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THE TREE PROJECT
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Final Report

May 2021

2020 Wheat Ridge Nature Play Connections Project

IMPACT REPORT

Environment

4 trees planted

28 pollinator-friendly plants planted

23 native shrubs and grasses planted

Community

450+ volunteer hours contributed

8 organizations involved

2 planting days implemented

Education

2 educational workshops completed

14 students engaged

4 virtual activities created

Table of Contents

Authors and Acknowledgments 4
Executive Summary 6
Chapter 1: Introduction and Overview 7
Chapter 2: The 2020 Nature Play Connections Project 10
Chapter 3: Project Partners and Community Collaboration 15
Chapter 4: Project Organization 17
Chapter 5: COVID-19 Modifications 19
Chapter 6: Project Evaluation 21

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KULLERSTRAND ELEMENTARY SCHOOL

ROOTED IN fun WHEAT RIDGE PARKS & RECREATION

Thank you to our funders!

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WHEAT RIDGE, CO

Executive Summary

The 2020 IES Wheat Ridge Nature Play Connections Project (NPCP) took place at Kullerstrand Elementary School in Wheat Ridge, Colorado during the spring and fall of 2020. This project marked the fifth year of IES's partnership with Kullerstrand Elementary School and the eighth year of partnership with Wheat Ridge Parks and Recreation Department (WRPRD) to implement environmental improvement and education projects in Wheat Ridge. While the 2020 NPCP experienced several setbacks and challenges due to the global COVID-19 pandemic that prompted worldwide shutdowns, including complete school closures just before the original project start date, this did not prevent IES from completing the project. The pandemic indefinitely postponed the spring project and all in-person events just as it was set to begin, so IES created an interactive virtual workshop with four educational activities and delivered it to students in spring 2020, to act as Workshop One while the remaining project events remained uncertain. IES closely monitored regulations set by Jefferson County Public Schools and the state of Colorado and maintained constant communication with both project partners and all project funders throughout the summer to ensure a plan for successful project completion. Once the 2020-2021 in-person school year began in August 2020, Kullerstrand Elementary agreed to let IES implement the NPCP on school property. IES and WRPRD successfully implemented one in-person workshop and two planting days with the Kullerstrand Elementary School's Teaching Responsibility and Independence with Learning Supports (TRAILS) students while strictly adhering to safety and social distancing requirements.

This report includes information on the development, implementation, and evaluation of the project, including all COVID-19-related modifications. The report briefly discusses the original project plan for the NPCP, a three-school collaborative effort in Wheat Ridge's Anderson Park where IES planned to plant a pollinator garden and several trees in collaboration with the TRAILS students. This report proceeds to describe the adjusted project goals, activities, and outcomes to evaluate the NPCP's success, provide information on implementing similar projects in the future, and discuss IES's reaction and adaptability to COVID-19. It includes recommendations to improve future projects and educational programs, especially in adapting educational activities into virtual formats.

The project successfully met all adjusted objectives through one remote-learning workshop, one in-person workshop, and two planting days. Kullerstrand TRAILS students successfully and enthusiastically planted 51 native shrubs, grasses, and flowers in addition to four trees at Kullerstrand Elementary School. General education classmates, who are traditionally invited by TRAILS students to join project events, were not allowed due to COVID-19 restrictions. A few TRAILS students decided to learn through a fully remote format this year, so IES had a smaller-than-usual group of students. Fourteen TRAILS students participated with eight teachers and paraprofessionals from Kullerstrand. Three IES team members, six Tree Stewards, and seven members of WRPRD also participated in the planting days. Although planned on short notice, the adjusted 2020 Wheat Ridge Nature Play Connections Project was completed with no further obstacles. The original theme of pollination was maintained through all activities by IES in coordination with WRPRD Environmental Interpreter Susan Bennett. IES proved its ability to adapt to circumstances as well as its commitment to improving the environment and providing environmental education to the community.

Chapter 1: Introduction and Overview

This report documents the development and implementation of the COVID-19-revised IES 2020 Nature Play Connections Project (NPCP). The Institute for Environmental Solutions (IES) designed and implemented this project in Wheat Ridge, Colorado to improve the environmental health of the Wheat Ridge community. This project included planting on Kullerstrand Elementary School property, providing hands-on science education, and facilitating socialization opportunities for Kullerstrand students in the Teaching Responsibility And Independence with Learning Supports (TRAILS) program. The 2020 NPCP is IES's first experience in modifying a project around a global pandemic. This report documents the project's development, adaptation, implementation, outcomes, critical evaluations, and suggestions for future projects. The 2020 NPCP marks the eighth year of partnership between IES and Wheat Ridge Parks and Recreation Department, and the fifth year of partnership between IES and Kullerstrand Elementary School. This report and its appendices outline the ecological improvements accomplished at Kullerstrand Elementary School and the education program with Kullerstrand TRAILS students. This year's project highlights IES's adaptability during unprecedented circumstances and its capability to successfully complete a planting project while ensuring the health and safety of all team members, volunteers, and students involved.

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. Through its two project teams, the Tree Project and the Chemical Footprint Project, IES strives to restore natural habitats through a unique multi-disciplinary approach that is socially and ecologically sustainable. By engaging a broad spectrum of participants in examining these problems on a project basis, IES develops sound and cost-effective solutions. Information about the IES Chemical Footprint Project can be found at www.i4es.org.

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: city trees. Tree Project Graduate Interns and Institute 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, presenting workshops describing the benefits of urban forestry, conducting research on tree science, and providing outreach to achieve a greater understanding of urban forestry impacts. The Tree Project has been successfully implementing urban forestry and environmental education projects in Wheat Ridge, CO since 2012 and in Sheridan, CO since 2014. Information about IES's work in Sheridan can be found at www.i4es.org.

The goals of the Tree Project are to:

- Research urban environmental problems, develop sustainable solutions, and enhance community health through tree planting and urban forestry.
- Partner with municipalities and actively foster community engagement projects to solve urban environmental challenges.
- Develop replicable educational programs to promote environmental stewardship, especially for students in underserved communities.
- Improve and optimize the survival of IES trees and plants through community-supported maintenance efforts.

- Establish IES as the resource for science-based tree planting capability and related environmental education on Colorado's Front Range.
- Improve objective, data-based assessments of project accomplishments.
- Improve volunteer and team member retention and increase IES-wide team collaboration.

Students and volunteers from Kullerstrand Elementary planted new plants to preserve the Greenbelt ecosystem in spring 2014.

History of IES Projects in Wheat Ridge

IES has implemented seven prior successful planting programs in Wheat Ridge. During the 2012-13 school year, IES first partnered with the City of Wheat Ridge with its *Revive the Greenbelt!* program. During the program, more than 200 volunteers planted over 200 trees and shrubs and removed invasive weed species along Clear Creek in the Wheat Ridge Greenbelt to help improve canopy cover and erosion in the riparian habitat.

In 2013-14, IES added the first educational program to planting projects. The *Preserve the Greenbelt!* elementary education program combined innovative hands-on workshops, educational planting days, and volunteer tree stewardship to engage students, educators, and families from Kullerstrand Elementary School, Mountain Phoenix Community School, and Wheat Ridge High School. The program resulted in the participation of 120 students in workshops and planting days, where over 200 native tree and shrub species were planted in the Greenbelt. The Colorado Alliance for Environmental Education awarded the *Preserve the Greenbelt!* project with its 2014 Environmental Education Award for Excellence.

In 2014-15, IES continued its work in the Greenbelt and its collaboration with the City of Wheat Ridge and Wheat Ridge High School through the *Growing the Greenbelt!* Project, focused on ecological education and environmental health. Students from Wheat Ridge High School's Career Exploration Class learned about Colorado's ecology and careers in science through hands-on classroom workshops and an interactive planting planning event where they worked to prepare materials for a community planting day. The project culminated with the planting of over 140 new trees, shrubs, and grasses completed by over 60 students and community volunteers.

Students from Kullerstrand Elementary participated in a hands-on ecological workshop in spring 2019.

From 2016-18, IES implemented a three-year environmental improvement project along a new trail section in the Greenbelt. The *Greenbelt Restoration and Environmental Education Network (GREEN)* program resulted in three years of hands-on science education for students from Kullerstrand Elementary School, six planting days in the Greenbelt with over 400 trees, shrubs, and grasses planted, and a watering program with local children from the Wheat Ridge Summer Sun Camp.

In 2019, IES expanded the work of previous years and held the Greenbelt Improvement Project. This initiative was completed again in collaboration with the TRAILS students at Kullerstrand Elementary school. Providing continued improvement to the Greenbelt in Wheat Ridge was the primary goal of the project. 126 native trees, shrubs, perennials, and grasses were added to the site. Wheat Ridge Summer Sun Campers, a Girl Scout Daisy Troop, and Tree Stewards provided necessary plant maintenance following the planting days.

Project Name	Goals and Purpose
2013 *Revive the Greenbelt!* Project	Restored 200 plants and wildlife habitats along the Wheat Ridge Greenbelt, managed stormwater runoff and pollution of Clear Creek with the help of students and volunteers.
2014 *Preserve the Greenbelt!* Project	Engaged 120 students in ecological education, increased native canopy cover by planting over 200 new native trees and shrubs along Clear Creek.
2015 *Growing the Greenbelt!* Project	Engaged 60 students and volunteers in ecological education, increased 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	Taught 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 over three years.
2019 Greenbelt Improvement Project	Continued education with over 35 TRAILS students through workshops and planting days, totaling 126 new native plants planted in the Wheat Ridge Greenbelt.

Although the 2020 Nature Play Connections Project was modified around regulations set by a global pandemic, the main mission and goals remained: to plant native pollinator species in areas that need them the most. IES's commitment to the Wheat Ridge community is evident through eight years of Wheat Ridge community and environmental improvement projects, implemented with local schools and community members. These projects highlight the importance of urban forestry and the need to implement comprehensive maintenance and preservation plans.

Chapter 2: The 2020 Nature Play Connections Project

Original Project Plan for the 2020 Nature Play Connections Project

The IES NPCP was originally designed to establish a pollinator garden and increase tree canopy cover in Anderson Park's new Nature Play Area. Students at Kullerstrand Elementary were scheduled to participate in two ecology and science-based classroom workshops and two outdoor planting days in the spring of 2020. These were designed to teach students important environmental lessons, develop students' social skills by interacting with peers and adults in the community, and provide students with the opportunity to experience outdoor education that they do not typically have access to due to their necessary learning supports. The Tree Project team met with Kullerstrand staff on October 17, 2019 to begin initial planning for the 2020 NPCP (Appendix A). Tree Project team members met with Wheat Ridge Parks and Recreation Department (WRPRD) staff members on December 17, 2019 to begin initial development of the project activities and planting design. You can find the original project plan in Appendix B.

TRAILS students worked hard during the first planting day to plant trees, shrubs, and grasses on school property in September 2020.

Listed below are the original objectives for the 2020 NPCP at Anderson Park:

- Create a pollinator garden in an area previously covered with turf grass to attract and provide habitat for critical pollinators such as bees, butterflies, and birds.
- Create a meadow using native flowers and shrubs to increase native plant cover in the park.
- Improve the areas of the park damaged from construction by planting native plants.
- Develop and implement two ecological workshops with Kullerstrand's TRAILS program and general education students.
- Care for new plants for three years after planting by the IES Tree Stewards.
- Foster strong collaborative relationships with project stakeholders through planning and debrief meetings.
- Evaluate the success of the project and create a Final Report along with a project video to document the program for improvement and future replication.

Modified Project Plan for the 2020 NPCP

As project planning continued, the COVID-19 pandemic surfaced in early 2020. Plans were modified as restrictions were put in place by local, state, and district authorities in an effort to keep the community safe. IES communicated often with project partners, the Wheat Ridge Parks and Recreation Department (WRPRD) and Kullerstrand Elementary School, throughout the process of re-designing the entire project to comply with these regulations.

Due to the limitations and closures prompted by COVID-19, IES was unable to hold classroom workshops or plant at

Anderson Park's new Nature Play Area with the TRAILS students. IES and WRPRD quickly modified Workshop One classroom activities into a virtual format and presented the virtual workshop to Kullerstrand shortly before school officially let out for the summer in May 2020.

Since the future of in-person learning was uncertain, IES and WRPRD spent the summer brainstorming for any potential learning formats that might be implemented during the fall and how to complete the planting days under COVID-19 restrictions. IES was finally able to meet with Kullerstrand Elementary staff members on August 25 to discuss project options. Jefferson County Public Schools had released information about the format and regulations of the 2020-2021 school year about a week prior to this meeting, which finally produced information that allowed IES to move forward with a new project plan. Kullerstrand Elementary School approved IES's idea to plant on school property while adhering to government and school district mandates to keep all students, staff, and volunteers healthy during this unprecedented time.

Project plans were modified to ensure participant safety and adherence to protocols. The 2020 NPCP took place on the west side of the Kullerstrand Elementary School building, near the newly installed outdoor classroom and playground. After IES received permission to plant on Kullerstrand property, former Tree Project team member and current environmental planner Sabrina Kleinman took soil samples at Kullerstrand and created a planting design for the school property within a week (see Appendix C). IES is grateful for Ms. Kleinman's willingness to produce a planting design on short notice. The outdoor classroom that Kullerstrand constructed over the summer included three wooden benches, four stump seats, and a moveable picnic table. The area between the western property fence and the new classroom and playground needed to be kept clear to allow the school maintenance staff to pass through with heavy equipment. Ms. Kleinman's plan involved installing adjustable planters around the outdoor classroom area rather than in-ground planting to allow for movement if needed. Her plan also included planting shrubs along the fence-line and planting trees behind the playground to provide canopy cover and a windbreak.

Aerial view of Kullerstrand Elementary School planting site.

Modified Workshops

Planters were placed strategically around the new Kullerstrand outdoor classroom.

When the onset of COVID-19 caused the spring planting days and all in-person events to be cancelled indefinitely, IES and WRPRD Environmental Interpreter Susan Bennett created virtual workshop activities for Kullerstrand students that were designed to get them outdoors over the remainder of spring and during the summer in place of IES's in-person classroom workshop. This remote-learning workshop acted as Workshop One while the rest of the project remained undetermined. For the remote-learning Workshop One, the students were given a pollinator-themed scavenger hunt, asked to "adopt a tree" and write journal entries during the summer, and taught how to press leaves from their "adopted" tree. Susan Bennett also provided a pollinator-themed data collection activity in which students could log the data they found out in nature onto a website. These activities were sent to Kullerstrand teachers via email and posted onto their interactive Google Classrooms platform in early May 2020. They will be made available on the IES website shortly and can be found in Appendix E.

Workshop Two was held with the TRAILS students in their new outdoor classroom at Kullerstrand Elementary School near the newly installed playground in September 2020. Typically, general education students join the TRAILS students to help them practice teamwork and communication skills during planting events. However, due to COVID-19 and restrictions on group size, TRAILS students' general education "buddies" could not participate this year. IES held two rotations for both primary and intermediate level student groups to ensure that the group sizes remained small. Everyone wore face masks and stayed six feet apart when possible. Ms. Bennett led a pollination-themed activity while IES team members Laura Prickett and Carol Lyons led an activity about tool safety and proper planting techniques. The beekeeping activity led by Ms. Bennett was a big hit with the students. They enjoyed looking at the honeycomb through magnifying glasses. The tools and safety activity, which included modeling how to plant and having students practice

Susan Bennett led a pollination-themed activity in the newly installed outdoor classroom.

Laura Prickett led the activity about tool safety and planting techniques. The students were seated 6 ft apart and wore masks to follow COVID-19 guidelines.

properly holding tools, as well as filling out a worksheet about safety and planting steps, went smoothly. Many students remembered the safety and planting techniques from last year.

Following the workshop and planting days, IES provided the TRAILS students with blank Thank You cards. The students were asked to draw, color, or write about their favorite parts of the project. IES retrieved the completed Thank You cards and mailed them to all NPCP partners and funders to show appreciation for all their support. You can view the students' Thank You cards in Appendix D.

Planting Days

The first planting day took place on October 2 at Kullerstrand near the newly built outdoor classroom and playground. WRPRD staff members arrived early with specialized heavy machinery to dig holes for the fence-line shrubs and the trees. This would facilitate the planting process, especially since the 15-ft trees required significantly large holes. They used specialized heavy equipment to move the trees to their holes and place the 400-lb trees in the holes. WRPRD provided a large mulch pile for students and volunteers to use during the planting days and during regular mulching throughout the year. The fourteen TRAILS students began planting shrubs and grasses along the fence-line. Students worked in pairs, with at least one adult to supervise each pair. All 23 shrubs were successfully planted, mulched, and watered. Next, the students planted the four trees behind the playground. Since the trees were already placed in their holes, the students filled the holes with soil and compost, then mulched the trees. WRPRD watered the trees with their water truck and a hose, and returned later to stake the trees in the ground.

TRAILS students filled in the holes around the new trees with soil and compost.

The second planting day took place on October 9. The TRAILS students were split into two groups; one group planted the planters around the outdoor classroom while the other group participated in a pollination activity led by Susan Bennett. Halfway through the planting day, the two groups switched activities. During the course of the second planting day, each group planted one large trough planter and one smaller barrel planter. Once the students positioned the rocks, soil, and compost, they then planted the plants based on Sabrina Kleinman's planting design. When the students finished planting all 28 plants, IES team member Laura Prickett and the IES Tree Stewards led an activity teaching the students how to cage the plants along the fence-line to protect them from herbivory. In Ms. Bennett's group, students discussed the importance of local pollinators and then created their own pollinator finger puppets and participated in an activity to "pollinate" different "flowers" around school grounds. Afterwards, the students came back together and discussed what they pollinated and the importance of pollination in Colorado.

Everyone took the COVID-19 protocols seriously. All IES team members, Kullerstrand staff members, project partners, and volunteers who participated wore face masks and gloves, washed their hands frequently, did not share tools if possible, sanitized tools after use, and were socially distanced when possible. The students were monitored to ensure they were also following COVID-19 safety precautions.

Maintenance

The students will provide regular maintenance to all new plants while the school year is in session, unless there are more COVID-19 interruptions. During the summer, maintenance will be taken over by Tree Stewards until school starts again in the fall. IES Tree Stewards are dedicated volunteers from the local community who provide much-needed care to plant sites including watering, mulching, and weeding. IES provided Kullerstrand with all the supplies and equipment needed to care for the plants, and instructions on what to do.

TRAILS students and Laura Prickett planted in the barrel planter located near the outdoor classroom.

Project Funders

The 2020 NPCP was generously funded by the National Fish and Wildlife Foundation, the Community First Foundation, the Wheat Ridge Outside Agency Program, and Wheat Ridge's Holy Cross Lutheran Church. Funding provided for the project was used to purchase educational materials for workshops, plants and trees, tools and equipment for planting days, and team member compensation. The success of the 2020 NPCP was due to the support of these donors and led to environmental education and tree planting to help improve our environment.

Chapter 3: Community Collaboration

The success of the 2020 Wheat Ridge Nature Play Connections Project depended on valuable support and feedback from IES stakeholders. The partnership between IES and Wheat Ridge Parks and Recreation Department (WRPRD) began in 2012 and has subsequently strengthened each year. IES began partnering with Kullerstrand Elementary School in 2015 and has since collaborated to complete six ecological education and planting projects together. These partnerships were vital in developing and implementing this year's planting and educational project in Wheat Ridge. This project continued to improve the Wheat Ridge environment, benefitting the local ecology and community members alike.

Importance of Partnership between IES and Wheat Ridge Parks and Recreation

The partnership between IES and WRPRD was essential for project success. This year is the eighth year of IES's partnership with WRPRD. WRPRD staff members provided feedback and guidance to IES during the planning, implementation, and evaluation phases of the project. WRPRD approved all planting designs, assisted during planting days, and supported site maintenance activities.

The WRPRD staff was instrumental in providing heavy machinery and operators to dig holes and place the large trees into position on Kullerstrand property. WRPRD Environmental Interpreter Susan Bennett provided her expertise in developing and implementing both virtual and in-person workshop activities. The exercises gave students the opportunity to participate in interactive educational activities both at home through the virtual format and in-person during the second workshop and second planting day.

Importance of Partnership between IES and Kullerstrand

This year is the sixth year of IES's partnership with Kullerstrand Elementary and the fifth year in collaboration with the Teaching Responsibility And Independence with Learning Supports (TRAILS) program. Students aged kindergarten through grade five with social and emotional disabilities are placed in the TRAILS program to receive additional learning supports that will optimize their educational and social capabilities. Project planting took place on Kullerstrand property surrounding the newly installed outdoor classroom and along the western fence-line. Kullerstrand teachers provided input and guidance for both workshops that IES planned and implemented for the TRAILS students. The first workshop was modified to a virtual format due to the pandemic-induced school closures and was given to students in the spring semester. The second workshop was an outdoor, in-person workshop held in the newly installed outdoor classroom behind the Kullerstrand school building. The TRAILS teachers provided information on curriculum standards and reviewed workshop lessons and activities. Kullerstrand staff members managed student behavior during all project activities, including two planting days at Kullerstrand Elementary School. Kullerstrand staff members, students, and participating volunteers were required to follow COVID-19 protocols and regulations set by Jefferson County Public Schools. These regulations involved virtual learning, socially distanced in-person activities, a ban on indoor supplemental activities, small group sizes, temperature checks, and wearing face masks. Kullerstrand TRAILS staff members offered

Susan Bennett from WRPRD taught her beekeeping lesson to Kullerstrand TRAILS students in their outdoor classroom.

feedback and input to assist IES in factoring all school district mandates into the NPCP workshops and planting days. After completing all project events, Kullerstrand staff members provided critical feedback to IES to improve future programs.

Community volunteers and TRAILS students finished the first planting day by watering the newly planted trees.

Importance of Community Collaboration

All IES stakeholders were integral to the success of the 2020 Wheat Ridge Nature Play Connections Project. Stakeholders participated in all aspects of the project, including regular stakeholder meetings, joint planning, implementation, and evaluative feedback. WRPRD and Kullerstrand Elementary School helped IES plan and implement a successful environmental education program despite unprecedented obstacles brought on by COVID-19. Communication from all stakeholders supported a group of young students working on social skills to develop their adeptness in environmental stewardship. Through this multifaceted program, students learned about Wheat Ridge's ecology and made a lasting impact in their community by participating in planting days and workshops.

Chapter 4: Project Organization

Project Stakeholder Involvement

The 2020 Wheat Ridge Nature Play Connections Project (NPCP) was made possible through continual collaboration with key stakeholders, Wheat Ridge Parks and Recreation Department (WRPRD) and Kullerstrand Elementary School. Both WRPRD and Kullerstrand Elementary School aided in the planning and implementation of one virtual workshop, one in-person workshop, and two planting days at Kullerstrand Elementary School. IES is especially thankful to WRPRD for digging holes for shrubs and trees at the planting site to ensure a smooth planting day.

WRPRD was instrumental in planting four 400-lb trees during the 2020 Wheat Ridge NPCP.

The Tree Project Steering Committee

IES appreciates the Tree Project Steering Committee members for their contributions to the 2020 Wheat Ridge NPCP. Made up of volunteers from various backgrounds, including former Tree Project members, the Tree Project Steering Committee assists IES in project decisions through expertise and ecological knowledge. The Tree Project Steering Committee conducts quarterly meetings with the Tree Project team to provide advice and guidance on projects.

Collaborative Funding

Funding for the 2020 Wheat Ridge NPCP was provided by the National Fish and Wildlife Foundation, the Wheat Ridge Outside Agency program, and the Community First Foundation. Wheat Ridge's Holy Cross Lutheran Church donated funds towards this project to support the interest of its members in local community development. Tree Project initiatives like the 2020 NPCP are made possible by in-kind contributions and volunteer time from Tree Project team members, WRPRD, Kullerstrand Elementary School staff and parents, and IES Tree Stewards.

Project Plan

The 2020 Wheat Ridge NPCP project plan was created by Wheat Ridge Project Coordinator Laura Prickett (located in Appendix F). This plan underwent several modifications during the year in response to the COVID-19 pandemic. To ensure the safety of all participants and accommodate restrictions from the school district, IES modified the final project plan to take place at Kullerstrand Elementary School rather than at Anderson Park as initially proposed. Further details about IES's response to COVID-19 can be found in Chapter 5 of this report.

The 2020 Wheat Ridge NPCP final project plan included two workshops, two planting days, a series of stakeholder evaluation meetings, a comprehensive three-year Tree Steward maintenance plan, a final project video, and this final report. The workshops focused on pollinators and trees, teaching students proper planting techniques, and how to safely use tools in preparation for their upcoming planting days. On the planting days, a variety of trees, shrubs, and grasses were planted to improve canopy cover, decrease erosion, and improve the ecological state of the Kullerstrand campus which had recently been degraded from the construction of a new school playground. IES incorporated barrel planters to plant four portable pollinator gardens around the newly installed outdoor classroom.

Project Timeline

Initial planning for the implementation of 2020 Wheat Ridge NPCP began in late 2018 when IES prepared a grant application for the National Fish and Wildlife Foundation to request funding for this project. The initial timeline proposed two in-person workshops and two planting days with students in April and May 2020. As COVID-19 prompted an indefinite postponement of in-person activities, including the NPCP, project planning continued through spring and summer of 2020, adapting to the ever-changing state and local COVID-19 regulations. To keep NPCP planning efforts moving forward, IES held meetings with team members and stakeholders to explore possible options for planting events that would safely adhere to COVID-19 regulations.

As part of the new project plan, four portable pollinator gardens were planted with flowers and grasses.

IES presented its first workshop to the TRAILS students as remote-learning activities in early May. The second workshop was conducted in an outdoor classroom on September 29 in compliance with state and Jefferson County Public Schools restrictions regarding COVID-19. Planting days were held at Kullerstrand Elementary School on October 2 and October 9 with the TRAILS students and Tree Stewards. During these two days, small groups planted four planters with 28 native pollinating flowers and grasses near the outdoor classroom and an additional four trees and 23 shrubs near the new playground. Final evaluation debrief meetings with WRPRD and Kullerstrand Elementary School took place in mid-November. These meeting notes can be found in Appendix G. In collaboration with Jesse Johnson of iotk Media, IES created a final project video.

A three-year maintenance plan for the site will be carried out by the TRAILS students and IES Tree Stewards.

Chapter 5: COVID-19 Modifications

Pandemic Background

The COVID-19 pandemic had far-reaching effects during the 2020 Nature Play Connections Project. On March 18, 2020, Governor Jared Polis mandated all Colorado schools to close for in-school learning from March 23 to April 17 to fight the spread of the COVID-19 virus. This was extended to April 30 as cases continued to increase in Colorado, until finally it was announced that the rest of the school year would be held remotely. This shutdown pushed back the proposed NPCP spring planting in Wheat Ridge and the uncertainty of the project's implementation was prolonged into the fall of 2020.

Changes to Original Plans

The original concept for the 2020 Nature Play Connections Project (NPCP) was a collaborative effort organized by the Wheat Ridge Parks and Recreation Department (WRPRD), which included Kullerstrand Elementary School and two other Wheat Ridge schools, to build a Nature Play Area in Wheat Ridge's Anderson Park. IES's role was to collaborate with the Kullerstrand TRAILS students to plant a pollinator garden and several trees near the Nature Play Area. WRPRD Environmental Interpreter Susan Bennett was leading the program to construct the Nature Play Area, consisting of a pollinator garden, nearby trees, a native plant meadow, natural historical education features, natural play structures, and a labyrinth to encourage local children to connect with the environment (Appendix B). The photo below contains the original drawings for the 2020 NPCP plan. This entire collaborative effort was intended to take place in the spring semester of 2020.

The original plan for the 2020 NPCP included planting trees and a pollinator garden in the newly installed Nature Play Area in Anderson Park.

Since spring planting was not feasible due to state orders shutting down schools and sheltering in place, WRPRD staff took certain measures to adapt and minimize the loss of plants. WRPRD had independently grown some plants that were going to be planted in the new pollinator garden by TRAILS students at Anderson Park, but WRPRD had to plant the pollinator plants themselves when students were no longer available to participate. IES subsequently spent the summer researching new planting location options to satisfy both the Tree Project's mission in addition to grant requirements. Potential adapted planting locations included back-planting in previous IES Greenbelt planting sites, planting at Historical Park in Wheat Ridge, and planting on Kullerstrand property. Continuous adaptation was essential, since two weeks before Workshop One was scheduled to be implemented in April 2020, Jefferson County Public Schools moved to a fully remote-learning format. IES and WRPRD Environmental Interpreter Susan Bennett scrambled to create educational remote-learning lessons to replace the in-person Workshop One.

Adapted Project Plan

IES's strategies in navigating COVID-19 state and local protocols included socially distanced workshops and plantings to ensure successful implementation of the project. IES and WRPRD provided materials for one remote-learning workshop in the spring with four activities geared to maintain the theme of 'pollinators' and to allow kids to interact safely outside over the summer. See Appendix E for the remote activities presented to students. Spring planting days were cancelled and IES had to postpone the project indefinitely until more concrete information about school and community capabilities were determined. One in-person workshop and two planting days were able to be held in late September and October under the official guidelines from the State of Colorado and Jefferson County Public Schools at that time. IES created a project plan for Kullerstrand Elementary School's property since field trips were not allowed. General education "buddies" were not allowed to pair up with TRAILS students and participate this year due to school social distancing and small-group requirements.

IES followed mandates and regulations to ensure the health and safety of all students and volunteers.

Safety Protocols

Throughout the 2020 Wheat Ridge NPCP, IES implemented strict requirements to follow health regulations. Masks were worn at all times during the project and all activities were implemented outdoors. Workshops and the partnership activity with Susan Bennett were designed to facilitate six feet of distance between the kids when possible. IES and WRPRD provided students with their own workshop and planting equipment during the in-person workshop and planting days to eliminate sharing of equipment as much as possible. When this was not feasible, sanitizing supplies were available to clean tools and equipment between users. The elimination of sharing equipment between students and volunteers was a vital project component as well as keeping the students in the smallest groups possible.

Similar protocols were applied to the Tree Steward program to keep volunteers and community members safe. Communication with Tree Stewards was increased to ensure they were comfortable and felt safe using tools and maintaining plants in Wheat Ridge. Resources such as surplus tools and personal protective equipment (PPE) were also provided by IES.

Chapter 6: Evaluation

Despite ongoing project modifications prompted by the COVID-19 pandemic, IES adapted, remained flexible, and completed all original project objectives (although slightly modified). IES remained committed to completing the 2020 NPCP and proved its dedication to the Wheat Ridge community and the local environment. After receiving the news that planting trees and a pollinator garden at the new Anderson Park Nature Play Area and holding two spring in-person workshops with Kullerstrand TRAILS students would not be feasible, IES acted immediately to ensure that the project would still occur. IES quickly modified the first workshop into a virtual format and was able to present it to Kullerstrand before the end of the school year. IES stayed in communication with Kullerstrand Elementary School and with Wheat Ridge Parks and Recreation Department (WRPRD) during the summer to continue the conversation regarding feasible project options. Even though the project location and the learning format were changed, IES strove to maintain the original pollination theme of the NPCP and get as close as possible to meeting all original objectives. In the end, IES proved adaptability and dedication. The chart below lists the original NPCP objectives next to their modified and completed versions.

Initial Objectives	Modified Objectives
Create a pollinator garden in an area previously covered with turf grass to attract and provide habitat for critical pollinators such as bees, butterflies, and birds	Create pollinator gardens in four large moveable planters to attract and provide habitat for critical pollinators such as bees, butterflies, and birds
Create a meadow using native flowers and shrubs to increase native plant cover in the park	Plant native shrubs and grasses to increase native plant cover on school property, and plant trees to increase canopy cover in an open field
Improve the area damaged by construction through planting native plants	Improve the area damaged by construction of the outdoor classroom and new playground through planting native plants
Develop and implement two ecological workshops with Kullerstrand TRAILS and general education students	Develop and implement two ecological workshops with the TRAILS students (no general education students due to small-group restrictions)
Care for new plants for three years after planting through our IES Tree Stewards community volunteer program	Care for new plants for three years after planting by TRAILS students during school year and Tree Stewards during summer months
Foster strong collaborative relationships with project stakeholders through planning and debrief meetings	Foster strong collaborative relationships with project stakeholders through planning and debrief meetings
Evaluate the success of the project, and create a Final Report and project video to document the program for improvement and future replication	Evaluate the success of the project, and create a Final Report and project video to document the program for improvement and future replication

IES dealt with constant challenges and last-minute changes from the onset of the pandemic through the completion of the project in October 2020; however, no challenges prevented the success of the overall project.

Plants along the fence-line provided much needed environmental improvements at Kullerstrand Elementary School.

Relationship with Stakeholders

IES strengthened its relationship with project stakeholders as frequent communication and collaboration was necessary through the planning and implementation of the project while adhering to all safety standards. Regular communication with WRPRD was vital to plan and implement the planting aspect of the NPCP. For the first time, several members of the WRPRD Forestry Crew participated in a planting day, helping IES to dig holes and move large trees into position. IES is grateful for the WRPRD Forestry Crew's assistance during the first planting day. Without their help, IES would have had great difficulty planting the trees.

Communication with Kullerstrand was key to planning around Jefferson County Public School restrictions and capabilities. Kullerstrand Elementary School was enthusiastic about IES's initiative to plant on school property, allowing students to continue project participation in addition to providing much-needed environmental improvements to the school property. Kullerstrand Elementary School staff members were grateful for IES's commitment to their students and offered their help in any way to make this project run as smoothly as possible.

Workshops and Planting Days

Despite the pandemic-related obstacles and uncertainty, IES successfully completed two workshops and two planting days with the Kullerstrand TRAILS students. In spring 2020, IES acted quickly upon learning that students would move to a virtual education format. IES and WRPRD Environmental Interpreter Susan Bennett created four remote-learning activities. Two were tree-themed and two were pollinator-themed. On September 29, IES implemented the second workshop, teaching students lessons on tool safety and planting techniques in addition to an activity about beekeeping from Ms. Bennett. These activities were part of the original NPCP workshop plan. This workshop was able to be completed thanks to the newly installed outdoor classroom at Kullerstrand Elementary, which allowed all participants to remain outdoors and socially distanced. Both workshops maintained the original NPCP theme of pollinators.

WRPRD helped IES dig four large holes and place trees into the ground.

Although IES was not able to plant at the original project location of Anderson Park, IES was able to make the same proposed environmental improvements in the new project location. IES took the original objectives planned for Anderson Park, and modified them for the school property. IES planted 23 native shrubs and grasses in an area that needed environmental improvements due to construction and land degradation. Four trees were planted in an open field near the playground to provide

canopy cover and 23 flowering plants were planted into four portable pollinator planters. IES is grateful for the opportunity to provide these environmental improvements and enhance the overall natural aesthetic to the school property. This opportunity allowed IES to fulfill grant requirements and maintain the original structure of the project plan with only minor alterations.

TRAILS students and Tree Stewards planted planters to benefit native pollinators.

Program Challenges and Recommendations

COVID-19 created several challenges for IES and the NPCP. IES's involvement in planting at Anderson Park was cancelled, not only requiring IES to postpone the project to fall 2020 but also requiring IES to find another project location. Kullerstrand Elementary School closed for in-person learning just two weeks before IES had intended to implement its first in-person workshop. IES and WRPRD spent the summer brainstorming options for planting locations that would still satisfy all grant requirements, which provided another challenge. In mid-summer, Jefferson County Public Schools released the information that all off-campus field trips would be cancelled for the 2020-2021 school year. In addition, the school district mandated that only students and staff would be allowed inside the school buildings. Federal and state restrictions limited the allowable group sizes. IES was thus tasked with taking all of these regulations and creating a plan that adhered to them while factoring in grant requirements.

The initial challenge was revising and implementing Workshop One. IES and Susan Bennett were flexible and determined in learning the short-notice news of the switch to online learning and creating lessons that maintained the project's theme of pollinators. With limited time to plan, these were developed and given to Kullerstrand in less than one month. Neither IES nor Ms. Bennett received the feedback that was expected, however. IES initially communicated with the TRAILS teachers to design lessons that all students could access at home on their school-provided Chromebooks and iPads; however, no completed worksheets were returned. IES communicated with the TRAILS teachers about this shortfall during the NPCP evaluation meeting (Appendix G), and the consensus was that the issue was not a fault of IES's, but rather a product of the unprecedented situation. The short-notice switch to 100% virtual learning was too hectic and new at the time to have any expectations. Teachers, parents, and students were not prepared for such a drastic, new situation, and the teachers did not receive feedback from their own online lessons either. At the evaluation meeting, the TRAILS teachers mentioned that they modified IES's virtual lessons into classroom activities and included them in their fall 2020 curriculum. While they liked the activities, they mentioned that they had to edit some aspects of activities due to the age difference of students. TRAILS students range from kindergarten through fifth grade, so their reading comprehension and writing skills are quite varied. The TRAILS teachers agreed that, other than the need to modify activities based on grade levels, IES's lessons and lesson formats were good, as the students enjoyed them and the curriculum met their educational needs. In the future, IES could provide similar activities. Next time, IES and Ms. Bennett could expect to receive feedback from students as the teachers and students are now prepared and experienced with this type of learning structure.

The teachers suggested that IES provide the staff with lessons a few weeks in advance to give teachers time to review them and make adjustments. In the future, IES should keep in mind the difference in capabilities between kindergarteners and fifth graders, and plan for each activity to be created in two versions: one for primary students and one for intermediate students. It would be sensible to create educational lessons that are easily adaptable to a virtual format. The future of next year's school format remains uncertain, and it would benefit IES to create lessons that could easily be switched from an in-person format to a virtual format, or the other way around. Not only would creating adaptable activities facilitate IES's project planning process as uncertainty remains about the school year format, but it would allow IES to post such activities on the IES website for the public to access. This would promote IES as an innovative leader in environmental education. These activities would be accessible to educators and parents who could easily replicate these lessons in the classroom or at home. In addition to planning for a virtual format, IES should factor the outdoor classroom into workshop planning and take advantage of the outdoor educational space as much as possible.

IES modified the in-person workshop to occur in an outdoor, socially distanced setup.

After the switch to online learning and the implementation of the virtual Workshop One, IES spent the summer brainstorming and modifying plans for the rest of the NPCP. Restrictions and regulations changed frequently. There was no way to know what would be allowed by September or October of 2020, which was the proposed postponed timeframe for NPCP completion. For this reason, IES could not make any concrete plans. Team members could only brainstorm different options and have those options prepared to move forward in the implementation process as soon as information was released regarding Kullerstrand's 2020-2021 schedule. To ensure preparation, IES brainstormed several options and kept an open mind about potential project opportunities. In the future, especially in the immediate future, IES should continue to keep an open mind and remain flexible in the project planning process. IES should have at least one back-up plan while the COVID-19 pandemic persists and create plans that include all current COVID-19 regulations.

During the final evaluation meeting with WRPRD (Appendix G), it was suggested that IES could add educational aspects to the planting day. IES could use this opportunity to discuss the importance of tree planting and caring for the environment while physically planting the plants with students to maximize their environmental education. This additional educational aspect during the planting process would foster nature stewardship among the students. WRPRD suggested that IES plant smaller trees during planting days, so that small children could participate in the actual planting of trees instead of only stepping in to fill in dirt and mulch. IES did not intend to use such big trees, but the fact that they were ordered so late in the season did not leave options for small trees. Since the planting adaptations were so last-minute due to the postponement of the project, there was no way around that this year. IES will make sure to secure smaller trees to plant in the future, so that children as small as kindergarteners are able to help plant the trees.

Conclusion

While IES was presented with numerous challenges during the 2020 Nature Play Connections Project's planning and implementation, no challenge prevented IES from completing the project. All challenges identified by IES, Kullerstrand Elementary, and WRPRD were directly or indirectly related to COVID-19. IES and project stakeholders remained in

communication and collaborated over months of uncertainty to meet project goals. All objectives, although slightly modified due to the change in project location and in-person capabilities, were still met. IES implemented two ecological workshops which included activities from WRPRD. IES implemented two planting days which provided environmental improvements and maintained the pollinator theme. IES fostered collaborative and positive relationships with stakeholders and improved these relationships due to pandemic circumstances and an overall determination to complete this project. IES is taking all lessons learned from implementing a project during a pandemic and will factor in all aspects when planning future projects.

Project Video and Report Distribution

IES videographer Jesse Johnson filmed Workshop Two and both planting days at Kullerstrand Elementary School. Long and short versions of the video can be found on IES's website at https://www.i4es.org/videos/ and on IES's YouTube channel at https://www.youtube.com/channel/UCfvC8v-AXKH-U2aJFrF7yfA.

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.

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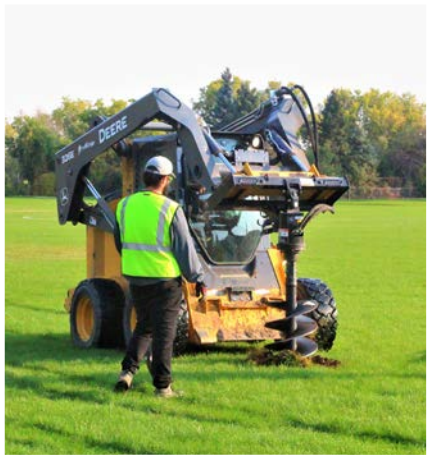

Final Report Appendices

May 2021

2020 Wheat Ridge Nature Play Connections Project Compiled Appendices

Appendices

Appendix A: Initial Project Planning Debrief Notes **2**
Appendix B: Original Project Plan and Kullerstrand Initial Meeting Notes **6**
Appendix C: Sabrina's Kleinman's Planting Design **7**
Appendix D: Student Thank-You Notes **9**
Appendix E: Remote Learning Activities **12**
Appendix F: 2020 Wheat Ridge NPCP Project Plan **24**
Appendix G: Final evaluation debrief meetings with WRPRD and Kullerstrand **25**

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