Growing the Greenbelt Education and Environmental Health Program
Final Report

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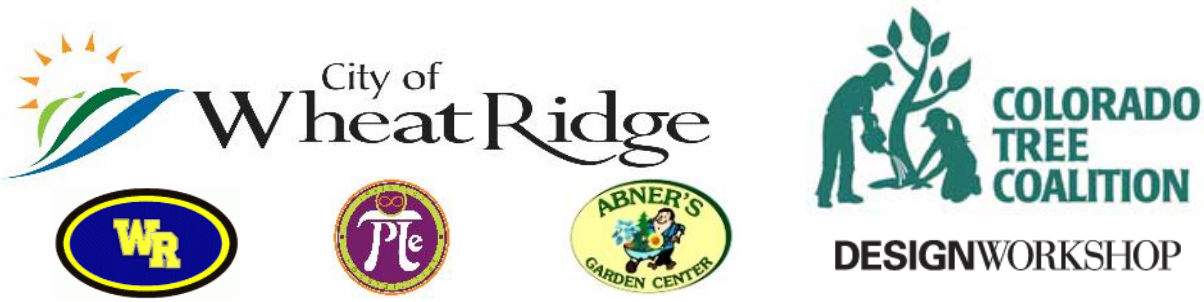

2. Executive Summary

This report documents the 2014-2015 IES *Growing the Greenbelt Education and Ecological Health Program*. The program took place in the Wheat Ridge Greenbelt and at Wheat Ridge High School in Wheat Ridge, Colorado. The Institute for Environmental Solutions (IES) and the City of Wheat Ridge developed the program to continue successful planting and stewardship programs in the Wheat Ridge Greenbelt.

This report describes the project's origins, planning, implementations, and outcomes. The report and the attached appendices document the project's organizations, goals, objectives, and the stakeholders and contributors. The project's replicable design is explained and can be employed in future ecological education initiatives. The report also contains a thorough project evaluation and recommendations for further action.

IES and the City of Wheat Ridge have been working together since 2012. The dedication and participation by the Wheat Ridge Parks and Recreation Department through Margaret Paget, Forestry and Open Space Supervisor, have been vital in making successful programs. The partnership has now produced three successful programs: *Revive the Greenbelt!* (2012-2013), *Preserve the Greenbelt Elementary Education Program* (2013-2014), and the current *Growing the Greenbelt Education and Ecological Health Program. Revive the Greenbelt!* addressed the need for restoration and beautification because of canopy and tree loss in the Greenbelt. *Preserve the Greenbelt* continued to address this need by introducing students of Kullerstrand Elementary and Mountain Phoenix Community Schools to hands-on science education and stewardship practices. *Preserve the Greenbelt* was awarded the 2014 Colorado Alliance for Environmental Education's Environmental Education Award for Excellence.

The *Growing the Greenbelt Education and Environmental Health Program* was developed to protect and improve the Greenbelt by implementing an ecological improvement program that included student and volunteer education, tree plantings, and tree stewardship initiatives. IES developed two in-class workshops and a planting day for Wheat Ridge High School's Career Exploration Class. Due to changes made by the high school class, combined with rainy weather, IES provided four workshops, two high school planting events, and created, implemented, and recruited for a volunteer planting day to ensure all plant material was properly planted at the *Growing the Greenbelt* planting site. The planting program was intended to continue the improvement of the ecological health of the Greenbelt through native tree planting and invasive species removal. More than 60 students and community volunteers of all ages participated in the plantings, which resulted in over 140 native trees, shrubs, and grasses planted in the Greenbelt. As of June 2015, two months after planting, the survival rate of new saplings is over 90%.

IES will continue to advance the survival of these saplings through the *IES Wheat Ridge Tree Stewards Program*. The volunteers that comprise the new Tree Stewards team are students, parents, and other community members. These Tree Stewards have been trained and organized by IES to help ensure the health of the saplings planted during the *Growing the Greenbelt Education and Ecological Health Program.*

IES encourages comments and questions. Please contact IES at solutions@i4es.org or visit our website at www.i4es.org.

3. Introduction and Overview

This Report: *Growing the Greenbelt Education and Ecological Health Project* Final Report

This report describes the 2014-2015 IES *Growing the Greenbelt Education and Ecological Health Project* in Wheat Ridge, Colorado. The Institute for Environmental Solutions (IES) created this program as part of The Tree Project: Integrated Urban Environmental Improvement Through Tree Selection and Management.

The IES *Growing the Greenbelt Education and Ecological Health Project* Final Report documents the program's development, planning, implementation, outcomes, and suggestions for future projects. This report and the attached Appendices provide the complete details about the high school education and tree planting program, and the volunteer planting day. The program was designed to provide high school students with information about ecology and careers in science. The program helped students understand a tree's role in the environment and how they can positively affect their environment through their career choice and through volunteer stewardship. The project and this report will provide a model for future environmental education programs and volunteer planting events in the Colorado Front Range.

Institute for Environmental Solutions

The Institute for Environmental Solutions is a Denver-based nonprofit organization that engages stakeholders to deliver technically sound solutions to complex environmental and human health problems – without unwanted side effects.

The IES science and stakeholder approach to environmental improvement is objective, practical and cost-effective. IES confronts multi-faceted environmental issues such as community health, climate change, air pollution, and water pollutants that others may find too complicated or difficult to address. By maintaining a commitment to science and collaboration with people of different backgrounds, perspectives, and interests, IES provides lasting solutions for Colorado's most pressing environmental problems. Through innovative and groundbreaking projects to tackle these challenges, IES provides Colorado communities with the opportunity to make measurable improvements to the environment.

The IES Tree Project

THE TREE PROJECT
ENERGY • WATER • AIR • CARBON

The Tree Project, one of IES's major on-going programs, is dedicated to improving the environment of Colorado's urban areas through strategic tree selection and management. The mission of the IES Tree Project is to improve Colorado cities using tree science. Through collaborative, multi-disciplinary partnerships and programs, we restore natural systems and urban green infrastructure, educate children and adults to become environmental stewards,, rehabilitate, improve and maintain critical urban natural resources, and improve community health and economy.

The Tree Project facilitates collaboration among communities, businesses and individuals to target and achieve environmental improvement in air and water quality, carbon sequestration, energy conservation, and storm water management with trees. Proper tree selection, planting, and maintenance of trees improves community health and the local economy. The Tree Project assesses planting practices and vegetation benefits under various scenarios to establish optimal urban tree selection, planting, and maintenance guidelines for practical and cost effective environmental, social, and economic improvement.

Volunteers plant trees at Mitchell Elementary School as part of the Trees for Healthy Kids and Community project.

In 2010-2011, IES collaborated with Mitchell Elementary School and the City of Golden on the *Trees for Healthy Kids and Community Project* to plant 40 trees to improve the school environment, reduce air pollution and noise from the adjacent highway, control storm water, and mitigate wind. After three years, City of Golden Forester, Dave Hugh, described the project as "a big success," with the majority of trees still thriving.

IES partnered with the City and County of Broomfield on the *Trees for a Healthy Community and Economy Project* in 2011-2012, developing and implementing a plan to protect the environment while improving the local economy in Broomfield's emerging civic center. In 2012-2013, the IES *Revive the Greenbelt!* Program started the successful partnership between IES and the City of Wheat Ridge. During the program, over 200 volunteers, planting more than 200 trees, removed noxious and invasive species, replaced canopy gaps, implemented strategies to improve the long-term health of the riparian ecosystem, and increased the local community's awareness of urban forestry in the Wheat Ridge Greenbelt.

Volunteers plant trees in Broomfield as part of the Trees for a Healthy Community and Economy Project.

In 2013-2014, IES implemented the pilot education program *Preserve the Greenbelt Elementary Education Program*. The program combined innovative hands-on classroom workshops, educational planting days, and volunteer tree stewardship to engage students, educators, and families from Kullerstrand Elementary, Mountain Phoenix Community, and Wheat Ridge High Schools. More than 120 students participated in the workshops and the planting day, resulting in over 200 native trees and shrubs planted in the Greenbelt. As of August 2014, the survival rate of saplings is over 90%. The Colorado Alliance for Environmental Education awarded the *Preserve the Greenbelt Elementary Education Program* with its 2014 Environmental Education Award for Excellence. This program is the base for the *Growing the Greenbelt Education and Environmental Health Project*.

Based on these experiences, IES has determined that five critical factors go into successful tree planting and survival.

- Collaboration with the full range of interested stakeholders
- Careful planning of the education and planting program
- Careful selection of the planting sites and plant species to optimize survival
- Good instruction and proper planting with well-organized volunteer participation
- Appropriate maintenance plants and implementation

After the successful 2014 tree planting, IES was contacted by City Council Member and High School teacher Jerry DiTullio about continuing to engage high school students in learning about ecology, careers in science, and planting and caring for trees in the Greenbelt. With grant support from the Colorado Tree Coalition and generous donations from the City of Wheat Ridge, Wheat Ridge Mayor Joyce Jay, and Wheat Ridge City Attorney Gerald Dahl, IES designed and implemented the *Growing the Greenbelt Education and Ecological Health Project* to teach high school students at Wheat Ridge High School and involve community volunteers in actively helping to grow the Greenbelt. The IES Tree Project will continue to build on its successes and work to improve the environment.

4. IES Wheat Ridge Growing the Greenbelt Education and Ecological Health Project

After successful collaboration with the City of Wheat Ridge in 2012-2013 with the *Revive the Greenbelt!* Project and in 2013-2014 with the *Preserve the Greenbelt Elementary Education Program*, IES planned and implemented the *Growing the Greenbelt Education and Ecological Health Program* starting in the fall 2014. The project included two high school planting days and a volunteer planting day in April 2015. Only one planting day was planned and budgeted. However, inclement weather and schedule problems with Wheat Ridge High School forced IES to add two more planting days. The program was a community-supported initiative to improve the health of a local urban forest while engaging community members and students in environmental stewardship and science education. The program was designed to teach Wheat Ridge High School's (WRHS) Career Exploration Class students to care for their local environment while providing critical habitat improvements to the Wheat Ridge Greenbelt, a cherished community open space. Students were taught about local ecology and were introduced to careers in earth sciences. The class participated in two planting events in the nearby Greenbelt where students planted native trees, shrubs, and grasses to restore this valuable open space, built protective cages, and helped assemble emerald ash borer information signs. Due to inclement weather and high school schedule changes, the high school students only planted 15 trees. Other activities, unrelated to the IES program, such as making the ash borer signs, were added to the program to give the students something to do in rainy and snowy weather. The other 120 native trees, shrubs, grass, and forbs were planted on the Growing the Greenbelt Volunteer Planting Day, thanks to the wonderful response from Wheat Ridge community members who volunteered their time and effort to help IES.

Project Goals

The goals of the *Growing the Greenbelt Education and Ecological Health Project* were to:

- Create and implement engaging workshops to teach high school students about local ecology and introduce them to careers in science.
- Create and implement an ecological planting program for students that focused on education and career exploration
- Foster a connection between WRHS, IES, and the City of Wheat Ridge
- Collaborate with local residents, nonprofit organizations, and Wheat Ridge businesses
- Advance community and city initiatives to revive and preserve the Greenbelt
- Establish an ongoing program involving both students and community volunteers in the Greenbelt.

Project Objectives

The *Growing the Greenbelt* project objectives were:

1. Continue collaboration between Wheat Ridge High School, IES, the City of Wheat Ridge Parks and Recreation, and other key stakeholders, including ecological, riparian, and forestry experts, to plan and implement the project.
2. Develop lesson plans for workshops and field trips.
3. Implement a planting day for high school students that improved the ecological health of the Greenbelt.

The first, second, and third objectives were designed to meet the goals of creating an engaging environmental program that included both classroom and outdoor ecological improvement and career exploration activities. The single planting day model for students was modified, due to WRHS scheduling changes and inclement weather, and became two separate planting days. In addition, IES organized and implemented a volunteer planting day to complete the planting and invasive weed removal at the site. Without the resilience and perseverance of IES team members, and the community support to help the Greenbelt, the site would not have been planted properly.

WRHS Career Exploration students plant trees on the second high school planting day.

4. Organize a Project Advisory Committee.
5. Implement a continuing Greenbelt stewardship program with volunteers from students and Wheat Ridge residents.

The fourth and fifth objectives were designed to achieve IES's Tree Project mission of improving local environments and communities through collaborative projects and sound tree science. Organizing a Project Advisory Committee allowed for local experts to have a place to discuss and improve on the developing program. The stewardship program is important for tree survival rates and ongoing ecological health improvement in the Greenbelt.

6. Organize a community outreach program, including community and school publications, and social media.
7. Evaluate the program and produce a final report.

The sixth and seventh objectives were created to give the Wheat Ridge community and IES the ability to continue to help the Greenbelt. Through community outreach, IES empowers the Wheat Ridge community to take action and address environmental concerns through collaborative program development. Evaluation of the program is a key aspect to providing innovative quality programs. This report completes the final objective of the project.

<u>High School Participation</u>

Wheat Ridge High School's Career Exploration Class gives students with disabilities unique opportunities to explore careers. These students may not have the opportunity to learn about career possibilities without this class and without outside support from organizations like IES. Wheat Ridge High School also has a significant low-income population, with 47% of students qualifying for free or reduced price lunch.

WRHS Career Exploration students at the second high school planting day.

Wheat Ridge High School's Career Exploration Class teacher and City Councilman Jerry DiTullio contacted IES to continue the partnership started in 2013. Thirty students attended two education workshops and two separate planting day events were organized and implemented. Fourteen students filled out evaluation forms to help IES improve on the educational aspects of the program. These evaluations can be found in Appendix Q. Students were enthusiastic about the planting day, with many saying that they enjoyed helping the Greenbelt and enjoyed the planting activity. However, students did not respond well to what they learned about the ecology of the Greenbelt, which was due to problems in the classroom.

The Career Exploration class workshops provided by IES had limited success and value. IES prepared a program at an accessible academic level with simple, hands-on participation opportunities so that all students could take part, regardless of their disability. Students generally did not pay attention to the classroom workshops and were almost totally reluctant to participate. The teacher provided little or no supervision in the classroom.

Volunteer Participation

Tree Project Manager Sean Mangus and a Tree Steward plant trees during the GTG volunteer planting day.

Colorado experienced an above average amount of rain in April 2015. WRHS students were originally meant to plant all of the trees, shrubs, and grasses purchased for the planting day in one half day planting program. The flooded condition of the planting site made planting impossible and unsafe on the scheduled planting day. IES, in consultation with the City of Wheat Ridge Parks and Recreation Department, cancelled the planting program, and rescheduled it for the following week, on the date scheduled as a rain/snow alternative date. The WHRS teacher declined to reschedule the field trip, so students and volunteers were provided with non-program tasks to do underneath a park shelter during the rain-snow-hail storm. IES made emergency adjustments to the program plan and organized a separate planting day with community volunteers when conditions were favorable and safe for planting.

IES contacted current and former Tree Stewards and volunteers from the Wheat Ridge community, and sent emails to IES contacts in Wheat Ridge and the surrounding area to gather volunteers for the last-minute tree planting. IES was delighted to receive many interested individuals on short notice. Volunteers consisted of 28 community members, including new and current Tree Stewards, Girl and Boy Scouts, and other interested community members. All volunteers were asked to fill out evaluation forms to help IES gauge the effectiveness of the Volunteer Planting Day. It is included below in Appendix R.

Project Partners and Donors

IES continued its partnership with the City of Wheat Ridge Parks and Recreation Department and Wheat Ridge High School, which began in 2012. Margaret Paget, Wheat Ridge Forestry and Open Space Supervisor, is a key project partner and provided critical expertise in site planning, event planning, tree purchase, and educational workshop content development. Ms. Paget also organized support and participation of City of Wheat Ridge staff members and provided supplies such as a tent, tables, shovels, mulch, soil, snacks, and water.

IES received a grant from the Colorado Tree Coalition to plan and implement the project, and to purchase supplies for the planting day.

The Denver office of the international landscape architectural firm, DesignWorkshop, volunteered to complete the site plan, thanks to the hard work of former IES intern and DesignWorkshop Associate Kathleen King. IES received funding from the City of Wheat Ridge City Council, Wheat Ridge City Councilman Jerry DiTullio, Wheat Ridge Mayor Joyce Jay, Wheat Ridge City Manager Patrick Goff, and Wheat Ridge City Attorney Gerald Dahl. IES was InfinitusPIE's February Charity of the Month, where 31.4% of total sales on February 16 went to support this project. IES received a donation from Abner's Gardner Center consisting of hand spades and gardening shears. IES implemented a business outreach initiative (see Community Collaboration section), to bring in project partners from the business community in Wheat Ridge.

5. Project Organization

Project Partner Involvement and the Tree Project Steering Committee

IES met with project partners to ensure that project information was available and so they could contribute their expertise and help plan the project. IES assessed the major organizations involved with the project. The major project partners included the City of Wheat Ridge Parks and Recreation Department, Wheat Ridge High School, DesignWorkshop, and the Colorado Tree Coalition. The City of Wheat Ridge provided monetary and in-kind donations to support the project. Margaret Paget, City of Wheat Ridge Forestry and Open Space Supervisor, was IES's main contact for the city. Wheat Ridge High School Career Exploration teacher, Jerry DiTullio, was IES's contact for Wheat Ridge High School. DesignWorkshop provided pro-bono landscape architecture expertise and produced the project's planting plan. Kathleen King and Josh Brooks were IES's contacts from DesignWorkshop. The Colorado Tree Coalition awarded IES a grant to complete the project. Keith Wood, Executive Administrator for the CTC, was IES's contact for the Colorado Tree Coalition. The members of this group were instrumental in helping with the planning and implementation of the project.

IES and Wheat Ridge staff members meet to discuss site logistics and prepare the site for plating in April 2015.

Having regular meetings kept the planning process on schedule and ensured that IES Wheat Ridge Growing the Greenbelt project objectives supported the project mission and goals, and improved the health of the Greenbelt. These meeting agendas are in Appendix A. IES drew from the expertise of the IES Tree Project Steering Committee during project planning and implementation. The Steering Committee consists of professionals in related fields and meets every three months. IES staff members took advantage of these meetings to describe the vision for the project and receive advice, ideas, and guidance to improve the project. Agendas for Steering Committee meetings that occurred during the Growing the Greenbelt Program are in Appendix B.

Collaborative Funding Model

The Colorado Tree Coalition provided a grant to IES to support this project in response to IES's application submitted in December 2014. The Wheat Ridge City Council provided funding through Councilmember Jerry DiTullio's public outreach funding. City of Wheat Ridge Mayor

Joyce Jay, City Manager Patrick Goff, and City Attorney Gerald Dahl provided additional contributions to the program. Local Boy Scout Nik Schnebly volunteered to build water tank stands as part of his Eagle Scout Service project. These contributions made the program possible.

IES and Margaret Paget accept a donation presented by City of Wheat Ridge City Councilmember Jerry DiTullio and Mayor Joyce

To engage the local business community, IES implemented a business outreach initiative. IES Associates visited local businesses throughout Wheat Ridge to spread project information and gather community support. Abner's Garden Center in Wheat Ridge provided planting supplies and a venue for community outreach. Local Wheat Ridge business owner Cheryl Brungardt of Thank 'Em Productions provided a donation to the project. Wheat Ridge business owners are passionate about the community and were excited to participate in the project. Larson's Ski and Sport and Foothills Cycling showed support by handing out fliers to interested customers in their stores.

IES staff members, graduate interns, and Institute Associates contributed hundreds of volunteer hours to project planning, implementation, research, evaluation, public relations, business outreach, project promotion, and volunteer recruitment leading up to and on each of the two classroom workshops and three planting days.

Sponsors were acknowledged in the IES quarterly e-newsletter, IES social media pages, the Wheat Ridge Connections newsletter, and in Greenbelt Kiosk posters. The Colorado Tree Coalition was also recognized with a placard on the water tank at the planting site. More information about dissemination of project information and public outreach can be found in the Community Collaboration section of this report (chapter 9).

<u>City of Wheat Ridge Parks and Recreation Department</u>

The City of Wheat Ridge Parks and Recreation Department, through the terrific cooperation and expertise of Forestry and Open Space Supervisor Margaret Paget, provided extensive in-kind contributions to support the project. Contributions included significant staff time for project planning, public relations, project promotion, and implementation leading up to and on planting days. Ms. Paget participated in the classroom workshops. The City of Wheat Ridge provided support for the classroom workshops by printing and laminating educational papers and posters. Wheat Ridge provided mulch,

Left to right, IES GTG Program Coordinator John Kelly, City of Wheat Ridge Forestry and Open Space Supervisor Margaret Paget, IES Tree Project Manager Sean Mangus.

shovels, beaver cages, and purchased trees, shrubs, and forbs for the planting days. Ms. Paget spoke about trees and tree planting at the second WRHS workshop and demonstrated proper planting techniques at the high school planting day. The project would not have been possible without Ms. Paget and her staff, including Brian Harvey, Lonnie Jaramillo, and Mark Dinnell. IES thanks Ms. Paget and her staff members for their willingness to adjust to unforeseen hurdles in project implementation, their patience, and their efforts to ensure the project was a success.

Project Plan

The IES Wheat Ridge Growing the Greenbelt Project Plan, provided in Appendix C, presents each component of the project from the planning stages to the planting days. The project plan was based on past successful projects administered by IES. The project had ten major components:

- Project organization and scheduling
- Research and landscape plan
- Business outreach
- Educational planning
- Educational workshop and planting day implementation
- Plan long-term maintenance
- Community tree planting event organization
- Community tree planting event implementation
- Outreach
- Public Relations Communications
- Project documentation and evaluation

The project plan was used by the project team and our partners throughout the project. When planning for a project of this size, it was important to be realistic with time and resources available for each task.

The project timeline is available in the project plan. Planning for the *Growing the Greenbelt* project began in the fall 2014. IES met with the City of Wheat Ridge Forestry and Open Space Supervisor Margaret Paget throughout the fall and winter to plan the project. IES met with Wheat Ridge City Councilmember and Wheat Ridge High School educator Jerry DiTullio early in 2015 to plan the WRHS education program. Agendas for these meeting can be found in Appendix A. Workshop curriculum was established in February 2015. The workshops were based on previous IES workshops and were adjusted for the Career Exploration high school students. Ms. Paget and Mr. DiTullio advised IES on workshop updates. The workshops were scheduled for late March and early April, based on the WRHS schedule. Mr. DiTullio requested last-minute changes to the workshop schedule, and they were rescheduled for April 13 and 14, 2015.

The WRHS planting day was scheduled for April 17, with April 24 planned as a rain/snow makeup date. The wet and flooded condition of the planting site made planting impossible and unsafe on the scheduled planting day. IES, in consultation with the City of Wheat Ridge Parks and Recreation Department, cancelled the planting program, and rescheduled it for the following

week, on the date scheduled as a rain/snow alternative date. Mr. DiTullio declined to reschedule the field trip, so students were provided with non-program tasks to do underneath a park shelter during the rain-snow-hail storm. IES made last minute adjustments to the program plan and organized a separate planting day with community volunteers when conditions were favorable and safe for planting. WRHS said that the Career Exploration students would not be available on the scheduled makeup date. IES began emergency planning for a community volunteer planting event to plant all the purchased trees, shrubs, and forbs. WRHS later insisted on students planting trees on the rain/snow makeup planting day, April 24. The high school students were provided with limited tasks to complete at the planting site and a limited number of trees to plant. The Growing the Greenbelt Project volunteer planting day was scheduled and implemented on April 28.

6. Community Collaboration

Many community members and organizations worked with IES to facilitate a successful project. The collaborating groups provided valuable knowledge, experience, time, and effort. IES Tree Stewards from past projects donated their time and knowledge to the project. The Wheat Ridge High School Career Exploration class participated in educational workshops and planting events, albeit with limited success. The City of Wheat Ridge City Council, Mayor, City Manager, City Attorney, and the Parks and Recreation Department supported the project with a variety of resources. Keith Wood, Colorado State Forest Service Community Forester and a representative of the Colorado Tree Coalition, provided tree-related learning materials for the workshops. DesignWorkshop provided valuable landscape architecture expertise and produced the planting plan created specifically for the planting site.

Volunteers

Volunteers on the GTG volunteer planting day.

In planning the Growing the Greenbelt volunteer planting day, IES tapped into its network of passionate Wheat Ridge area volunteers and contacts at the City of Wheat Ridge to pull together over twenty five individuals. Many individuals assisted IES in gathering volunteer support, including Lloyd Levy and Jennifer Brown, Wheat Ridge residents and Tree Stewards. The volunteers included local Boy and Girl Scouts, Wheat Ridge residents, and current and new Greenbelt Tree Stewards. These volunteers were given planting instructions by IES Associates and City of Wheat Ridge Parks and Recreation Department staff members. Community collaboration allowed IES to meet the project's goals and showcased the passion Wheat Ridge community members have for their Greenbelt.

The volunteer planting day was a success, especially given the small amount of time to recruit and organize volunteers. Over 25 volunteers planted over 100 saplings on April 28 from 3 to 5 pm. The volunteers filled out participation surveys and were interviewed by Jesse Johnson, videographer, IOTK media, for the project video. IES thanks all of the volunteers for their passion, flexibility, and efforts in improving the health of the Greenbelt.

Public Relations

To promote the project and create better awareness of the benefits of urban forestry, IES developed and implemented a public relations plan that employed various media and platforms. Platforms for diffusing project information were local and regional. The goal was to inform and update the public, involve local businesses, recruit Tree Stewards, and increase awareness of IES and its efforts.

Project information was provided on the City of Wheat Ridge's website, in IES newsletters, social media sites, press releases to local news organizations, and the IES website and quarterly newsletter. The information included event schedules, event photographs, project developments, and project planning events. Video footage of classroom workshops and planting days was recorded for a project video by a professional videographer, described below. IES Associates visited local businesses and community organizations to inform community members about the project and gather community support.

Video

IES commissioned a local videographer, Jesse Johnson of IOTK Media, to record the workshops and planting day events. Mr. Johnson was present at both workshops and the first high school planting day. Mr. Johnson's associate, Patrick Carlson, was present to record the volunteer planting day. To ensure the video accurately and completely described the project, IES worked closely with Mr. Johnson while planning the video. IES produced video outlines with suggested content. Drafts of the video were carefully reviewed by IES staff, associates, and Margaret Paget.

Volunteers and participants were interviewed about the program, workshops, planting day, and the project's future influence and effects. Those interviewed included IES Associates John Kelly and Sean Mangus, IES Executive Director Carol Lyons, volunteers Susan Crisfield and Jennifer Brown, participating Girl Scouts, and Margaret Paget. The interviews and footage of planting day activities are assembled in two videos, produced by Mr. Johnson. The videos are available on the IES website and YouTube channel.

WRHS Career Exploration students plant trees with a Tree Steward.

Wheat Ridge High School Career Exploration Class

The Wheat Ridge High School Career Exploration Class, taught by Jerry DiTullio, participated in two education workshops and two tree planting events on April 17 and 24, 2015. Through these events, students were introduced to several careers including landscape architecture, urban forestry, and forestry and open space management. The students also learned about local ecology, tree science, and how to properly plant and care for trees in the Greenbelt.

The students and volunteers assisted in a variety of tasks. The students planted 15 large (5-gallon) cottonwood trees in the planting area, assembled protection cages to prevent damage from beavers and other grazing animals, cleaned up litter around the planting site, helped prepare informative signs about the emerald ash borer, distributed mulch and soil, and removed invasive species.

The Career Exploration Class improved the Wheat Ridge Greenbelt through their efforts. The interaction proved to be beneficial for both students and the Greenbelt, and supported the project's goals. This special education class includes students with a wide range of special physical, mental, and emotional needs. The class was accompanied by paraprofessional educators. The tasks assigned to the class were planned to take into account the various special needs of the students. The students did not participate in or complete the full program planned for this project due to schedule changes. The tasks substituted at the last minute were completed successfully.

7. Project Design and Events

Background

The project was initiated through the partnership between IES and Jerry DiTullio, a Wheat Ridge High School teacher and City Councilmember. This is the third year of the partnership with Jerry DiTullio, teacher of the Career Exploration Class. IES also continued its successful partnership with the City of Wheat Ridge Parks and Recreation Department through Margaret Paget, Forestry and Open Space Supervisor. These partners are dedicated to improving education for Wheat Ridge students and improving ecological health in the Greenbelt.

Wheat Ridge High School's Career Exploration Class gives students with disabilities unique opportunities to explore careers. These students may not have this opportunity to learn about career possibilities without this class and without outside support from organizations like IES. Wheat Ridge High School also has a significant disadvantaged population, with 47% of students qualifying for free or reduced price lunch.

The Greenbelt, a 300-acre woodland open space bordering Clear Creek, is a cherished area to the people of Wheat Ridge and many surrounding communities. The Greenbelt has experienced ecological decline due to drought, extreme weather, and limited municipal resources. Threats to Greenbelt species and habitats include:

The Wheat Ridge Greenbelt. Image courtesy of Google Earth.

- Lack of buffer zone, which enables an "edge effect," degrading the native vegetation. An edge effect refers to the changes in structures and ecology that occur at the boundary of two habitats. With the growing population of Wheat Ridge, more community members use the Greenbelt, causing a greater degradation of the zone directly between the community and the Greenbelt.
- Past grazing, haying, and gravel mining caused considerable disturbance of the natural flora and topography of the floodplain and creek.
- Artificial lakes from gravel quarrying dominate the western portion of the floodplain. The creek is now largely isolated from its floodplain.
- Ineffective mitigation efforts to stop erosion along the creek banks in many areas, such as the area south of Prospect Lake, have altered the natural hydrology of the creek system.
- Severe storms such as the 2009 hailstorm caused significant canopy loss.

IES is committed to advancing the City of Wheat Ridge's Open Space Management Plan (OSMP). Wheat Ridge identifies the Greenbelt as a jewel in the community and values it for wildlife, social, and economic importance. The OSMP requires the city to improve and encourage the composition and structure of the Greenbelt through the distribution of native vegetation types that naturally occur in the area. The City of Wheat Ridge and IES have worked in past projects to remove invasive and non-native species including Russian Olive (*Elaegnus angustifolia*), common teasel (*Dipsacus fullonum*), yellow toadflax (*Linaria vulgaris*), and mullein (*Verbascum thapsus*). As part of this project's site plan, IES completed an Environmental Protection Agency Riparian Condition Assessment (RCA). The RCA will be described in the planting plan section below.

Planning

IES began planning the project in January 2015. IES combined previous project experience and stakeholder engagement to produce a comprehensive plan that included classroom activities, a planting day, and an ecological improvement plan. Due to rainy and snowy weather in April, IES had to revise the planting plan to include volunteers from the Wheat Ridge community.

IES began meeting with stakeholders in early February. IES met with Jerry DiTullio on February 10 to agree on program parameters, discuss plans for the classroom sessions, and set dates for the classroom workshops. During this meeting IES learned the number of students in the Career Exploration Class and that the larger class was divided into two 50-minute periods every day. This meant that IES needed to implement each classroom workshop twice. IES Associates, partnering with Margaret Paget and Jerry DiTullio, developed classroom workshop program. The meeting agenda from this meeting is in Appendix A.

IES also met with Margaret Paget on February 10 to discuss the planting plan and planting day. IES and Ms. Paget discussed the most pressing needs for the Greenbelt and possible sites for the planting. On February 12, IES and Ms. Paget decided on the Growing the Greenbelt site, northeast of the Miller Trailhead parking lot, and southwest of the Moore Street entrance to the Greenbelt. The site has been designated for revegetation as the area includes social trails used for many years. Ms. Paget decided that this site was in high need of revegetation and a planting program that included trees, shrubs, and grasses would be an appropriate solution.

The GTG planting site from above.

IES meeting at the GTG site with Margaret Paget and Kathleen King on March 5.

IES contacted IES Associate Kathleen King about a potential partnership with her employer, landscape architectural firm, DesignWorkshop. DesignWorkshop volunteered services as part of the DesignWorkshop Foundation. IES welcomed the expertise of DesignWorkshop in the planning process. Ms. King agreed to develop a planting plan. On March 5, IES met with Kathleen King and Margaret Paget for a walkthrough of the site and to begin the planning process for the planting plan.

IES presented on the status of the program to the IES Tree Project Steering Committee on March 5, 2015. IES Tree Project team members discussed the challenges of program development and implementation with experts from a variety of professions including foresters, landscape designers, and lawyers. Steering Committee Meeting agendas is in Appendix B.

Planting Design

The planting plan was designed to increase the ecological health of the Greenbelt. IES, DesignWorkshop, and City of Wheat Ridge carefully selected the site, selected a list of species, selected the number of species to be planted, and prepared the site for the planting events. After the site walkthrough, Margaret Paget finalized a species list after consulting local nurseries and tree suppliers. The final tree species list is in Appendix T and includes:

Cottonwood
Dogwood
Peachleaf Willow
Wax Current
Wild Rose

Staking the site on April 13.

When the tree species list was finalized, DesignWorkshop created a plan that combined the need to revegetate the site with the species available. Kathleen King analyzed the topography and present flora species to create a plan that placed the best tree or shrub specie in the location that would maximize survival The plan is in Appendix J. IES, Margaret Paget, and staff from the City of Wheat Ridge Parks and Recreation prepared the site for planting by staking the site. The stakes had the name of the tree or shrub specie that needed to planted in each area. Each stake represented one tree, shrub, or forbs. The staking happened on April 13.

IES completed an Environmental Protection Agency Riparian Condition Assessment (RCA). The assessment is intended to "help characterize the physical and ecological attributes that represent the thresholds for sustainability" (Riparian Assessment: Using the NRCS Riparian Assessment Method, www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_050752.pdf). IES completed the assessment with the help of Margaret Paget. IES found that the segment of Clear Creek adjacent to the northern area of the planting site is at risk and is in critical need of improvement. Specific needs for Clear Creek include: high level of invasive and noxious species, low amounts of middle aged trees, and ineffective dissipation of energy and water flow in the flood plain. The RCA is in Appendix U.

Clear Creek bordering the northing edge of the GTG planting site. Image taken for the RCA.

8. Classroom Workshop and Design

Workshop 1 Design and Event

The goal of the first workshop on April 7, 2015 was to familiarize students with the Greenbelt's ecosystem, demonstrate how the plants and animals of the Greenbelt depend on one another, and introduce them to the plants and animals of the Greenbelt and careers related the Greenbelt environment. The workshop plan is in Appendix D.

IES Executive Director Carol Lyons began the program by introducing IES, the project, and the workshop plan to the students. Tree Project Manager Sean Mangus started the discussion of the workshop by presenting students with a description of the Greenbelt's location and definitions of organism and the web of life.

Students participate in the Web of Life activity.

Students participated in the "Web of Life" activity developed by IES. Students were given 8 1/2" by 11" laminated sheets that depicted trees and animals found in the Greenbelt. Students were asked to stand in a circle. The activity started with one student holding the end of a roll of string. The student was asked to explain what their organism was and how it connected to another organism. IES Associate Emily Alvarez rolled out the string and connected the two students. This continued until all students were connected in the web.

A student reads from a career card.

Students who had tree cards were asked to drop their string. This represented what would happen to the Greenbelt ecosystem if trees were removed. Students discussed the importance of trees in the ecosystem and why planting new trees are important to the health of an open space. IES then moved the focus of the activity to career development. IES set up hats on a table at the front of the classroom. Each hat had a different career on it such as forester, ecologist, maintenance crew member, and high school teacher labeled on the front. Underneath each hat was a description of the career. Students were asked how a career they saw on the table could help reinvigorate the Greenbelt's ecology. The student who answered was given the hat to wear and asked to read the description of the career. Hats and career description were compiled by Liz Wickard of Wheat Ridge Parks and Recreation. The career poster is in Appendix F and the career descriptions are in Appendix G.

IES then led a discussion about video production. IES Associate Emily Alvarez led a brainstorming session where students discussed important aspects of the program, what should be included in a video, what the video's structure should be, and why it is important to document a project with a video. Students believed that a shorter video is more productive and can get more community members excited about the project through a visual representation of project events.

The last part of the workshop was the handing out and explanation of a brief homework assignment for students. The homework asked students to look around their community before the second workshop for species discussed during the first workshop. Students were given a homework sheet and asked to bring it back, completed, for the second workshop. IES ended the workshop by thanking students and reminding them about the next workshop.

Workshop 2 Design and Event

The goal of the second workshop on Monday, April 13 was to introduce the planting day, and to teach students about planting activities and how to properly plant a tree. The full workshop design is in Appendix H.

The workshop started with an introduction and a review of the first workshop. Program Coordinator John Kelly led students in a brief overview of the web of life game and discussion of the homework. Students did not complete the homework. IES tried to engage the students in spite of their extremely low attention and interest level by discussing species of animals and trees the students might have seen during the previous week. Students were informed about the three activities that IES had planned for the planting day. Students were told they would be broken up into three groups and have a chance to complete tree planting, protective cage assembly, and invasive species removal activities.

A student participates in the second workshop.

Wheat Ridge Forestry and Open Space Supervisor Margaret Paget led a discussion about the planting day event, including details about each activity. Ms. Paget discussed proper planting and invasive species removal techniques, including the need to dig an appropriately sized whole, to water plants, and to be careful to bag invasive species so their seeds are not spread further into the site. The invasive species poster used in the presentation is in Appendix I. She described the ways that protective cages are built and why they are necessary for the survival of young saplings. Finally, Ms. Paget discussed the need for safety at the planting day so students understood the risks of working with tools and the need to pay special attention to what they were doing when using them.

The workshop moved to a discussion of tree stewardship led by Sean Mangus. Sean asked students what the main parts of the tree are, what a tree needs to establish itself, and what is needed for a tree to survive. When students answered, they were asked to come to the front of the classroom and draw either the part of the tree or the need of the tree on a flipchart. Students were given an explanation of the IES Tree Stewardship program and shown how they could care for their trees in the Greenbelt.

Students participated in a brief video brainstorm before IES concluded the workshop. Emily Alvarez discussed the students' brainstorm from the previous workshop and asked if any students had any further ideas about the project video. After answers were recorded, Carol Lyons ended the workshop by reminding students about the planting day, the discussion of safety from earlier in the workshop, and brief discussion about what students should wear and bring to the planting day.

Margaret Paget teaches WRHS Career Exploration students about proper planting technique at the second high school workshop.

9. Planting

First High School Planting Day

The first High School Planting Day occurred on April 17. This event was marred by cold, rainy weather. IES, the Wheat Ridge Parks and Recreation, and students met in Prospect Park instead of the Growing the Greenbelt site because the site was deemed to be in too poor condition to plant on. The event began at 9 am, with the group meeting under the large awning in the park.

Thanks to the adaptability of Margaret Paget, IES and WRPR were able to give the students three activities to complete. The first activity had students separating the saplings into carrying containers and learning about tree species. The second activity consisted of students measuring and cutting wire, and assembling protective cages. The final activity saw students cutting and tying emerald ash borer signs that will be used by WRPR to mark ash trees and inform citizens around Wheat Ridge about the dangers of the insect. Students were starting to feel the effects of the weather by 10:30, so the group moved to the offices of WRPR for a general discussion about tree stewardship and the emerald ash borer. The original planting day agenda can be found in Appendix K.

Second High School Planting Day

Students plant trees during the second high school planting day.

The second High School Planting Day occurred on April 24. Students arrived at the Growing the Greenbelt Planting site at 10 am. Margaret Paget led an instructional briefing about how to plant trees properly, how to remove invasive species, and safety. Students then broke into groups to plant fifteen 5 gallon cottonwoods. These larger cottonwoods were given special spots on site that were marked by IES Associates and WRPR staff prior to the planting day. Students were accompanied by WRPR staff members Brian Harvey and Lonnie Jaramillo, IES Associates John Kelly and Sean Mangus, and volunteer Don Mangus.

Students also completed two other activities on site. The first was digging fence post holes along the southern portion of the site. As part of the revegetation effort by WRPR, the site needed to be closed off from public use, so students participated in starting the process of blocking off the trail from the public. A smaller group of students who couldn't dig post or tree holes were guided by Margaret Paget to remove invasive species and plant native grasses and flower seed mixes along the trails to the southeast of the planting site. At the end of the planting day, students filled out evaluations of the program. Evaluations are in Appendix R.

Volunteers plant trees during the GTG volunteer planting day.

Volunteer Planting Day

On Tuesday, April 28, IES and WRPR gathered 25 volunteers at the Growing the Greenbelt planting site. Volunteers included children, adults, and Girl and Boy Scouts. They were given a brief demonstration by WRPR staff on how to plant trees properly. Volunteers were then asked to walk onto the site to find a planting flag which had a specific tree species listed on it. They brought this flag back to WRPR staff to get a sapling, which they then planted at the marked location. Between IES Associates and volunteers the majority of plant material originally attended for the high school students was able to be planted. Over 120 plants went into the ground during this event. Volunteers also participated in noxious and invasive weed removal. At the end of the planting day, volunteers completed evaluations. Volunteer evaluations are in Appendix S.

Volunteers plant trees during the GTG volunteer planting day.

IES would like to thank all the volunteers that participated in the Growing the Greenbelt program. Without their help, IES would not have been able to get all the plants in the ground. IES appreciates their time and effort, and knows they made a real difference for their community.

Commemorative Posters

IES created commemorative posters for both the High School and Volunteer planting days to recognize the students, volunteers, and project funders. They were placed in kiosks near the planting site. The posters list project partners and sponsors, provide images of the planting days, and summarize the planting days. The posters are in Appendices O and P.

10. Growing the Greenbelt Education and Environmental Health Program Evaluation

Project Outcomes

The *Growing the Greenbelt Education and Environmental Health Project* was a successful program despite obstacles that arose when implementing the program. The main goals of the project were to create an education program that focused on ecology and career exploration while motivating students and community members to actively improve their local open space. The ecological goal of the program was to improve the Greenbelt through the use of tree science and in accordance to the Wheat Ridge Open Space Management Plan. IES was able to meet its ecological goals, but was able to meet only some of the educational goals. The educational goals and objectives will be discussed later in this section.

The first objective was to continue collaboration among IES, the City of Wheat Ridge Parks and Recreation, Wheat Ridge High School teachers, students, and parents, and other interested stakeholders, including ecological, riparian and forestry experts. This collaboration among IES, the City of Wheat Ridge, and Wheat Ridge High School was largely successful. The partnerships were strengthened through addition of a key project partner, DesignWorkshop, who provided pro bono landscape design.

The second objective was the development of meaningful and engaging workshops and planting days for the students of the Wheat Ridge High School Career Exploration Class. IES implemented two classroom workshops, and one scheduled and one unscheduled planting days to complete this objective. The classroom workshops were designed to teach students about local ecology, tree planting and stewardship, and careers in science. The planting days were designed to provide students with contextual knowledge from lessons learned in the classroom and put this knowledge into action. Students planted trees, removed invasive and noxious species, cut wire to assemble protective cages, and helped prepare informational emerald ash borer signs. IES developed these programs with the help of Margaret Paget. The ash borer sign activity was unrelated to IES's program.

The third objective was to implement a planting day for High School students that helped improve the ecological health of the Greenbelt. This objective was not fully met because of schedule changes by the class teacher. The majority of the plants were not planted and the invasive weed removal was not completed. IES implemented three separate planting days to ensure the site was properly planted, instead of the one day planned. The first high school planting day, in rain, snow, hail, and wind, was ineffective in advancing the project objectives. On the hastily scheduled second planting day, students planted fifteen 5-gallon Cottonwood trees. IES quickly organized the Volunteer Planting Day to complete the planting of the 120 native species saplings, forbs, grasses, and shrubs, and removing noxious invasive species.

Doubling the number of classroom workshops and tripling the number of planting events caused a huge strain on IES's very limited time, resources, and funding. To make this program a success, IES was forced to use other organization resources designated for other projects.

The fourth objective was to organize a Project Advisory Committee. This committee consisted of IES volunteers and associates, Margaret Paget, Kathleen King of DesignWorkshop, and Jerry

DiTullio. The committee met multiple times during the initial planning of the program from December to April. The meeting agendas are in Appendix A.

The fifth objective was to implement an ongoing tree stewardship program in the Greenbelt. IES used previous models of tree stewardship developed in the Greenbelt for this project. Tree Stewards include previous and new stewards. IES will continue to teach, support, and monitor stewards as they care for the *Growing the Greenbelt* site. Stewards complete forms that describe dates they were on site, parts of the sites they worked on, and the amount of water used.

The sixth objective was to organize a community outreach program. IES engaged the press through press releases and informed interested community members through the IES website and social media pages. IES designed and implemented a business outreach program that was a direct contact campaign to local businesses. IES used its relationship with existing tree stewards and volunteers from previous programs to implement the Volunteer Planting Day. The community outreach objective was one of the most successful parts of the program. IES adapted when faced with challenges in the program and was successful in harnessing community passion for the Greenbelt to help fund the program and complete site planting.

IES's final objective was to complete and compile this report. This objective was completed by Tree Project team members. IES evaluated the program through student and volunteer evaluations, responses from stakeholders, and internal review. The results of the evaluations are discussed below.

GTG Program Coordinator John Kelly plants trees with volunteers during the volunteer planting day.

<u>Project Successes</u>

The *Growing the Greenbelt Education and Environmental Health Project* was a successful program that implemented tree science-based initiatives to educate community members and improve ecological health in the Wheat Ridge Greenbelt. IES had three key areas of success:

1. All trees were planted despite partner schedule changes and challenging weather conditions.
2. Students and volunteers enjoyed the program and learned about tree science, proper tree planting techniques, and that they can positively impact their open spaces.
3. IES was resilient in addressing project challenges and was able to meet its stated goals for the project.

All trees that were designed to be planted were planted. Through careful planning and generous

donations, IES and our volunteers planted over 120 trees. WRHS schedule changes prevented the high school students from planting the saplings, forbs, and grasses. Volunteers planted the saplings, forbs, and grasses, and completed thorough invasive weed removal at the site. IES showed resiliency and resourcefulness in this campaign when recruiting and organizing volunteers. The project success was due, in part, to IES's ability to quickly adapt to changing conditions. IES was forced to reschedule both classroom workshop session dates and the original high school planting date. The Volunteer Planting day took shape quickly due to the work done by IES Associates, who contacted volunteers and worked closely with Margaret Paget to monitor weather patterns. Once a date was scheduled, IES organized all volunteers. Margaret Paget organized a crew of Wheat Ridge Parks and Recreation employees. Securing 30 volunteers to plant the site was incredible due to the short notice. This would not have been possible without Margaret Paget's efforts and the excitement of the Wheat Ridge community members.

Students and volunteers enjoyed the program and learned about proper planting techniques. Satisfaction with the event was measured through student and volunteer evaluations, which are in Appendices Q and R respectively. Positive feedback from the program included:

WRHS Career Exploration students plant trees during the second high school planting day.

"The planting day was a blast. We had team work which is a very good thing." (WRHS Student, Danielle Burg)

"I liked that we got to dig holes with our friends and help out [the Greenbelt by] planting the trees." (WRHS Student, Batley)

"It is a nice concept. I liked the opportunity to help Mother Nature. It is a nice opportunity for community involvement." (Volunteer, Pat McKenna)

"We thoroughly enjoyed that day!" (Volunteer, Genevieve Robinson)

Program Challenges

The project's biggest challenge was the participation of the high school class. The WRHS students did not pay attention in the classroom and did not treat IES and Wheat Ridge presenters with respect. The teacher did not set or maintain minimal behavior standards in the classroom and did not respect IES's limited resources. He also made last minute and unforeseen schedule changes that increased the number of workshops and planting events. While we experienced well above-average rain and snow in April, our program was organized to account for possible weather delays.

It was difficult to engage the students in the classroom during both classroom workshops. It was difficult to engage students and interest them in the activity. Many students did not participate, opting instead to read books or use hand held electronic devices. The teacher often walked in and out of the classroom, signaling to the students that the workshop was not an important program and making it difficult to keep the students on track and focused on the activities. Students were asked to complete a homework assignment where they recorded animal species around Wheat Ridge during the week between classroom workshops. None of the students completed the homework.

IES found it challenging to develop education materials suitable for students with a wide variety of learning disabilities. As part of the first workshop, students were asked to read cards that explained careers in science. IES hoped this tactic would be an innovative way to combine the ecological Web of Life game with career exploration. The cards contained language at a basic high school level, which proved too difficult for students to read and understand.

IES did not have adequately clear and defined partnership parameters with Jerry DiTullio. After carefully checking calendars and scheduling the WRHS workshops in a joint meeting, the dates were later found to be a conflict with other classroom activities and had to be changed. A comparable problem arose with the planting date and rain-out planting date. For safety reasons, IES and the City of Wheat Ridge cancelled the planting date, and rescheduled planting for the rain date. Mr. DiTullio insisted on conducting a field trip on the original planting date, stating that the scheduled rain date was no longer available. After conducting the field trip (with no planting) on the original planting date, Mr. DiTullio insisted on a planting field trip on the rain date. Mr. DiTullio was responsible for providing generous funding through the Wheat Ridge City Council. IES failed to clearly define that this funding was used as matching funds to support the overall project, and not specifically designated to purchase specific trees.

The Denver metropolitan area experienced unusually high precipitation in April. Cold and precipitation caused IES and the City of Wheat Ridge to implement the planned rain date schedule, as it was too cold and icy on the original planting date. The high precipitation caused parts of the planting site to be flooded. IES needs to make even more robust provisions for weather delays in the future.

The Volunteer Planting Day was the first time the IES organized a planting event on short notice. Planning and outreach details typically considered by IES were left out. Some volunteers had difficulty finding the site. Many of these volunteers missed the explanation of tree species and proper planting techniques. This was due to a lack of follow-up during the initial email correspondences to ensure that volunteers understood the directions of the planting day and to a less than perfect event schedule.

IES tackled an ambitious business outreach initiative. Many businesses were interested in the program, but could not donate money due to tight budgets or the little time between IES contact and the planting day. Most of the business contact was done in March. The initiative took significant time given the amount of funds IES received from businesses. IES associates spent considerable time contacting businesses through emails, phone calls, and direct face-to-face contact.

The *Growing the Greenbelt* program did not include collaboration with Kullerstrand Elementary School. Kullerstrand Elementary was a key participant in last year's *Preserve the Greenbelt Elementary Education Program*. Due to a change in the fourth grade teaching staff and an increased test schedule, along with limited IES resources, Kullerstrand could not participate in this spring's program.

Recommendations for Next Steps

IES has four recommendations to improve future projects. These recommendations will allow IES to improve future Tree Project initiatives to advance our mission and to bring education and ecological health improvements to communities in the Front Range

The first recommendation is to draft detailed Memorandum of Understandings (MOUs) with project partners at the beginning of the project. An MOU with a defined set of project parameters will facilitate better planning of classroom workshops and planting days. The MOU should express precisely how the funds donated by each party are going to be allocated and what they are expected to purchase. MOUs should itemize project responsibilities of each project partner along with dates and a project timetable. The MOU should be signed by the responsible official of each partner. MOUs can be revised and updated as needed throughout the project.

The second recommendation is to improve the instructions and guidelines for each project activity, including planting days. IES could further develop its manual for volunteer tree plantings. This guide would give IES interns and associates a detailed walkthrough of a successful planting day. If future IES projects followed those instructions, planting days would not see volunteers confused about meeting areas or how to plant trees properly.

The third recommendation is to have early and frequent contact with participating teachers. This could help to alleviate the problems of workshop development and partner participation. IES should contact teachers at least six months prior to implementation. This provides teachers time to commit to the program. Contacts should include detailed plans and expectations, including teacher participation, student participation, and student behavior. Conversations should confirm that each participating teacher agrees to the plans and expectations. IES would have the opportunity to better develop workshops with this time. The key to a successful workshop is involving students in activities that enhance their curriculum. Working with educators for a longer period of time can improve the content of activities. Having a longer relationship and earlier contact with educators will improve classroom activities.

The final recommendation is to begin business outreach sooner. As with contacting teachers, IES should begin business outreach in the fall for a spring program. This gives IES the opportunity to have longer discussions with potential donors, which is important in cultivating meaningful relationships. It also provides businesses time to gather a meaningful donation. Wheat Ridge is full of small, family owned businesses that do not necessarily have the funds available for an immediate donation. These businesses might be willing to donate to the program if given time necessary to effectively pool funds for a donation. Furthermore, contacting businesses earlier in the planning portion of the project improves stakeholder engagement in project planning.

Conclusion

IES's *Growing the Greenbelt Education and Ecological Health Project* was a success. The project was made possible due to major grant funding by the Colorado Tree Coalition and the generous contributions of the City of Wheat Ridge City Council, Mayor, and City Attorney, Wheat Ridge Parks and Recreation, and valuable partnership with DesignWorkshop. Stakeholders were actively engaged in program development and implementation. Margaret Paget and her staff members at the Wheat Ridge Parks and Recreation Department were incredibly helpful and resourceful in the face of numerous challenges. Volunteers from the community made a real difference, and their time and efforts have made the Greenbelt a healthier open space. The success of the project will continue as Tree Stewards care for the newly planted trees over the next three years. IES is proud to be associated with the Wheat Ridge community, a community that has passionate civil servants and community members that care so much for their open spaces and urban forests.

Volunteer Girl Scouts plant trees during the GTG volunteer planting day

The mission of the IES Tree Project is to improve Colorado cities using tree science. Through collaborative, multi-disciplinary partnerships and programs, we restore natural systems and use urban green infrastructure, educate children and adults to become environmental stewards, rehabilitate, improve and maintain critical urban natural resources, and improve community health and economy.

Based on this experience, IES confirmed that five critical factors go into successful tree planting and survival:

- Collaboration with the full range of interested stakeholders
- Careful planning of the education and planting program
- Careful selection of the planting sites and plant species to optimize survival rates
- Good instruction and proper planting with well-organized volunteer participation
- Appropriate maintenance plans and implementation

IES looks forward to building on this experience and continuing to train the next generation of tree stewards. IES welcomes comments, feedback, and volunteers. Please contact as Solutions@i4es.org or www.i4es.org.

Plans for Printing, Binding, and Distributing this Report

This report will be available electronically via the IES website, www.i4es.org. A limited number of printed and bound copies will be distributed to project stakeholders.