree, led by Blakesley Egan; and Nature Journaling, developed and led by Susan Bennett from WRPRD. The workshop was designed to prepare the students for the first planting day and to introduce ecological concepts needed for the planting days. Workshop 1 introduced the concept of life-cycle stages, which was a theme that students encountered during each IES event.

IES and WRPRD facilitated Workshop 1 on April 2. Students who had reached a specific level of accomplishment in the TRAILS program were each allowed to invite a peer from a general education classroom to be their buddy during the project, resulting in approximately 35 students attending both workshops and planting days. One session of each workshop was designed for the students in grades kindergarten to two, and the second was for students in grades three to five. In each session, the students split into three groups and rotated through three stations. The rotation activities reinforced their knowledge of tools and how to use them safely, led them through creating their own nature journals and beginning to use them to record their observations of plants and plant life cycles, and taught them proper planting techniques.

Carrie Martin-Haley shares tool and safety tips with Kullerstrand kids

When looking back on this workshop, IES staff members felt that the Tools and Safety rotation needed to be refreshed, as the content had been used a few times and was getting repetitive, and that the team needed to prepare materials sooner, as the planting and plant life cycle rotation materials were not ready and needed to be assembled at the last minute. Some students finished early at their stations and needed additional activities to keep them busy. Other tasks needed adjustment to be age appropriate and to make sure the students understood the terminology and illustrations.

Appendix A contains the Workshop 1 outline, station curriculum, and journal examples.

Planting Day 1

The first planting day took place on April 19, having been rescheduled due to snow on the original date of April 12. The TRAILS students and their general education peers planted in the riparian habitat. The students were divided into two groups; one that began planting, and another that went on a nature walk with Susan Bennett. During the nature walk, students observed different stages of life cycles and recorded observations in their nature journals. The groups switched midway through the morning so that each group experienced both planting and the nature walk.

IES flagged the planting locations prior to the students' arrival and set up stations around the area with plants, soil, and water. The students paired up and IES Tree Stewards, staff, interns, and several parent volunteers from Kullerstrand teamed up to help plant. The students found a planting spot, pulled one of the flags from the spot and took that flag to the plant station to get their plant. Once the plant was in the ground, they visited the soil station to get additional fill as needed, and finally the water station to water in the plants. Mulch was available, but adult volunteers were encouraged to mulch the plants so the students could focus on proper planting techniques. This station arrangement helped the planting go smoothly. The kids were able to plant all 50 plants in the riparian habitat, including several larger cottonwood trees. Appendix G contains the Planting Instructions that explain the stations and the planting process.

Logistically, there were a few stumbling blocks. The school bus arrived late, which made it difficult to complete the nature walk rotation on time. Panera left out part of the food order for breakfast and lunch with volunteers. There were too many t-shirts in adult sizes and not enough smaller sizes for the kids. Overall, however, these issues did not affect the success of the day.

Kullerstrand students plant a cottonwood tree

Planting Day 2

The second planting day took place on May 3. The students planted in the grassland area. Once again, the students divided into two groups. The group not planting went with Susan Bennett on a scavenger hunt to find evidence of each life cycle stage in the Greenbelt and used their nature journals to record their findings. All students participated actively in the nature scavenger hunt. IES monitored the planting stations. Students and volunteers planted 68 grassland species and removed a substantial amount of Scotch thistle weeds. At the end of the planting, WRPRD staff spread native grass seed and planted the eight remaining flowering perennials.

In general, this was a very successful event. The number of adult volunteers was such that there was at least one adult for every pair of students, which helped planting go smoothly. A few parent volunteers took over the planting work from the students, but that was rare. Some adults and students misused the tools (jumping on shovels, swinging them around). In the future IES will provide a quick refresher on using tools before planting starts.

Workshop 2

The second workshop took place on May 7 at Kullerstrand Elementary and focused on tying together the themes from the first workshop and the planting days in three separate stations. Carrie Martin-Haley introduced the workshop and provided the conclusion. Blakesley Egan led the students in writing thank you notes to the organizations that helped fund this project. Sabrina Kleinman worked with the students to mark the planting locations on a map and discuss the differences between riparian habitats and grassland habitats. Susan Bennett helped the students finish their nature journals and reinforced the concept of life cycles by looking at insect life stages.

This workshop took place on a day following a non-contact school day for the students, which meant that the day functioned as a Monday. The students were not fully in school mode for the workshop. In addition, a disruptive event just prior to IES's arrival caused the students to have difficulty focusing. Nonetheless, they managed to finish their journals and compose thoughtful thank you cards.

Appendix A contains the Workshop 2 outline and station curriculum.

Learning about insect lifecycles with Susan Bennett

Wheat Ridge Summer Sun Camp Tree Ambassador Program

For the third year in a row, children attending the Wheat Ridge Summer Sun Camp became Tree Ambassadors by weeding, watering, and monitoring a Greenbelt planting site two days a week throughout the summer. To kick off the season, IES team members attended the Sun Camp registration open house on May 15, where they talked with parents and campers about the Tree Ambassador program and created a radish terrarium.

Wheat Ridge Summer Sun Campers watering in the Greenbelt

IES conducted a training workshop with the Sun Camp staff in the Greenbelt on May 31 to ensure that the camp counselors were familiar with the tree maintenance process and to clarify responsibilities. On June 4, IES held an introductory workshop with the Sun Campers. At this workshop, Carol Lyons shared information on tree safety, Cathi Schramm taught the campers to identify the most common weeds they would be removing, and Susan Bennett facilitated a kinesthetic activity about the parts of a tree.

From June 7 to August 9, the Tree Ambassadors walked from the Wheat Ridge Recreation Center to the Kipling Trailhead on Tuesdays and Fridays. They broke into groups to fill buckets, water plants, and pull weeds. Susan Bennett worked with the kids once a month to monitor and measure the growth of the newly planted trees.

Vandals destroyed a water tank, temporarily interrupting watering activities

Vandalism

On July 30, IES team members arrived to set up for the Tree Ambassadors and found the water tank near the Kipling Trailhead smashed and destroyed by vandals, who had bent the metal cage and drained the water. The faucet spigot was missing. As a result, Sun Campers were unable to water that day. WRPRD replaced the tank quickly and filed an incident report with Wheat Ridge Police.

Later in the summer, vandals stole the wagon that the Tree Stewards and Tree Ambassadors used to transport water to their watering sites, and removed spigots from the water tanks, causing them to drain.

Additional Summer Watering and Maintenance

To supplement the watering by the Tree Ambassadors, a few members of local Daisy Scouts Troop #67337 came out to the site on Tuesdays after the Tree Ambassadors had finished. The number of Daisy Scouts participating in watering was small, one or two scouts at a time, but it allowed them to get experience maintaining this year's planting site and may be the beginning of an ongoing relationship.

6. Student Impact

During the 2018-2019 school year, IES worked with students from the Kullerstrand Elementary School TRAILS program to provide a community-based approach to deliver outdoor learning opportunities that support the students' social and emotional needs. Through the TRAILS program, Kullerstrand Elementary School provides students with social, emotional, and behavioral support so they can thrive academically as well as socially.

Educational Content and Application

The IES planting projects provide TRAILS students with opportunities to partner with students in the general education program to collaborate in the classroom and on the trail. Student engagement with their peers and local volunteers allows TRAILS students to practice valuable communication and social skills as they learn about the Greenbelt and plant native species. Due to limited outdoor education programs that meet TRAILS students' needs, IES provides them with a unique opportunity for hands-on environmental learning in a setting that supports their social and emotional needs.

Students work together planting in the Greenbelt during Planting Day 1

IES's partnership with Kullerstrand in 2019 included lessons on local ecology and tree science for TRAILS students. The ecological lessons were reinforced during planting days and classroom workshops through nature journaling, participating in nature walks and classroom learning activities, learning how to be safe, and planting. At the end of the workshops, students were asked to create thank you cards for project funders. When topics from the workshop were revisited, students were able to recall the lessons they had learned. For example, students identified the different life cycle stages of trees and remembered the safety precautions during planting days. During the final workshop, several students drew trees on their thank you cards and correctly identified the species that they had planted. TRAILS students who had participated in past IES projects remembered the proper steps for planting a tree, which helped establish them as leaders among their peers.

Connecting with classroom curriculum, the workshop lessons were aligned with the education standards used in the TRAILS classroom and Jefferson County Public School District. Because of IES's long running partnership with Kullerstrand, many TRAILS students had participated in multiple projects. As a result, these students were seen as knowledgeable and experienced by students participating for the first time. This increased their social esteem and leadership roles in class.

Opportunity for Engagement and Interaction

During the planting days, all students fully participated in all the planned activities. The unique nature of the program required students to perform a goal-oriented activity connected to lessons they learned in the classroom. The approach and the subject matter were engaging for students, which helped them remain attentive and get excited about the work they completed on the Greenbelt. This year, one student who had previously not attended school field trip due to behavioral difficulties successfully participated in all project events in and out of the classroom. The 2019 Greenbelt Improvement Project was his first field trip, with his father serving as a chaperone. The TRAILS teachers noted that the

Students bonding at the Greenbelt on the first planting day

student had no issues during the planting days and looked forward to IES events with great anticipation.

The 2019 Greenbelt Improvement Project provided students with an educational and social platform that strengthened their ability to become environmental stewards. They contributed to their community by establishing connections among leadership skills, environmental learning, and community interaction. Through the educational workshops and planting days, students built a foundation of self and group empowerment. For Kullerstrand and IES, the program supported community-based environmental improvements through an engaging educational program designed to encourage students to practice their social skills.

IES would like to continue to foster its relationship with students. Recommendations to build on student impact include:

- Provide positive reinforcement to give students a sense of accomplishment and build their confidence.
- Facilitate peer learning by pairing more experienced students with those who may be new to the program.
- Maintain awareness of potential scheduling conflicts that could impact student involvement and engagement in IES projects.

Chapter 7: Plant Health

Plant health is a major factor in determining the success of the 2019 IES Greenbelt Improvement Project. To evaluate plant health, IES performed a series of assessments throughout the summer, focused on all Greenbelt planting sites from 2013 through this year. IES conducted two site visits with WRPRD staff to assess the project site conditions at older IES planting sites and evaluate other contributing factors on plant survival and health.

IES surveyed previous sites to assess plant survival rates

2019 Site Assessment

IES conducted a site evaluation on July 23, 2019, with Susan Bennett, WRPRD Environmental Interpreter, which found issues with initial planting and maintenance that impacted plant health. Poor planting techniques were found for many plants that were deemed to be struggling or dead. Issues included planting too deep, planting too shallow, not enough topsoil, and over or under mulching. Ms. Bennett determined that irregular watering likely affected plant establishment following the planting events in April. Distance from the watering tank and proper flagging of plants were important factors to maintaining routine watering in the 2019 site.

Signs of herbivory from deer and rabbits, and insect activity were identified at the 2019 site. However, some plants that with herbivory damage did show signs of regrowth, which indicates that the plants were able to establish below ground root systems, which may enable them to survive the damage. However, prolonged and repeated herbivory may inhibit young plants from maintaining such root systems over time. A small amount of insect damage was found on two of the cottonwoods. Aside from some damage to the leaves, the cottonwoods still appear to be healthy.

In addition to the site visits with WRPRD, all IES Tree Stewards performed site evaluations of their assigned sites to estimate plant survival and identify potential issues that reduce plant growth and establishment. Tree Stewards' notes from these sites can be found in Appendix C.

The survival rate for the 2019 Greenbelt Improvement Project is 70.29% at the time of this report. However, when viewed separately, the riparian area had a survival rate of 88% after planting, while the grassland section had a survival rate of 52%. Survival rate was determined by comparing the number of living plants to those originally planted for each project.

Past Site Assessments

On August 30, 2019, IES conducted a second site visit with Margaret Paget, WRPRD Forestry and Open Space Supervisor. IES associates and Ms. Paget walked through past planting sites to analyze plant health. Ms. Paget noted that some sites were affected by a significant shift in the hydrology of Clear Creek. Areas that originally had good access to a stream or the creek on planting days were now completely dry and not near open water at all. Shifts in hydrology may be a result of construction efforts on the other side of I-70. The survival rate of plants closest to the creek was low in some instances. Heavy erosion along the stream bank from the 2013 flood may have washed away plants close to Clear Creek. However, evaluation of past sites found improved survival rates when planting was arranged in clusters. Notes from the site evaluations can be found in Appendix C.

Insect damage on one of the Cottonwoods at the 2019 planting site

The assessment of the 2018 planting site found a survival rate of 69.81%; the 2016-2017 site retained a rate of 70%. Among all plants used, IES found sumac and chokecherry to have the most success with survival rates.

Challenges

Specific site conditions greatly affect plant survival at the 2019 planting site. Plants may have had a harder time establishing in the grassland section due to its distance from Clear Creek and limited groundwater availability. Plants farther from the creek do not experience the same degree of soil saturation compared to those closer to the creek banks. This year Clear Creek ran high, which may have benefited the closer riparian section. The soil composition in the grassland section is much poorer than that in the riparian section. The grassland section contains a large quantity of sand and rock, which reduces the soil's water storage capacity and available organic matter. Tree Stewards noted that sandier soil makes it more difficult to saturate the soil during watering. Trees in these areas often require more frequent watering as a result.

IES and WRPRD Recommendations

IES and WRPRD developed recommendations to address the challenges at the 2019 project site. Recommendations include:

- Conduct a Tree Stewards training session to train new and returning volunteers and reinforce proper maintenance practices with veteran volunteers.
- Use a hands-on approach during planting days to ensure that TRAILS students use proper planting techniques. Tree Project team members should monitor planting to ensure proper planting.
- Identify and use plant species that will have a better chance of success in areas with poor soil composition.
- Evaluate soil conditions throughout the planting sites to ensure that proposed plants are well suited to the conditions.
- Cage young plants, especially perennial forbs which are more susceptible to damage from foraging animals.
- Track Tree Ambassador and Tree Steward schedules to ensure all sites receive two visits each week to maintain weeding, mulching, and watering.

IES will use these measures to ensure that plants are cared for properly to improve their health and survival rates. Classroom and field training will educate TRAILS students on proper planting techniques. IES will provide a model for each step of the planting process to give the students an illustration of proper planting techniques.

Model of proper planting techniques

8. Project Evaluation

The 2019 Greenbelt Improvement Project is the seventh IES planting project in the Wheat Ridge Greenbelt. This project continued IES's collaborative partnerships with stakeholders in the Wheat Ridge community to restore native vegetation to this cherished open space through an environmental education and planting program. By leveraging grant funding with partner contributions and in-kind donations, the IES Tree Project team developed and implemented a successful environmental education and community service program to increase the tree canopy and improve resilience of riparian and grassland habitats in the Greenbelt.

Project Objectives and Accomplishments

Objective 1: Restore ecological health of both riparian and grassland ecosystems by removing invasive species and planting 100 native trees, shrubs, perennials, and grasses.

IES successfully planned and implemented two planting days on April 19 and May 3, 2019. The first planting day restored native canopy cover and increased the size of the riparian buffer along Clear Creek by planting riparian trees and shrubs. During the first day, students planted 50 trees and shrubs in the Greenbelt, including:

- Four plains cottonwoods
- 12 chokecherry
- 18 three-leaf sumac
- 12 American plum
- Four lanceleaf coreopsis

IES planned for fewer plants to be planted during the first day to allow students to learn proper planting techniques. Students were given instructions and cheat sheets to help them remember each step. A copy of the cheat sheet can be found in Appendix G. IES used numbered stations and included a topsoil station to remind the kids to add soil to plants when placing them in the ground. Numbering the stations helped the students remember where to get the needed supplies. Although mulch was available, IES wanted the students to focus more on adding topsoil to each plant to ensure that they were planted properly and to avoid students substituting mulch for soil. Overall, this resulted in healthier looking plants at the end of the day in this area and with students following a set of well-defined steps to learn proper planting techniques.

The second planting day focused on grassland shrubs and perennial species to increase plant cover and reduce invasive weeds near the multi-use trail. During the second day, students planted 68 plants in the Greenbelt, including:

- Two plains cottonwoods
- Eight American plums
- Eight chokecherries
- Two three-leaf sumacs
- 30 yellow prairie coneflowers
- 18 lanceleaf coreopsis

Students work with Rob Robinson, IES Tree Steward, to properly plant a chokecherry in the riparian area of the Greenbelt

There were eight lanceleaf coreopsis that the students were unable to plant during the second planting day due to time constraints. Wheat Ridge Parks and Recreation Department (WRPRD) planted these in the Greenbelt after the planting day. IES Tree Steward Betty Jo Page worked with a few students to remove Scotch thistle *(Onopordum acanthium)* in the planting area. Together, they removed two large trash bags full of thistle. Students enjoyed having a variety of plants to work with and were able to remember many of the planting instructions from the first planting day. They were very enthusiastic about planting the larger trees and worked well in pairs and teams. However, in trying to accomplish all planned planting activities, eight flowering perennials had to be planted by WRPRD after the event, and some of student-planted plants were not properly planted as several holes were either too shallow or too deep. Over the two planting days, students planted a total of 126 native trees, shrubs, and flowers in the riparian and grassland areas.

Objective 2: Provide a hands-on naturalist program for underprivileged TRAILS students and children in the community to restore and care for the Wheat Ridge Greenbelt.

Kullerstrand students make nature journals with Susan Bennett while learning about life cycles during workshop 1

IES successfully developed environmental education curriculum for both the Kullerstrand TRAILS students and the Tree Ambassador program. TRAILS students had the opportunity to invite general education peers from Kullerstrand to participate in the program with them, giving them an opportunity to introduce other students to the planting program. Both educational programs used a rotational workshop model with three activities in each workshop for the students to work on in small groups.

For the TRAILS students, educational activities were implemented for each project event. Two workshops were held to bookend the planting events. The first workshop had activities to prepare the students for planting in the field, which included a station on how to safely work with tools, a station where students made nature journals to use throughout the project, and a station where they learned about the plant life cycle and how to properly plant young seedlings. During the second workshop, students made thank you cards for each of the project funders, created maps of where they planted, and looked at how life cycles differ for various wildlife species. During planting days, TRAILS students and their general education peers participated in interpretive activities organized by Susan Bennett, WRPRD Environmental Interpreter. These included a nature hike and a life cycle themed scavenger hunt. Students were given the chance to write down or draw their observations from these activities in their nature journals.

Overall, the students were very engaged and excited about the educational activities. During planting days, the activities gave students a break from the hard work of planting and gave them an opportunity to explore more of the Greenbelt in hands-on learning. All students participated and were engaged in the workshops and interpretive activities, with few behavior problems encountered.

For the Tree Ambassador program, IES conducted an introductory workshop for the campers prior to their first trip to the Greenbelt in June. The Tree Ambassadors program works with the City of Wheat Ridge's Summer Sun Camp Program to water and weed the Greenbelt twice a week. There were 39 campers enrolled in the program, with a group of approximately 25-30 kids each day and about five camp counselors or staff members. The workshop introduced the kids to the Tree Ambassador program and why their work on the trail was so valuable to the establishment of native plants in the Greenbelt. The kids, ages 6 through 14, learned about invasive weeds and how to treat them, how to safely handle

tools and dress appropriately during their site visits, and simulated the critical parts of a tree in an interpretive activity with WRPRD interpreter Susan Bennett. The kids created sticker charts to document each visit to the Greenbelt as a way to track their work during the summer. This workshop was helpful in getting the campers to understand the value of their watering in the Greenbelt. Campers were able to jump right into the maintenance activities during their first few weeks, often finishing their work within 30 minutes and working together as a team. Once a month, Susan Bennett joined the kids during watering to measure IES-planted trees in the Greenbelt and to talk with them about how trees grow and establish in open areas. At the end of the Tree Ambassadors program, IES and WRPRD held an awards ceremony to recognize and thank the kids for their hard work in the Greenbelt.

Objective 3: Care for new plants to ensure high survival rates by implementing a 3-year maintenance program.

IES has completed the first year of maintenance for the 2019 Greenbelt Improvement Project site through the Tree Stewards and Tree Ambassadors programs. In addition to the campers, IES started working with Daisy Girl Scout Troop 67337 in the Greenbelt. There are 3-4 Girl Scouts, ranging in age from 6 to 8 years, who watered a small subset of plants in the project site once a week. While this partnership is still in development, the Girl Scouts are a new opportunity for IES to engage other children in the community.

IES continued its community volunteer efforts through the Tree Stewards program. Tree Stewards are volunteers who live in and around the community. Twelve Tree Stewards worked in the Greenbelt during the first year to provide care for an assigned planting site one to two times each week. Tree Stewards water, weed, and mulch the plants in IES-planted sites and help monitor the sites for planting concerns or needs that may affect tree establishment. Tree Stewards are assigned to their sites for up to three years. The majority of Tree Stewards have worked in the Greenbelt for more than two years. One new Tree Steward is a former Tree Ambassador who helped weed portions of the Greenbelt during the previous two summers.

This year, the Tree Stewards conducted a survey of their planting sites to evaluate plant survival and identify potential issues that may affect plant growth. Based on the survey, major factors that limit or prevent plants from establishing include:

- Browsing of young plants by wildlife and insects after the initial planting
- The use of poor planting techniques with plants being placed in holes that are either too shallow or too deep for their size
- Poor soil conditions with little topsoil or organic material in the planting site that prevented the development of healthy roots
- Competition from weeds

In light of these factors, Tree Stewards were encouraged to use metal cages to protect young plants, replant newly planted species to provide better soil beds and planting areas, remove weeds, and place 2-3 inches of mulch around each plant to reduce weed competition and improve soil moisture. After an initial survey, it was found that approximately 100 plants were actively growing at the site, resulting in a survival rate of 80% a few months after planting.

Objective 4: Evaluate the successes of the program with a final report and video.

This report was developed to fulfill this objective. To evaluate the success of the program, IES met with the TRAILS teachers at Kullerstrand Elementary to discuss the planting program and its impact on the students. More information on the long-term impact of IES's partnership with the TRAILS program is discussed in Chapter 6, Student Impact. To evaluate the environmental and planning portions of the project, IES met with staff members from WRPRD shortly after the planting program was completed. Notes and agendas from these meetings can be found in Appendix E. The

comments and recommendations provided by these stakeholders are incorporated and documented in the various sections of this report.

Jesse Johnson of IOTK Media attended and filmed all workshops and planting events to develop a project video. The video is posted on IES's YouTube channel, and a link to the video is posted on the IES website. IES emailed a notification to each project stakeholder and adult participant with this link.

Program Challenges and Recommendations

IES successfully completed and met its stated objectives for the 2019 Greenbelt Improvement Project. However, IES did encounter some challenges and issues during the project and has worked with stakeholders to identify recommendations and changes to incorporate into future projects.

There were some minor behavior problems during workshops and the final planting day that affected how engaged and focused students were.

During the second workshop at Kullerstrand, the IES Tree Project team noted that some of the older students were not engaged, which made it harder to conduct the activities. While Kullerstrand staff members were present, they did not manage student behavior. To address this issue, Kullerstrand agreed to have one paraprofessional or teacher assigned to each workshop station in the future to address behavior issues and to keep students on task. Students would be assigned to workshop groups before IES's arrival to reduce uneven groups and to separate students who may easily distract each other.

Students were late to each of the workshop sessions, which made it difficult to have enough time for each workshop rotation. During the intermediate workshop, some students needed to leave early for orchestra, which was not anticipated. Teachers noted that there had been an incident in one of the TRAILS classrooms in the morning of the first workshop, which affected student behavior throughout the day. Workshop 2 was scheduled after a flex day, where some of the students were not required to attend school. This resulted in the staff being off from their normal routine and students who were not settled. Kullerstrand agreed to carefully review all planned project events to avoid conflicts with special schedule days and other extracurricular activities.

Students were tired of nature journals by the end of the program, which decreased engagement during some of the later activities.

This was the second year that nature journals were incorporated into the educational program. While the nature journals provide an effective way to engage younger and older students in the field, the students were ready for a different activity by the end of the program. A different on-going activity that students can work on during each of the project events is still recommended.

Kullerstrand noted that the nature journal activity was a good way to introduce the students to environmental science and wanted to see other curriculum-based content, similar to the life cycle themes, used in the next project. The teachers noted that classroom curriculum for both primary and intermediate students will focus on geography and plants in the next school year. WRPRD suggested that a mapping activity would work well with the project to align with curriculum standards for social studies and geography skills for both age groups.

During planting days, the schedule was off from the beginning due to late arrival of the students, creating confusion about when students would take a break and switch activities.

The initial schedule estimated that students would arrive at the Greenbelt between 9:00 and 9:15 am. However, students did not arrive at the site until around 9:30 am, which required that all planned activities adjust by 30 minutes. Fortunately,

Kullerstrand could adjust their schedule to allow students to work at the site until 11:30 am. The Kullerstrand teachers noted that this delay is mostly due to the bus schedule, as the bus cannot pick up the students from the school until it has finished its initial drop-offs for the day. To account for this, IES will adjust its schedule for future planting days with the students arriving at 9:30 am. This would include adjustments to the initial start times for volunteers and set-up for planting events.

After a few weeks of the Tree Ambassadors program it was harder to keep the campers engaged with the maintenance tasks.

Tree Ambassadors, their counselors, and IES volunteers at awards ceremony to thank them for the care they provided in the Greenbelt

The Tree Ambassadors visited the Greenbelt twice a week from June 8 until August 9. After a few weeks it became difficult to keep the campers engaged in the maintenance work. Campers often stopped or avoided work, for example by neglecting to wear proper footwear and attire. Counselors were asked to remind the campers to keep working. Having different jobs that campers could volunteer for and rotate through each time, such as refilling water jugs, weeding, watering, and mulching, can give the campers a better sense of their responsibilities during each visit while allowing them to change roles in subsequent visits. Assigning specific campers to these tasks made it harder for them to switch tasks mid-way through their site visit. Counselors were asked to work with each work group to ensure that any behavior issues were addressed as they arose. IES and Sun Camp staff members are encouraged to use positive reinforcement to encourage students to keep up the good work. This could include telling students when they are doing a great job or a mid-season awards ceremony to acknowledge the best weeders, waterers, or attitude.

As part of a grant requirement, IES needed to obtain separate media release forms from all project participants. This task was not completed for all project participants and required additional time to organize and compile the forms during all project events.

IES received a grant from the National Environmental Education Foundation (NEEF), which required that all project participants featured in any project-related media sign a separate media release form for the organization. Previously, IES has used a waiver for its volunteers and has worked with stakeholders to ensure that they have permission to use their image for all project media. For example, in meetings with Kullerstrand, IES checks with the Administrative Assistant to ensure that all participating students have signed a blanket media release form with the school district as part of their school registration. This allowed IES to use the students' images in all project related photos, reports, social media, and videos. However, the requirement of an additional form for an outside organization presented a challenge. The forms were sent to the school two weeks before the event, but many of the students did not return them before the initial planting day. Additional efforts and time were needed to obtain the forms from all the students before the final workshop. Three students did not turn in a form by the end of the project, which required additional time and effort by IES and Kullerstrand staff. To resolve this for future grant requirements, IES should provide Kullerstrand with any additional forms at least one month prior to the project activities so they can be included with the field trip permission slips. IES should also work with the grant organization to determine if the district's blanket media waiver will suffice for the organization's media release requirements.

In July, one of the watering tanks was vandalized and damaged along the trail.

Prior to one of the Tree Ambassador visits, IES Tree Project members found one of the watering tanks significantly damaged and vandalized. Someone had crumpled the top and sides of the tank, bending the metal cage that protects it. The tank was completely drained and the nozzle spigot was no longer attached to the tank. IES immediately contacted the Summer Sun Camp staff to let them know that watering would be canceled and then contacted Margaret Paget, WRPRD Forestry and Open Space Supervisor, to inform her about the incident. WRPRD came out the same day to remove the damaged tank and placed a new tank later that afternoon. An incident report was filed with the City. Additional safety patrols are recommended for the area to decrease such activities. More secure locks on the tank valves may also prevent future damage.

Conclusion

The IES Tree Project was able to meet our stated objectives for the 2019 Greenbelt Improvement Project. While the team encountered a variety of challenges, none of them prevented IES from accomplishing all project activities. Recommendations for future projects include the following:

- Engage Kullerstrand staff in classroom activities to better manage behavior during workshops.
- Provide Kullerstrand with any required releases or forms for the students at least a month prior to the planned project events.
- Plan a new project activity for students to work on during all project events.
- Ensure that scheduled project activities do not occur on Mondays or right after planned school flex days.
- Adjust the planting events to account for bus schedule delays.
- Have a set of assigned tasks for the Tree Ambassadors to prevent campers from switching activities mid-way through their visits and to keep them engaged.
- Acknowledge well-behaved students and campers to encourage similar behavior in other participants.
- Continue collaboration with the City of Wheat Ridge to address vandalism concerns and safety along the trail.
- Train Tree Stewards to pay attention to how trees are watered and how other plants may affect plant growth and establishment to increase plant survival.

Thanks to the efforts of the students from Kullerstrand Elementary School, the Wheat Ridge Summer Sun Camp, and Wheat Ridge Parks and Recreation Department, IES was able to improve a popular portion of the Wheat Ridge Greenbelt by planting 126 native trees, shrubs, and flowers. Over 70 children from Wheat Ridge learned about local ecology and the benefits of native plants while exploring the Greenbelt and engaging in hands-on activities. IES worked with 12 Tree Stewards in the community to provide the initial year of care for the site. Through this work a number of Wheat Ridge residents have understood the benefits of planting projects and how they can contribute to improving and restoring open spaces in their communities.

This Report

This report and its appendices will be available electronically via the IES website, www.i4es.org, through its publications login page. A limited number of printed and bound copies will be distributed to project stakeholders. If you would like a printed copy of the report, please email Solutions@i4es.org.

IES welcomes comments and questions on our report and project. Please contact IES at Solutions@i4es.org.

2019
IES Wheat Ridge Greenbelt Improvement Project

Final Report Appendices

December 2019

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Appendices

A. Kullerstrand and Tree Ambassador Workshop Materials

B. 2019 Greenbelt Improvement Project Plan, Design, and Budget

C. Site Evaluation Agendas, Survey Results, and Notes

D. IES Tree Project Steering Committee Meeting Agendas

E. Stakeholder Meeting Agendas and Notes

F. 2019 Greenbelt Improvement Project Memorandum of Understanding

G. Planting Day Agendas and Planting Cheat Sheet

Appendices are available on the IES website, www.i4es.org, and on request at Solutions@i4es.org.