COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan

Water Project Summary

Name of Applicant	Lincoln Hills Cares
Name of Water Project	Project-01887 Youth-Driven Innovation Engine
Grant Request Amount	**$186,120.00**
Primary Category	$186,120.00
Engagement & Innovation Activities	
Additional Funding Category	
Watershed Restoration & Recreation	
Total Applicant Match	**$119,320.00**
Applicant Cash Match	$113,720.00
Applicant In-Kind Match	$5,600.00
Total Other Sources of Funding	**$392,000.00**
Greater Outdoors Colorado	$128,000.00
Greater Outdoors Colorado	$71,000.00
Caring for Denver	$193,000.00
Total Project Cost	**$697,440.00**

Applicant & Grantee Information

Name of Grantee: Lincoln Hills Cares
Mailing Address: 2530 North Washington Street, Suite 100 Denver CO 80205
FEIN: 814,552,726

Organization Contact: Shane Wright
Position/Title:
Email: shane@lhcares.org
Phone: (303) 815-7613

Grant Management Contact: Shane Wright
Position/Title:
Email: shane@lhcares.org
Phone: (303) 815-7613

Description of Grantee/Applicant

No description provided

Type of Eligible Entity

- ☐ Public (Government)
- ☐ Public (District)
- ☐ Public (Municipality)
- ☐ Ditch Company
- ☐ Private Incorporated
- ☐ Private Individual, Partnership, or Sole Proprietor

- [x] Non-governmental Organization
- [ ] Covered Entity
- [ ] Other

Category of Water Project

- [ ] Agricultural Projects
  Developing communications materials that specifically work with and educate the agricultural community on headwater restoration, identifying the state of the science of this type of work to assist agricultural users among others.
- [ ] Conservation & Land Use Planning
  Activities and projects that implement long-term strategies for conservation, land use, and drought planning.
- [x] Engagement & Innovation Activities
  Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application on the website.
- [x] Watershed Restoration & Recreation
  Projects that promote watershed health, environmental health, and recreation.
- [ ] Water Storage & Supply
  Projects that facilitate the development of additional storage, artificial aquifer recharge, and dredging existing reservoirs to restore the reservoirs' full decreed capacity and Multi-beneficial projects and those projects identified in basin implementation plans to address the water supply and demand gap.

Location of Water Project

Latitude	39.742043
Longitude	-104.991531
Lat Long Flag	
Water Source	South Platte River
Basins	South Platte
Counties	Adams; Denver
Districts	2-South Platte: Denver Gage to Greeley

Water Project Overview

Major Water Use Type	Education
Subcategory	Planning (e.g. watershed)
Scheduled Start Date - Design	4/1/2022
Scheduled Start Date - Construction	

Description

The impaired waters of the South Platte River through Denver and Adams Counties both cry out for remediation and are a tremendous learning and community-building opportunity. For both these reasons, in 2021 Lincoln Hills Cares (LHC), El Laboratorio, Wright Water Engineers, and the CSU Colorado Water Center, helped facilitate a youth-led pollution reduction action plan entitled, "Our River, Our Voices, Our Future."

A central component of that plan was the South Platte River Advisory Youth (SPRAY) Council. Lincoln Hills Cares partners in developing and assisting the SPRAY Council are El Laboratorio, Wright Water Engineers and The Colorado State University (CSU) Colorado Water Center.

Lincoln Hills Cares uses nature as a tool for youth development. As a Black-founded and -led organization, we focus on audiences that are underrepresented in higher education and career pathways around nature and

water. Through the summer of 2022 we are positioned to employ, educate, and empower over 60 youth in watershed restoration, urban agriculture, natural resource management and civic and community engagement. The South Platte River Advisory Youth Council (SPRAY) will be a team of youth from across the metropolitan area of Denver who have been educated around water issues and will be carefully and thoughtfully prepared to give input on our collective direction to reduce pollution and benefit nature in the South Platte River.

Measurable Results

	New Storage Created (acre-feet)
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive
	Existing Storage Preserved or Enhanced (acre-feet)
	New Storage Created (acre-feet)
	Length of Stream Restored or Protected (linear feet)
	Efficiency Savings (dollars/year)
	Efficiency Savings (acre-feet/year)
10	Area of Restored or Preserved Habitat (acres)
	Quantity of Water Shared through Alternative Transfer Mechanisms or water sharing agreement (acre-feet)
	Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning
1,000	Number of Coloradans Impacted by Engagement Activity

Water Project Justification

Colorado's Water Plan sets forth strategies to meet our future needs through balanced policies and actions that all Coloradans and their elected officials can support. The plan attests to our citizens' ability to organize around shared goals to preserve our water values of a productive economy, vibrant and sustainable cities, productive agriculture, a strong environment, and a robust recreation industry.

Our project and proposal address the identified need in the Colorado Water Plan for Education, Outreach, and Innovation while addressing environmental and recreational issues of the critical watershed that is the urban South Platte River.

Related Studies

Please see the attached South Platte River Urban Pollution Reduction Action Plan

Taxpayer Bill of Rights

None

Budget and Schedule

This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format.

Reporting Requirements

Progress Reports: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues.

Final Report: At completion of the project, the applicant shall provide the CWCB a Final Report on the applicant's letterhead that: (1) Summarizes the project and how the project was completed. (2) Describes any obstacles encountered, and how these obstacles were overcome. (3) Confirms that all matching commitments have been fulfilled. (4) Includes photographs, summaries of meetings and engineering reports/designs. The CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

Payment

Payment will be made based on actual expenditures and must include invoices for all work completed. The request for payment must include a description of the work accomplished by task, an estimate of the percent completion for individual tasks and the entire Project in relation to the percentage of budget spent, identification of any major issues, and proposed or implemented corrective actions. Costs incurred prior to the effective date of this contract are not reimbursable. The last 10% of the entire grant will be paid out when the final deliverable has been received. All products, data and information developed as a result of this contract must be provided to as part of the project documentation.

Performance Measures

Performance measures for this contract shall include the following: (a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as specified. Grantee shall maintain receipts for all project expenses and documentation of the minimum in-kind contributions (if applicable) per the budget in the Budget & Schedule Exhibit B. Per Water Plan Grant Guidelines, the CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment. (b) Accountability: Per Water Plan Grant Guidelines full documentation of project progress must be submitted with each invoice for reimbursement. Grantee must confirm that all grant conditions have been complied with on each invoice. In addition, per Water Plan Grant Guidelines, Progress Reports must be submitted at least once every 6 months. A Final Report must be submitted and approved before final project payment. (c) Monitoring Requirements: Grantee is responsible for ongoing monitoring of project progress per Exhibit A. Progress shall be detailed in each invoice and in each Progress Report, as detailed above. Additional inspections or field consultations will be arranged as may be necessary. (d) Noncompliance Resolution: Payment will be withheld if grantee is not current on all grant conditions. Flagrant disregard for grant conditions will result in a stop work order and cancellation of the Grant Agreement.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Updated: December 2021

Colorado Water Conservation Board
Water Plan Grant – Statement of Work – Exhibit A

Statement Of Work	
Date:	**11/29/2021**
Name of Grantee:	**Lincoln Hills Cares**
Name of Water Project:	**Replicable Youth-Driven Innovation Engine to Help Make the South Platte River Swimmable and Fishable**
Funding Source:	**CWCB Water Plan Grant: Engagement and Innovation**

Water Project Overview:

The impaired waters of the South Platte River through Denver and Adams Counties both cry out for remediation and are a tremendous learning and community-building opportunity. For both these reasons, in 2021 Lincoln Hills Cares (LHC), El Laboratorio, Wright Water Engineers, and the CSU Colorado Water Center, helped facilitate a youth-led pollution reduction action plan entitled, "Our River, Our Voices, Our Future." For these two reasons we make this proposal.

A central component of that earlier plan was the creation of the South Platte River Advisory Youth (SPRAY) Council, which continues to meet. Lincoln Hills Cares' partners in developing and assisting the SPRAY Council are El Laboratorio, Wright Water Engineers and The Colorado State University (CSU) Colorado Water Center.

Lincoln Hills Cares uses nature as a tool for youth development. As a Black-founded and -led organization, we focus on audiences that are underrepresented in higher education and career pathways around nature and water. Through the summer of 2022 we are positioned to employ, educate, and empower over 60 youth in watershed restoration, urban agriculture, natural resource management and civic and community engagement. The proposed enhanced South Platte River Advisory Youth (SPRAY) Council will be a team of youth from across the metropolitan area of Denver who have been educated around water issues and will be carefully and thoughtfully prepared to give input on our collective direction to reduce pollution and benefit nature in the South Platte River.

El Laboratorio is a Latino-led solution generator, incubator and accelerator anchored in social capital. Paul Hellmund of El Laboratorio was a lead author of the South Platte River Urban Pollution Action Plan, "Our River, Our Voices, Our Future". Nita Gonzales is an elder and leader of Denver's education and civil rights community. Paul and Nita will develop the high level stakeholder engagement, planning process and implementation, informal STE(A)M program design and authentic community connection and engagement, especially with Spanish-speaking audiences and the Lincoln Hills Cares youth and families.

Wright Water Engineers, Inc. (WWE) is a full-service water resource, environmental, and civil engineering firm in Denver, Colorado (established 1961) with offices in Glenwood Springs, Colorado (established 1974) and Durango, Colorado (established 1990). WWE has a staff of approximately 45 people who include senior

level engineers, hydrologists, scientists, biologists, chemists, geologists, and hydrogeologists. WWE professionals are Professional Engineers (P.E.s), Certified Professionals in Erosion and Sediment Control (CPESCs), Certified Floodplain Managers (CFMs), Ph.D.s, and Leadership in Energy and Environmental Design (LEED) Accredited Professionals. Most WWE employees have worked for the firm 15 years or longer and many are recognized experts in their respective disciplines. WWE staff members regularly testify as experts, publish, teach continuing engineering education, and are otherwise highly involved with professional activities. Maggie Lewis from Wright Water Engineers will lead the connection to the river and youth and community.

The Colorado State University Colorado Water Center is one of 54 Water Resources Research Institutes created by the Water Resources Act of 1964, which collectively form the National Institutes for Water Resources. As a division under CSU's Office of Engagement and Extension, the Center aims to connect all water expertise in Colorado's higher education system with research and education needs of Colorado's water managers and users, building on the rich water history at Colorado State University. The Colorado Water Center leads interdisciplinary research, education, and outreach to address complex and evolving water-related challenges in Colorado and beyond. We do so by fostering collaboration between higher education and water stakeholders, synthesizing objective water knowledge to inform decision-making, and inspiring the next generation of water leaders. Nora Flynn will be the lead connector for the Colorado Water Center and will coordinate with her students and the youth and community teams from Lincoln Hills Cares.

Building on the success of our Youth-Led South Platte River Pollution Reduction Action Planning of 2019 through 2021, Lincoln Hills Cares (LHC) in partnership with El Laboratorio, Wright Water Engineers and Colorado State University seek continued support of this Environmental Careers and Higher Education Pathways Program for Colorado's underrepresented youth in the Denver metropolitan area. This continued support will build upon what we have submitted and attached, herein referred to as the South Platte River Urban Pollution Reduction Action Plan, "Our River, Our Voices, Our Future." This plan and process identify education and outreach best management practices that include but are not limited to a Youth Advisory Council for the Urban South Platte River, the implementation of pollution control measures, higher education opportunities and career pathways for youth of color in water careers and hands-on restoration and education opportunities for low-income youth, who are disproportionately disconnected from our rivers. The program is focused on water education and the protection and restoration of the South Platte River.

Our proposed program is an innovation engine that brings together teams of underrepresented high school and college youth in a replicable spring, summer and fall program characterized by:

- Radical integration of culturally sensitive citizen science with hands-on project-based learning
- Focus on protecting and restoring rivers for the people, and on the "One Water" sustainability paradigm
- Meaningful engagement and interaction between our youth water solution-makers, community, decision-makers, and subject matter experts
- Regained wonder of nature and of Colorado's rivers by underserved youth who often lack access to safe and meaningful outdoor experiences.

This program builds on our CWCB-funded citizen science, restoration and family engagement activities in the Globeville, Elyria and Swansea neighborhoods of Denver, Colorado and strengthens our effort to engage in education and restoration activities and outreach downstream from the urban corridor in Segment 15 of the South Platte River. We propose to expand education, recreation and employment opportunities for youth while connecting people and water stakeholders from the urban stretch of Segment 14 downstream into Adams County.

Youth participating in the program will:

- Gain a broader perspective on environmental careers and STE(A)M educational opportunities by working with subject matter experts on real projects
- Have transformative, nature-based experiences while helping solve river and water management problems important to local communities
- Be exposed to a wide and deep professional water network that can connect them to future projects, education, and jobs
- Be better prepared and motivated to apply to colleges and graduate schools because of enriched project-based STE(A)M coursework
- Gain 21st century learning and career skills—such as teamwork, communications, creativity, and critical thinking—that can motivate them to stay in school and be leaders in their schools, professions, and communities.

Stakeholders (including academic units, government agencies, water decision makers, engineers, and agricultural interests) participating in the program will:

- Hear from underrepresented voices of youth and families.
- Teach youth and neighbors about watershed and habitat engagement activities.
- Partner to implement watershed-based solutions that will improve water quality and habitat.
- Share watershed-based career pathways with youth and under-represented audiences.

Project Objectives:

Our project will focus on four pillars of:

1. Supporting our newly re-established South Platte River Youth Advisory (SPRAY) Council.
2. Building a Youth River Team to implement conservation projects in the metropolitan Denver area.
3. Implementing youth- and agency-vetted pollution-control measures identified in the South Platte River Urban Pollution Reduction Action Plan, “Our River, Our Voices, Our Future.”
4. Implementing a high level (professionally planned and rigorously academic) STE(A)M program design and community engagement process for youth in community-based watershed planning and restoration.

Last Updated: December 2021

Tasks

Task 1 – SPRAY Youth Advisory Council

Description of Task:

In 2019, in partnership with El Laboratorio and the Colorado State University Upward Bound Program, Denver high school youth identified the need for more youth voices for our rivers. These youth suggested that an advisory council of youth that represented the interests of the river would be beneficial for stakeholders and our collective water community. In 2021, with pilot funding from the Catalyst Fund and support from the Colorado Water Conservation Board, The Environmental Protection Agency, and the Colorado Department of Public Health and Environment, Lincoln Hills Cares youth led a South Platte River Action Planning effort that identified the further need to engage youth and families in reducing pollution in the South Platte River.

Because of the need we heard identified by the youth and due to the recommendations of the youth-led South Platte River Urban Pollution Action Plan, we intend to continue connecting with Youth Leaders through an enhanced South Platte River Advisory Youth (SPRAY) Council.

Method/Procedure:

Building on the youth and leaders we have been mentoring over the last three years and partnering with other youth- and nature-serving organizations, we will assist youth in building a Youth Advisory Committee for the South Platte River that represents the varied and wide interests of our local communities.

Current Youth Advisory SPRAY (South Platte River Advisory Youth) Council Members include:

Ahtiziri Rodriguez (Lincoln Hills Cares)
Braylen Aldridge (Lincoln Hills Cares)
Jamar Holmes (Lincoln Hills Cares)
Lizette Saucedo (Lincoln Hills Cares)
Swee Tee (Colorado State University)
Theresa Centola (Colorado State University)

Partner organizations we have communicated with to recruit new SPRAY Council members include, but are not limited to:

Groundwork Colorado
Environmental Learning for Kids
The Greenway Foundation
Mile High Youth Corps
GRASP (Gang Reduction and Support Services)
Lifeline Colorado
Mo Betta Green
Adams County School Districts
Denver Public Schools
Servicios de la Raza
Viva
D3 Arts

It is essential for us to develop a functional SPRAY Council from Spring of 2022 through Winter of 2023. We intend for this SPRAY Council to plant the seeds of South Platte River Watershed Restoration best management practices for youth and community for years to come.

Last Updated: December 2021

Deliverables:

- Up to 15 youth from across the metropolitan area are educated and employed as an Advisory Council with the goal of reducing pollution and benefitting nature in the urban South Platte River corridor.
- 8 SPRAY Council Meetings per year for five years.
- Youth SPRAY Council members will give input to families and policy and decision makers and receive input on watershed management issues in the urban South Platte River corridor.
- Youth SPRAY Council members will work with the students and leaders at the Colorado State University (CSU) Colorado Water Center in partnership with El Laboratorio and Wright Water Engineers to implement watershed solutions identified in the 2021 South Platte River Urban Pollution Action Plan.
- A website will be built to represent youth and community- and stakeholder-based pollution control action measures and will be considered the living document of the South Platte River Urban Pollution Reduction Action Plan. This website will hold our pollution reduction control measures data and will evolve as our project evolves.

Tasks

Task 2 – Youth River Team

Description of Task:

We will recruit and hire youth from Adams County and our school partnerships to work with the graduate students at the Colorado State University Colorado Water Center, El Laboratorio, and Wright Water Engineers to improve the water quality and benefit nature in the South Platte River in the urban corridor and throughout Segment 15. Youth will engage in habitat management, watershed planning, community engagement, and natural resource conservation from April of 2022 through May of 2023.

Lincoln Hills Cares has designated funding to support youth in a variety of river-based activities. With support from Colorado Water Plan Engagement and Innovation funding we will employ a designated Youth River Team that will focus on water restoration and career pathways in watershed management and related fields.

Last Updated: December 2021

Method/Procedure:

Recruiting from local schools, we will hire 8-10 youth who will be trained as trainers and leaders of the Lincoln Hills Cares River Team to work for up to 160 hours. We will also hire a Youth Supervisor and a Youth Water Program Coordinator to work with a Lincoln Hills Cares Program Director on building water and water quality programs. These youth and leaders will partner to implement the E. coli and pollution control protocols with Wright Water Engineers and Colorado State University Colorado Water Center Students. They will implement natural resource projects with the Rocky Mountain Arsenal and Adams County Natural Areas and implement projects identified in the 2021 Plan. The River Team will work with El Laboratorio to connect families and neighbors to the South Platte River. Youth on the River Team will partner to educate other students in the Trout in the Classroom Program with Trout Unlimited and through fly fishing at the Lincoln Hills Cares Environmental Education Facility on South Boulder Creek. The River Team will pilot a new sampling program with eDNA kits that have been purchased to sample macroinvertebrates and other life in the river.

We intend and expect that this citizen science based sampling will lead to a more robust eDNA microbial testing program and are excited to pilot in the summer of 2022. These youth will be the primary points of connection, along with the SPRAY Council, for civic engagement and community outreach efforts along Segment 15 of the South Platte River. They will also be the primary connection to the source tracking and emerging contaminate data review and program development with Wright WaterEngineers and the Colorado Water Center.

Deliverable:

- 8-10 youth employed for 160 hours will be trained as trainers in watershed planning and restoration. Through the training they subsequently carry out, their knowledge will extend throughout their neighborhoods and families.
- 1 Youth Leader employed for 200 hours in watershed planning and restoration, who guides the youth team.
- 1 Watershed Program Coordinator employed in watershed planning and restoration, who coordinates the efforts that bring together youth and agencies.
- The Youth River Team will partner with Adams County in natural resource and habitat management.
- SPRAY Council members will work with Maggie Lewis at Wright Water Engineers and the team under Nora Flynn and the CSU Colorado Water Center to implement pollution control measures and E. coli source tracking protocols.
- The Youth River Team and Leader will connect with over 100 youth and families.
- The Youth River Team will plant over 30 trees and will help to restore over two acres of natural habitat in the South Platte River Watershed.
- SWEAP metrics and other evaluation techniques will be tested and adopted to help gauge the success of the efforts.

- Field test and improve the 20 activities identified in the Pollution Reduction Action Plan, with agency partners (detailed below in Task 3).

Tasks

Task 3–
Implementing youth and agency-vetted pollution control measures identified in the South Platte River
Urban Pollution Reduction Action Plan

Description of Task:

Maggie Lewis and Wright Water Engineers and Swee Tee and Theresa Centola with support from Nora Flynn at the Colorado State University Colorado Water Center, developed the source tracking protocols for E. coli and other pollution control measures in association with the Lincoln Hills Cares and El Laboratorio consistent with the South Platte River Urban Pollution Reduction Action Plan.

The Youth River Team, in partnership with the SPRAY Council, will work to implement the pollution control measures to improve water quality in the South Platte River vetted collaboratively by youth and agencies. See Tables 1-4 below.

Last Updated: December 2021

Table 1: Proposed activities (Component A) to be implemented in establishing the South Platte River Advisory Youth Council and build bridges to communities with the goal of reducing nonpoint source pollution of the river.

Component A Proposed Activities: Council and Communications	Contacts at lead agencies/organizations
A.1 South Platte River Advisory Youth Council. Pilot organizational strategies for the Council, including public engagement.	• Nora Flynn, CSU Colorado Water Center • Shane Wright, Lincoln Hills Cares • Paul Hellmund and Nita Gonzales, El Laboratorio
A.2 Annual Youth River Festival. Annual youth-led STE(A)M-oriented festival to engage communities in the progress with the river and its prospects, as well as connect the public to other offerings and programming.	• Nita Gonzales and Paul Hellmund, El Laboratorio • Sarah Miley, CSU Spur • Alfredo Reyes, Latino Cultural Arts Center
A.3 River Digital Storytelling. Collaborate with Youth Council members to develop compelling river and community stories related to the Council and its work. A website, social media, and video materials will communicate and engage potential partners, including youth, community members, environmental organizations and agencies, and donors. Develop a communications system whereby youth document their own activities in support of the river and constantly share images and other information with the world.	• Lauren Stephenson, Progress Now Colorado
A.4 Oral histories and Photovoice. Develop and communicate an extensive and evolving understanding of youth and community attitudes, perceptions, values, and knowledge of the river and water issues through oral histories, photovoice image capture, and other surveys.	• Greg Newman and Isabella Harris, CSU CitSci.org
A.5 Community river tours and ambassadors on bikes. Introduce the river, its assets, problems, and potential to youth by bicycle and then train some of them to give such tours to community members and act as river ambassadors.	• Shane Wright, Lincoln Hills Cares
A.6 Conduct youth-led public information sessions ahead of public meetings and document review periods—including for future revisions to Segment 15's TMDL, to review topics.	• Juliana Archuleta, Adams County Stormwater Program Donny Roush, Stormwater Education and Outreach at City and County of Denver

Last Updated: December 2021

Table 2: Proposed urban stormwater runoff implementation activities to reduce nonpoint source (*E. coli* bacteria) pollution of Segment 15 of the South Platte River through youth involvement (Component B).

Component B.1 Proposed Activities: Urban stormwater runoff	Contacts at lead agencies/organizations
B.1.1 Map, enhance through planting, and monitor riparian buffer areas, including surveys through annual community bioblitzes with drones	Greg Newman, CSU CitSci.org Eric Wardle, Christina Welsh, Emmanuel Deleon, CSU Ag Water Quality Program
B.1.2 Identify priority locations, and mark storm drains ("this drains to the river") and place hang tags	Juliana Archuleta, Adams County Stormwater Program Donny Roush, Stormwater Education and Outreach at City and County of Denver
B.1.3 - Participate in Certified Rain Garden Installer Training by Colorado Stormwater Center in order to become rain garden experts in their community, assist with community installations, and advocate for the installation of additional rain gardens.	Jessica Thrasher, CSU Colorado Stormwater Center Brik Zivkovich, Mile High Flood District
B.1.4 - Identify locations, install, and monitor rain garden installations in partnership with the Colorado Stormwater Center	Jessica Thrasher, CSU Colorado Stormwater Center
B.1.5 Continue to conduct *E. coli* data analysis to identify potential hotspots and conduct Environmental DNA (EDNA) testing at such places, especially at tributaries to Segment 15 that indicate high probability of human fecal contamination.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.1.6 Crowd source evaluations of stormwater control measures.	Brik Zivkovich, Mile High Flood District
B.1.7 Respond to community concerns about the river's water quality by engaging youth to help design, create, evaluate, and monitor a low-cost water monitoring system.	Eric Wardle, Christina Welsh, Manny Deleon, CSU Ag Water Quality Program

Last Updated: December 2021

Table 3: Proposed implementation activities for youth involvement to reduce human and animal sources of nonpoint source (*E. coli* bacteria) pollution of Segment 15 of the South Platte River (Component B).

Component B.2 Proposed Activities: Human sources	Contacts at lead agencies/organizations
B.2.1 Look for possible leaking sanitary pipes or elicit connections by reviewing sanitary sewer systems maps, pipe materials, and proximity to dry weather *E. coli* bacteria hot spots. Identify agencies or organizations that have robots with cameras or other methods for inspecting pipes for leaks.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.2.2 Engage the public to address septic system issues through a public information campaign regarding septic systems and maintenance in areas with high levels of *E. coli*.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.2.3 Map locations of public restrooms, get community input, and recommend new locations and hours as needed.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.2.4 Map locations of public septic dumping sites, get community input, and recommend new locations and hours as needed.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center

Component B.3 Proposed Activities: Animal sources	Contacts at lead agencies/organizations
B.3.1 Identify common wildlife in the area, consult wildlife sanctuaries and local wildlife experts. Research options for population control and road kill pickup programs.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.3.2 Work with ranchers and landowners to prevent certain livestock from entering waterways and riparian areas through fencing and education.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.3.3 Study locations of existing pet poop pick up stations and determine locations where they might be needed through field assessment and community survey. Implement a campaign to include more frequent poop pick-up monitoring, dog poop composting, leash mandates, designated dog pooping areas, and/or no dog areas.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center

Last Updated: December 2021

Table 4: Other proposed implementation activities for youth involvement to reduce nonpoint source pollution of Segment 15 of the South Platte River (Component B).

Component B.4 Proposed Activities: Additional sources	Contacts at lead agencies/organizations
B.4.1 Request that facilities near *E. coli* bacteria hotspots be held accountable for any pollution exceedances. Youth and community could also request permit modification hearings.	• Maggie Lewis, PE, Wright Water Engineers • Nora Flynn, CSU Colorado Water Center
B.4.2 Develop a campaign for getting phosphorus out of lawn fertilizers. Encourage people to reduce the amounts of phosphorus they contribute to streams and water bodies through lawn fertilizers and encourage phosphorus removal from fertilizers themselves.	• Steve Lundt, Metro Water Recovery and Barr-Milton Watershed

Method/Procedure:

In partnership with youth and families from lower income Denver metropolitan areas of the South Platte River, Maggie Lewis from Wright Water Engineers and Nora Flynn and her team of students at the CSU Colorado Water Center will work with the SPRAY Council and the Lincoln Hills Cares River Team to develop, build, implement and analyze the pollution control measures that were built through the South Platte River Urban Pollution Action Planning Process. We envision this process becoming a citizen science led source tracking protocol that is supported by a laboratory to identify E. coli and pollution in our watershed. The pollution control measures will be used to guide our implementation of clean water solutions for the South Platte River in partnership with the youth and families with input and advice from the collective of stakeholders who we have effectively engaged over the last two years.

Deliverable:

- Updated Pollution Control Measures..
- Updated E. coli and pollution data review.
- eDNA citizen science based data collection and review.
- Partnerships built with laboratories for sample analysis.
- Youth engaged in sampling and source tracking protocols.
- Youth SPRAY Council consulted for recommendations on best management practices for water quality improvement and added nature connections.

Last Updated: December 2021

Tasks
Task 4 – Program Design and Community Connection
Description of Task:
Working with the River Team, we will solicit community input on river- and water-related topics, relevant to watershed health and sustainability. In collaboration with water engineers and other professionals, we will develop materials to train River Team youth. Training these trainers will allow them to train other youth in carrying out and implementing stormwater control measures and related tasks. Simultaneously, we will develop, test, and adopt effective evaluation techniques, some based on SEAP metrics, to provide feedback to our process. El Laboratorio is a community engine and solution generator. Principal Paul Hellmund is an educator and professional planner with deep relationships supporting the South Platte River. Principal Nita Gonzales, daughter of Corky Gonzales, is a community leader with indiginous roots who is an expert at connecting to spanish speaking audiences. Paul and Nita (El Laboratorio) have over five decades of combined community engagement and educational program design expertise that they will bring to the design of this higher education and career water pathway for underserved Denver area youth.
Method/Procedure:
El Laboratorio will lead our community engagement process and will design the informal STE(A)M water career pathways for the River Team and the SPRAY Council. Paul Hellmund is a teacher at Colorado State University who previously directed a college in the Northeast. He will bring his experience and expertise to represent the higher education path in water. Paul will lead the design and implementation of our shared website for the South Platte River Urban Pollution Reduction Action Plan. Nita Gonzales directed Escuela Tlatlolco in Denver to bring an indigenous rooted voice to a Denver Public School for Spanish-speaking audiences. She will bring her education expertise and indigenous rooted values to our work in reducing pollution in the South Platte River. Nita will lead our community connections to Spanish speaking audiences.Youth will learn about the Hermanas Del Rios vision spearheaded by El Laboratorio. Paul and Nita will manage the Program Design and Community Connections of our youth and stakeholder engagement while continuing to amplify youth and community voices and developing further the South Platte River Urban Pollution Reduction Action Plan.
Deliverable:
• Overview of community concerns, interest, and knowledge about river- and water-related topics, relevant to watershed health and sustainability • Instructional and support materials to train the trainers, in collaboration with water engineers and other professionals • 20 River Team and Pathways team members fully trained to train other youth and community members in carrying out tasks • Effective evaluation techniques to provide feedback • Updated and designed website for the South Platte River Urban Pollution Reduction Action Plan.

Last Updated: December 2021

Repeat for Task 3, Task 4, Task 5, etc.

Budget and Schedule

This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format.

Reporting Requirements

Progress Reports: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues.

Final Report: At completion of the project, the applicant shall provide the CWCB a Final Report on the applicant's letterhead that:

- Summarizes the project and how the project was completed.
- Describes any obstacles encountered, and how these obstacles were overcome.
- Confirms that all matching commitments have been fulfilled.
- Includes photographs, summaries of meetings and engineering reports/designs.

The CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

Payment

Payment will be made based on actual expenditures and must include invoices for all work completed. The request for payment must include a description of the work accomplished by task, an estimate of the percent completion for individual tasks and the entire Project in relation to the percentage of budget spent, identification of any major issues, and proposed or implemented corrective actions.

Costs incurred prior to the effective date of this contract are not reimbursable. The last 10% of the entire grant will be paid out when the final deliverable has been received. All products, data and information developed as a result of this contract must be provided as part of the project documentation.

Performance Measures

Performance measures for this contract shall include the following:
(a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as specified. Grantee shall maintain receipts for all project expenses and documentation of the minimum in-kind contributions (if applicable) per the budget in Exhibit C. Per Grant Guidelines, the CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report

has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

(b) Accountability: Per Grant Guidelines full documentation of project progress must be submitted with each invoice for reimbursement. Grantee must confirm that all grant conditions have been complied with on each invoice. In addition, per Grant Guidelines, Progress Reports must be submitted at least once every 6 months. A Final Report must be submitted and approved before final project payment.

(c) Monitoring Requirements: Grantee is responsible for ongoing monitoring of project progress per Exhibit A. Progress shall be detailed in each invoice and in each Progress Report, as detailed above. Additional inspections or field consultations will be arranged as may be necessary.

(d) Noncompliance Resolution: Payment will be withheld if grantee is not current on all grant conditions. Flagrant disregard for grant conditions will result in a stop work order and cancellation of the Grant Agreement.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Water Plan Grant
Budget and Schedule - Exhibit B

Prepared Date: 12/01/2021

Name of Grantee: Lincoln Hills Cares

Name of Project: Youth led innovation engine for South Platte River

Project Start Date: 4/1/2022

Project End Date: 3/31/2023

Task No.	Task Description	Task Start Date	Task End Date	CWCB Grant Funding Request	Match Funding
1	SPRAY Youth Council	4/1/2022	3/31/2023	$7,000.00	$7,000.00
2	Youth River Team	4/1/2022	3/31/2023	$74,120	$74,120.00
3	Source Tracking Protocols	4/1/2022	3/31/2023	$32,000	$16,000.00
4	Program Design/Community Connection	4/1/2022	3/31/2023	$73,000	$22,200.00
			Total	$186,120	$119,320

Voices of Youth and Community for the Urban South Platte River in Denver, Colorado

	CWCB	LHC Cash Match
Youth Advisory Council		
Meeting/Food and Travel Costs for SPRAY Council	$2,000	$2,000.00
River Team Student Wages		
(8 youth leaders x $15/hr x 160 hrs = $19,200)	$19,200	$19,200.00
River Team Student Leader Wages		
(1 youth leader x $20/hr x 180 hrs = $3,600)	$3,600	$3,600.00
River Water Planner		
(1 water program planner $25 x 400 hrs = $10,000)	$10,000	$10,000.00
River Program Direction		
(1 Program Director $50/hr x 400 hours = $20,000)	$20,000	$20,000.00
CSU Colorado Water Center		
(1 leader $130/hr x 100 hrs = $13,000 4 students $32.5/hr x 100 hrs = $13,000)	$26,000	$13,000.00
Wright Water Engineers		
(Maggie Lewis, with support from other Wright Water Staff, $130/hr x 200 hrs = $26,000)	$26,000	$13,000.00
El Laboratorio		
(Paul Hellmund $130/hr x 400 hrs = $26,000)	$52,000	$16,000.00
(Nita Gonzales $130/hr x 80 hrs = $10,400)	$10,400	$5,600.00
ADMIN		
Admin 10%		
(1 Senior Administrator for Reporting and Recruiting and Collaboration $50/hr x 286.4hrs)	$16,920.00	$16,920.00
TOTAL	**$186,120**	**$119,320**

COLORADO
WATER CENTER
COLORADO STATE UNIVERSITY
E102 Engineering, Fort Collins, CO 80523
970.491.6308 | CoWaterCenter@colostate.edu
WaterCenter.colostate.edu

11/30/2021

To: The Colorado Water Conservation Board

I'm writing to support Lincoln Hills Cares proposal for a Water Plan Engagement and Innovation grant. The Colorado Water Center at Colorado State University has been collaborating with Lincoln Hills Care to create informal STEM learning activities for Denver youth to learn about river health. The great strength of Lincoln Hills Cares is their direct and strong connection with the communities they serve. We look forward to continued collaboration with Lincoln Hills Care to engage with youth and community around water education.

Sincerely,

Nora Flynn
Nora.flynn@colostate.edu
970-491-6328
Research Associate
Colorado Water Center
Colorado State University

EL LABORATORIO
P.O. Box 11463, Denver, CO 80211
Website: El-laboratorio.us

To: Colorado Water Conservation Board

Re: Support of the Lincoln Hills Cares Proposal: **Replicable Youth-Driven Innovation Engine to Help Make the South Platte River Swimmable and Fishable**

It is a pleasure to support Lincoln Hills Cares and their proposal to provide meaningful — and paid — learning and service opportunities for Denver-area youth who want to help improve the water quality of the South Platte River.

My El Laboratorio colleague, Nita Gonzales, and I have partnered with Lincoln Hills Cares since our 2019 joint program with the Colorado State University Upward Bound high school youth who first envisioned a South Platte River Youth Advisory Council. Subsequently (during the pandemic) we developed family-based River Adventures for familes in Denver's Globeville, Elyria, and Swansea neighborhoods that focused on water quality and the South Platte River.

Lincoln Hills Cares' current proposal to the Colorado Water Conservation Board builds on these and other previous efforts in ways that hold a great deal of promise to improve water quality and quality of life for area residents, including those often underrepresented in these dicussions. The proposal is timely.

Sincerely,

Paul Cawood Hellmund
Principal
paul@el-laboratorio
(970) 231-8970

Evaluation Results from 2021 Youth River Activities

Pre and Post Activity Results from Denver Youth

Future Recommendations

Evaluation Methods

- We used both focus group interviews and online surveys to guage youth engagement with summer activities.
- This hybrid evaluation model was used to adapt to the needs of our participants by providing flexibility and options for varying comfort levels within our target community.
- Both evaluation formats contain open-ended and likert scale questions that focus on evaluating youth participants.

Participant Demographics

Pre-Activity

- Participants ranging from high school to university age.
- Participant groups representing Adams County and East Denver.
- Major contribution from youth participants engaging through Lincoln Hill Cares, with limited input from youth leaders and activity leaders.
- Data was gathered from entirely in-person focus group interviews.
- About 30 participants.

Post-Activity

- Participants ranging from high school to university age.
- Individual participants
- Major contribution from youth leaders and project coordinators.
- Data gathered from hybrid focus group interview and online survey.
- About 10 participants.

Questions Asked

Pre-Activity

- On a scale of 1-10, how much do you care about rivers near you?
- What memories come to mind when you think about your river?
- What do you love most about your local river?
- What about your local river do you think needs to be fixed or stops you from enjoying the river?
    - What could be done to help fix these problems?
- Do you feel safe playing by or in rivers and lakes near your home?
- Do you feel safe playing by or in rivers and lakes near your home?
- What (if anything) keeps you from having fun at your local river?
- Do you think your local river will always be strong and beautiful?
- On a scale of 1 - 10, how likely are you to support river conservation in your community?
- With your current knowledge of river conservation, would you feel confident participating in a conversation about how to protect your local river?
- What would you like to learn about river conservation?

Post-Activity

- What was something new you learned about leading community youth?
- Do you feel like your relationship with East and West Denver communities changed over the course of these summer activities?
- Do you feel like your relationship with the Adams County community changed over the course of these summer activities?
- How do you think we all did well as a group while engaging the youth community we worked with?
- What do you think we could have done better to engage the youth community we worked with?
- What activity do you think was the most useful this summer?
    - What activity do you think was the least helpful?
- What changes have you observed in the youth you have worked with over this summer?
    - More specifically, how did you see them change mentally?
- Did you notice the youth talking about anything different throughout the summer?
- What themes did you notice when talking to the youth in a more informal way?

PRE-ACTIVITY RESULTS

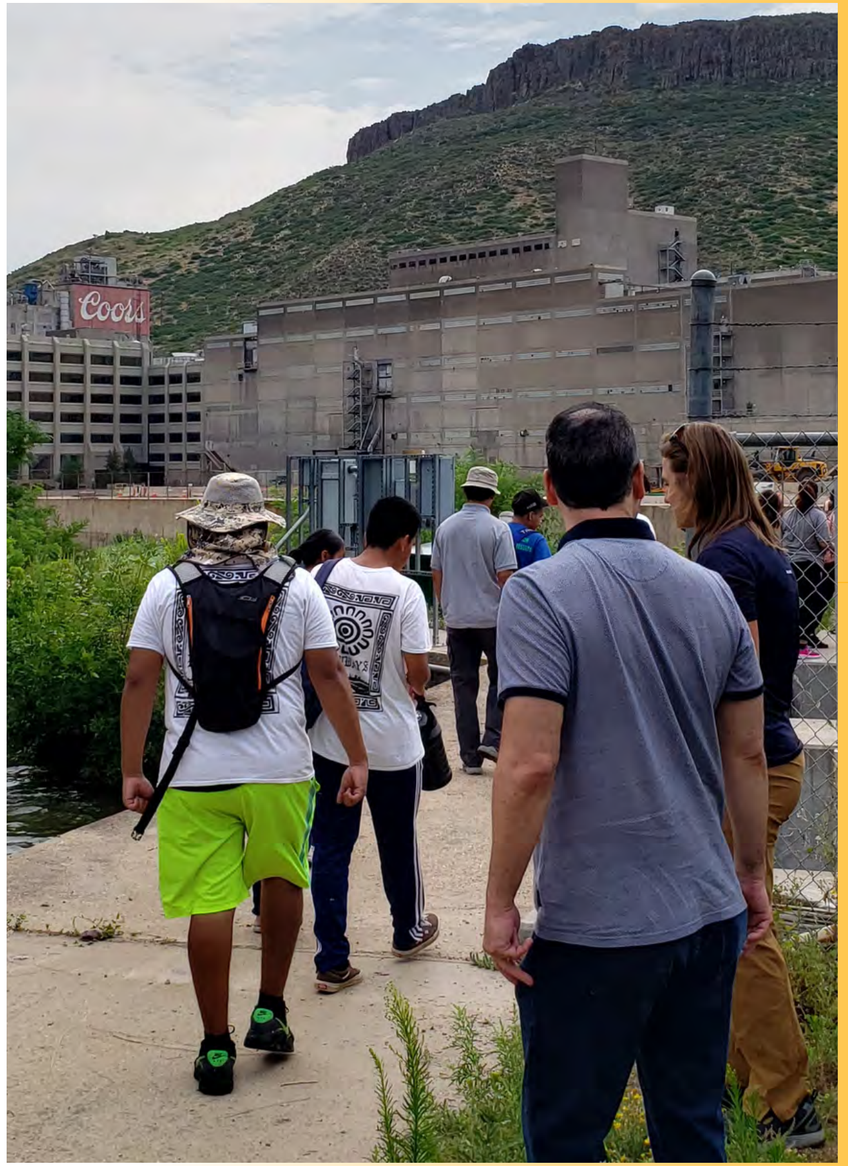
Questions	Major Themes			Questions	Major Themes			Questions	Major Themes			Questions	Major Themes		
would you feel confident participating in a conversation about how to protect your local river?	Not Very Confident - 4	1		What would you like to learn about river conservation?	River Ecology	2		Do you think your local river will always be strong and beautiful?	No	7	2	What about your local river do you think needs to be fixed or stops you from enjoying the river?	Trash	4	2
	Middle - 5	3	3		River Pollution	2			Yes	2	3		Distance from House	2	
	Somewhat Confident - 6	1	1		River Safety	1			Maybe	3			Vandalizing	1	
	Mostly Confident - 7	5	3		Where the River Flows	1			It Depends on Human Activity	1	1		Pollution	3	3
	Very Confident - 8	1			I Don't Know	1							Crowds	1	
													Physical State of the River	1	1
On a scale of 1-10, how much do you care about rivers near you?	4	1		What memories come to mind when you think about your river?	Fishing	1	1	What do you love most about your local river?	The Ecosystem	3	2		I Don't Know	1	
	5	2	1		Boating	1			The Feelings I Have from Being by it	4	2		Everything	1	
	6	2	2		Biking	1			Enjoying it	2	1				
	7	1	2		Swimming	1			Keeping it Clean	1	1	What could be done to help fix these problems?	Clean up trash	3	
	8	5	1		I Don't Know	1	1		I Don't Know	2	1		Encourage Community to Not Litter	2	
	9	2			Picking Up Trash	2			Spending Time with People There	1	2		Raise Awareness	2	
	10	1	1		Almost Drowning	1			Swimming in it	1			Strengthen Regulations	1	
					Dog Walking	2							Better Communication	2	
					Exploring	2						Do you feel safe playing by or in rivers and lakes near your home?	Yes	1	
					Feeling the Water	1							Maybe	1	

- **Table represents the unique occurrences of major themes throughout pre-activity focus group interviews.**
- **RED = Data from Adams County Focus Group Interview**
- **YELLOW = Data from East Denver Focus Group Interview**

Major Take-Away's from Pre-Activity Evaluations

What are the most common themes from our 2021 summer youth activities?

- Most youth participants understand that their local river is not static and will likely not stay as beautiful as it is currently.
- Participants did not come into the activities knowing what the South Platte River was, and were only comfortable discussing the term "local river"
- Youth held the strongest value for the physical feelings they experience while being near a river or body of water
- While most youth expressed a moderately strong desire to care for their local rivers, their level of confidence to converse with others about river health was mixed.
- Youth feel that the biggest challenge to the health and beauty of their local river is pollution.



Results from Our Final Post-Activity Evaluation from Summer River Activities

This evaluation helped us understand how to better serve youth in our target communities and how to create more effective engagement strategies in the future

Youth Leader and Participant Experiences During Summer River Activities

Take Away's

Over the course of our summer river activities, our youth leaders and participants learned that the South Platte River exists in Colorado, different ways in which community members engage with the South Platte River and what a clean versus polluted river can look like. Specifically, our youth leaders also learned that engaging communities in river focused activities can be challenging but that forming relationships with community youth can help in creating achievable solutions to keep local rivers safe and healthy. Our youth leaders are excited to see how these solutions influence to river pollution, community relationships and overall world-wide ecological health.

Favorite Memories

Our youth leaders and participants expressed that their favorite memories over the summer included physically being in the river, hands-on activities, seeing wildlife, camping, and learning from professionals in the City of Denver.

Changes in Youth Participant Attitudes and Behaviors

BEHAVIORAL CHANGES

Overall, our team leaders witnessed their youth participants gain more environmental knowledge and have more interest in scheduled activities over the course of the summer. Additionally, participants felt a greater sense of community, mutual respect for each other and felt more gratitude following our summer activities focused on river health and safety. However, many participants reportedly felt greater confusion following our summer activities.

ATTITUDE CHANGES

While talking with youth participants over the course of the summer, our leaders found that the participants treated them as more authoritative figures. Additionally, leaders witnessed youth talking about greater societal issues, being present in the outdoors, personal interests as well as personal health and wellbeing. However, youth participants also expressed that they did not enjoy learning about concepts surrounding river science.

Effectiveness of Summer River Activities

What worked well?

- Our youth leaders and participants found these summer activities to be the most useful.
  - working within the community
  - Bike ride in Carpio Sanguinette Park
  - Traveling to Lincoln Hills Cares Estate
  - Biking beside the South Platte River

What could have been better?

- Our youth leaders and participants found these summer activities to be the least useful.
  - Working outside
  - Completing program evaluations
  - Our two day E-Coli Discussion

Overall Reflections and Recommendations for the Future

Reflections

Overall, our youth leaders felt that our summer activities did not provide enough time for proper engagement, did not encourage hands-on engagement, provided concepts that were too difficult to follow, were uncoordinated and were made complicated with too many stakeholders. However, our leaders also felt that our themed work days were helpful for youth engagement. In response to these results, our youth leaders also gave us some helpful advice on how to engage youth more effectively in the future.

Reccomendations

We recommend that future programs include opportunities for more direct interaction with youth participants, provide easier options for communication, encourage engagement through food and prizes and allow more time for participants to complete projects.

Our River, Our Voices, Our Future

A Youth-to-Youth Guide to a Healthier South Platte River

South Platte River Advisory Youth Council

DRAFT
2021 11 28

2021 Task Force

South Platte River Advisory Youth Council
Braylen Aldridge (Red Rocks Community College)
Theresa Centola (Colorado State University)
Jamar Holmes (University of Colorado at Denver)
Lizette Saucedo (Council Chair, New York University)
Ahtziri Rodriguez (University of Colorado at Denver)
Swee Tee (Colorado State University)

Professional Support
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Isabella Harris (CitSci.org at Colorado State University)
Paul Cawood Hellmund (El Laboratorio and Hellmund Associates)
Maggie Lewis (Wright Water Engineers)
Shane Wright (Lincoln Hills Cares)

Additional Professional Support
Juliana Archuleta (Adams County Stormwater)
Joseph Cordova and Mauricio Gonzales (Groundwork Denver)
David Ocelotl Garcia (Public Artist)
Nita Gonzales (El Laboratorio)
Greg Newman (CitSci.org at Colorado State University)
Donny Roush (Stormwater Education & Outreach at City & County of Denver)
Jessica Thrasher (Colorado Stormwater Center at Colorado State University)
Eric Wardle, Manny Deleon, and Christina Welch (Ag Water Quality Program at Colorado State University)
Brik Zivkovich (Mile High Flood District)

Funding Support
Colorado Department of Public Health and Environment
Colorado Water Conservation Board,
Great Outdoors Colorado
Gateway Fund II at The Denver Foundation
Metro DNA and the Catalyst Fund
Environmental Protection Agency Environmental Justice Program,

Other Supporters
Denver Parks and Recreation
Groundwork Denver

Other Youth Team Leaders
Vivian Cervantes, Nancy Delarosa Marmolejo, LaRae Goldsmith, Mauricio Gonzales, David Lopez, Alicia Martinez, Leslie Rivera, Aliyah Fard

Denver Public School Interns
Brooke Buddy, Natalia Nuñez

Overall Project Coordination—Lincoln Hills Cares (Shane Wright, Braylen Aldridge)
Program Development, Editorial and Document Design—El Laboratorio (Paul Cawood Hellmund)

This plan was developed collaboratively by a Task Force of youth and professionals and their advisors. The co-editors were Paul Hellmund (El Laboratorio) and Theresa Centola (a recent environmental engineering graduate of Colorado State University).

Download this document at tinyurl.com/notfinalXZX.

For more information or to send us comments, contact us at SPRAYCouncil@gmail.com.

Cover: Alicia Martinez takes a water sample near the upstream limit of Segment 15 of the South Platte River, while on a riverside bike exploration. (Photo: LaRae Goldsmith)

▲ The Colorado State University Ag Water Quality Program introduced drone aviation to youth from Lincoln Hills Cares and Groundwork Denver. (Photo: Emmanuel Deleon)

Our River, Our Voices, Our Future

A Youth-to-Youth Guide to a Healthier South Platte River

South Platte River Advisory Youth Council
in Collaboration with
Lincoln Hills Cares , El Laboratorio,
Wright Water Engineers, Colorado Water Center

December 2021


Clear Creek
South Platte River
Burlington Ditch
Robert W. Hite
Treatment Facility

Our urgent message and invitation

It's time for us to do better by our river—the South Platte. It's too important to us—our past, our present, our future—to be treated the way has been.

The river was a main reason indigenous peoples—including the Cheyenne, Arapaho, and the Ute—moved through the Denver area with the seasons. It brought settlers here looking for gold in its waters and who later moved and used those waters to coax food from these arid lands. By tunneling through the mountains, engineers found ways to add more water to the river, water otherwise headed down the Colorado River to Mexico. Only with those added waters were our Front Range cities possible.

The South Platte River is too important to us—our past, our present, our future—to be treated the way has been.

The watershed of the South Platte River drains 28,000 square miles, draining to the Missouri River, which flows to the Mississippi River, eventually reaching the Gulf of Mexico.

But along the way, people seem to have forgotten all that a healthy, living river can mean to its communities. While viewed as a channel to move water to where people wanted it, and as a sewer to carry away waste, it has often been otherwise ignored.

People seem to have forgotten all that a healthy, living, river can mean to its communities.

Today more people are aware of the South Platte's potential as a dynamic, living resource in our midst. But some of the problems facing the river—like the quantities of contaminants washing from our streets and yards polluting the river—are seen by some as intractable.

◀ **Figure 1: The upper reach of Segment 15 of the South Platte River runs north from Denver through Adams County (photo: Google Earth). This reach shows the complexity of this urban river system, with the Burlington Ditch drawing river water toward Barr Lake, and with the Robert W. Hite Wastewater Treatment Facility and tributaries Sand and Clear Creeks adding flow to the river. The square-ish ponds along the river are remnants of sand and gravel mining. (Photo: Google Earth)**

This is unacceptable! We all deserve a better river and should demand more attention to its health, not simply of our corporations and government, but of ourselves.

Our message

We—all of us—deserve a river that has healthy, clean water, brimming with life in its waters and growing beside it. We must learn how to change the things we do that degrade our river. We must prepare for the uncertain climate and environments ahead and be especially aware of disproportionate impacts on frontline communities.

We are committed to acting on behalf of the river for our own generation and for future generations.

We, the youth of the South Platte—for our own generation and for future generations—are committed to acting on behalf of the river.

An invitation

"Our River, Our Voices, Our Future" is our plan, and an invitation, for youth who want to help create a healthier South Platte River. It's also a proposal for environmental agencies and organizations who want to collaborate with youth, families, and communities. It is a community-based, nonpoint source pollution reduction plan. At the heart of this plan are two complimentary objectives. We aim to:

"Our River, Our Voices, Our Future" is a plan—and an invitation—for youth who want to help create a healthier South Platte River.

- Build youth power by transforming the newly-formed South Platte River Advisory Youth Council (SPRAY) into a vibrant and robust collaboration of youth engaging with families, community, agencies, and organizations who also love the river. The Council and its supporters will coordinate specific river activities that offer youth—and their environmental youth-serving organizations— opportunities to help solve real-world river problems.
- Encourage and advise environmental agencies and organizations in fulfilling their missions to effectively reflect public values, especially of under-served communities, on river-related issues.

▲ **Figure 2: Jamar Holmes presents his ideas on river pollution issues to other youth who live in the drainage of the South Platte's Segment 15.**

This plan was developed collaboratively by youth, youth-serving nonprofit organizations, state and local government environmental agencies, university programs, and others who see an opportunity and urgency to harness the energy and aspirations of young people on behalf of the South Platte River through the Denver metropolitan region.

"Our River, Our Voices, Our Future" is divided into these main sections:


River
august 4, 2021
1000mL = 1L
Cross section survey
Measuring sediment
bank to bank
(cross section)

Our focus: A specific challenge in a specific reach of the river

The South Platte River Advisory Youth Council is committed to taking a watershed-wide, ecosystems perspective so we can learn about significant problems and create practical solutions. Our current focus is on Segment 15 of the South Platte River because less attention has been given to that part of the river than upstream in Denver. We are especially focused on contamination that is polluting this part of the river.

Concern for a leading cause of water pollution

In this plan, we focus specifically on coordinating roles for youth and community that can address the broadly distributed sources of river pollution that come from areas of north Denver and southern Adams County. These nonpoint sources of pollution are a leading cause of water pollution and are especially hard to control because the pollutants don't come from a single identifiable point. Sources of this pollution can include animal feces, lawn chemicals, grease, and oils.

So-called nonpoint sources of pollution are one of the leading causes of water pollution.

Our Focus is just downstream from Denver, in Adams County, and the areas that drain to it

Our specific concern is for the 26-mile segment of the South Platte River, downstream from Denver's northern boundary. Known as Segment 15, it is designated by the U.S. Environmental Protection Agency as "impaired" (i.e., polluted) by a nonpoint source pollutant, coliform bacteria, which can indicate disease-causing pathogens in the water. The broad area that drains into this segment of the river, including parts

The river's Segment 15—our specific concern—has been designated as "impaired" by the U.S. Environmental Protection Agency.

◀ **Figure 3: Hands-on field work in support of environmental problem solving is at the heart of our approach.**

of Denver, Aurora, Commerce City, and Adams County, are potentially the sources of the bacteria and the places to enlist community support. Other sources of coliform bacteria are upstream from Segment 15 in metro Denver, and reach our segment by flowing down the river. Still other pollutants flow from tributaries directly to the segment.

Segment 15 has been designated an "effluent dominated stream."

Segment 15 has been classified for these uses: aquatic life (Warm 2), recreation (E), water supply, and agriculture. Because greater than 50 percent of the segment's flow consists of treated wastewater (for at least 183 days each year, for eight out of the last ten years), it is designated as an "effluent dominated stream."

The Burlington Ditch, which draws water from the upper end of Segment 15, dramatically influences river flows. At times there are extremely low flows in this part of the segment. Approximately two miles downstream of the Burlington Ditch diversion, the Metro Wastewater Reclamation District's treatment facility discharges highly treated effluent water into the river.

In 2002, due to high levels of the coliform bacteria, *Escherichia coli (*referred to as *E. coli),* Segment 15 was added to the list of Colorado's impaired water bodies (a list referred to as the 303(d) list). Because these high levels potentially affected human health—for the existing use of the segment for recreation—action was considered a priority. This led to the creation of a plan called the 2015 Total Maximum Daily Load Plan Assessment (TMDL)*, which inspired and directed much of our recent work and influenced our current proposal to help agencies and other organizations enlist youth and communities directly associated with Segment 15.

▲ **Figure 4: Areas (shown here in color) of Denver, Aurora, Commerce City, Thornton, Brighton, and three counties: Denver, Adams, and Weld, all drain into Segment 15 of the South Platte River. Canals that divert water from the river sometimes also divert the flow of the river's tributaries so that they no longer reach this segment.**

*"Total Maximum Daily Load Assessment Upper South Platte Segment 15, Adams County and Weld County, Colorado," is available to read here: drive.google.com/file/d/1NlOnnFtSXzTI7XHyCKaymfoyIlJi75Lf/view

▲ **Figure 5: A group of youth (from Lincoln Hills Cares and Groundwork Denver) visit the headgate of the Burlington Ditch, while on a bicycle tour of Segment 15. Seeing the river was a first-time experience for many of the youth.**

Building on the 2015 Total Maximum Daily Load Plan Assessment

"Our River, Our Voices, Our Future" builds directly on the recommendations of the TMDL Plan for:

1. education and outreach;
2. coordination with other watershed groups and entities in the urban South Platte Basin;
3. additional monitoring;
4. future tracking of pollution sources; and
5. possible revision of the TMDL.

2021 pilot tests of youth river activities and the Youth Council

During the summer of 2021, we organized youth through two youth-serving organizations (Lincoln Hills Cares and Groundwork Denver) to work with environmental agencies and organizations to pilot a half dozen activities focused on addressing aspects of river pollution. (See pp. 23-26 for details.)

At the end of the summer, to pilot the work of the SPRAY Council itself, we invited agencies and organizations to make proposals ("give pitches") for revising activities they hosted over the summer or for developing future activities in support of a cleaner river. Council members were selected from youth who had participated in the summer activities. From these proposals, and after debate and discussion with our collaborators, we revised and endorsed the activities included in this plan, including how the Council can be launched on a firmer grounding. See p. 35.

A Youth Council grounded in community values

We envision a robust SPRAY Council as a collaborative effort led by youth, and its activities guided by four main community-inspired values. The Council joins with others to:

During summer 2021, youth from Lincoln Hills Cares and Groundwork Denver piloted activities related to river pollution.

1. Restore the health of the river
2. Respond responsibly to climate change, throughout the river corridor
3. Acknowledge and amplify diverse voices and communities on behalf of the river
4. Develop authentic and symbiotic partnerships that benefit the river

While pursuing these values, the council will actively contribute to community education and outreach.

Youth lead the way: The first South Platte River Advisory Youth Council

In 2019, these fourteen Denver high school students—Nancy Delarosa Marmolejo, Valeria Delarosa Marmolejo, Néstor Deras, Elvira Garcia Arcos, Mayerli López-Hernández, Alicia Martinez, Nathalie Muhigirwa, Isabella Riedel, Annalise, Rivera-Solis, ReAnne Salazar, Isabella Saucedo, MyKenzie Sherman, Ariana Torres, and Victor Torres-Corona—worked together to understand and improve the South Platte River.

As students at John F. Kennedy High School, Abraham Lincoln High School, and Bruce Randolph School, they participated in Colorado State University's federally-funded TRIO Upward Bound program.

"We, as representatives of Colorado's youth, believe that a Youth Advisory Council can empower our community to heal past generations, provide for present generations, and ensure the livelihood of future generations by protecting the health of the South Platte River."

Upward Bound focuses on supporting qualified youth who are from low-income families and potential first-generation college students. CSU staff work with the students to prepare them for post-secondary rigors, success, and graduation.

In 2019, Upward Bound staff, Lucia V. Delgado, Nancy Lawrence, Riley DeMorrow Lynch, Jose Olivo, and Susana Ruvalcaba, consulted with youth and education specialists from El Laboratorio and Lincoln Hills Cares to develop a summer program with a hands-on, project-based STE(A)M curriculum focused on problem solving and Denver's river.

El Laboratorio's Jorge Figueroa, Nita Gonzales, and Paul Hellmund, working with Shane Wright (Lincoln Hills Cares), developed and taught an integrated program of activities with Upward Bound staff.

The youth titled their final product "Sourcebook: South Platte River Youth Advisory Council." In

◀ Figure 6: "Sourcebook: South Platte River Youth Advisory Council" is the 2019 plan developed by Denver high school students for the South Platte River. You can read it here: tinyurl.com/UB17CouncilPlan.

that plan they wrote, "We, as representatives of Colorado's youth, believe that such a Youth Advisory Council can empower our community to heal past generations, provide for present generations, and ensure the livelihood of future generations by protecting the health of the South Platte River."

Two of the youth, Nancy Delarosa Marmolejo and Alicia Martinez, who participated in 2019 as high school students, and 2021 as college students, were part of the team testing aspects of what we now call the SPRAY Council.

The 2019 Sourcebook clearly articulates a proactive leadership role for youth and communities working on behalf of the river. That approach is the basis of the 2021 work of the SPRAY Council, as it piloted field activities related to nonpoint source pollution and heard pitches from environmental agencies for future youth education and engagement.

▲ Figure 7: In 2019 as high school students, Nancy Delarosa Marmolejo (left) and Alicia Martinez helped develop the concept of a Youth Council for the river. As college students, in the summer of 2021, they were part of our team testing aspects of what we now call the SPRAY Council. Hear them talk of their experiences from 2019 here: tinyurl.com/Nancy-Alicia-Youtube

Helping people understand how they influence river health

We learned that technically speaking, the work of the SPRAY Council and most of its proposed youth activities are considered *nonstructural* best management practices (BMPs). These important actions aim to improve the health of the river, not by building pollution control structures, but by helping people remedy the things they do in their neighborhoods that harm the river.

Most of our efforts are to help people remedy the things they do that contribute to nonpoint source point pollution.

Some of the activities proposed in this plan, such as constructing rain gardens and other types of green infrastructure are *structural* best management practices. They are built in the landscape to directly reduce pollution. By engaging youth in such construction, these activities also become important forms of education and outreach as nonstructural BMPs.

What we are building on

"Our River, Our Voices, Our Future" builds on the work of others, especially a 2019 group of fourteen Denver high school students. They spent the summer studying the South Platte River flowing through Denver, identifying its problems and possibilities. (See next page.) These youth developed a range of possible forward-looking solutions to the problems they witnessed and ultimately endorsed one: a South Platte River Youth Advisory Council.

We seek to help those typically not well-represented in environmental decision making.

Their plan for the Council included the four principal values listed above and inspired discussions of how best to institute the Council. The students also described the challenges associated with each of the community values and they suggested guiding principles to move toward solutions for each.

These same values, challenges, and guiding principles form the basis for the currently proposed SPRAY Council, how it operates and what it seeks to facilitate with agencies and organizations on behalf of communities and the environment.

We believe building a more robust SPRAY Council will allow youth and communities, particularly those typically not well-represented in environmental decision making, to contribute to improving our river, and moving it toward a more fishable, swimmable community asset.

▼ **Figure 8: This aerial view of Segment 15 shows the complex landscapes the South Platte River traverses as it flows north from Denver and Commerce City into unincorporated Adams County. (Photo: Google Earth)**


Brighton
South Platte River
South Platte River
Clear Creek
I-270
I-76


Barr Lake
E-470
I-76
Burlington Ditch
Sand Creek
Robert W. Hite
Treatment Facility

B.

Guided by values and principles

The 2019 group of students who first envisioned a South Platte River Advisory Youth Council (see previous section) articulated a set of values they felt should be reflected in all youth efforts on behalf the river. Those values—presented in more detail here—were embraced during the 2021 convening of the Council and the supporting principles were expanded upon.

The SPRAY Council adopted four key values to inform its work.

The proposed Youth Advisory Council for the South Platte River addresses the following values:

1. Health of the River
2. Climate Action and Responsibility
3. Diverse Voices and Communities
4. Authentic Partnerships

◀ **Figure 9: Leslie Rivera takes in the complicated view—including the river, riverside vegetation, a sewage treatment plant, a power plant, and transmission lines—from a bridge across Segment 15 of the South Platte River. (Photo: LaRae Goldsmith)**

Health of the River

Value: Health of the River

Challenges: Pollution and over-exploitation of the South Platte River has compromised many habitats that the river provides. This affects plants, aquatic organisms, terrestrial animals, microbes, and even humans.

Guiding Principles

- Develop a shared vision of a healthy South Platte River, using an inclusive drainage basin and ecosystem perspective
- Don't be blinded/limited by political boundaries and other artificial limitations
- Commit to make the South Platte River more swimmable and fishable
- Advocate for change through inter-generational public education

Actions

- Understand diverse perspectives on the river and its health, through action (activities) and dialog
- Communicate the river's (and its watershed's) environmental history, status, and potential future uses (including for swimming and fishing)
- Participate in water quality monitoring and pollutant tracking, which are also means of education and engagement.

▲ Figure 10: The river's problems affects plants, aquatic organisms, terrestrial animals, microbes, and even humans

◀ Figure 11: To help understand river health, Alicia Martinez uses a graduated Imhoff cone to measure the amount and type of sediment in a water sample, with the help of CSU's Ag Water Quality Program staff.

Climate Action and Responsibility

Value: Climate Action and Responsibility

Challenges: The amount of water available to us will likely decrease significantly in the coming years due to decreased snowpack and altered weather patterns. This will impact human, animal, plant, and overall environmental health.

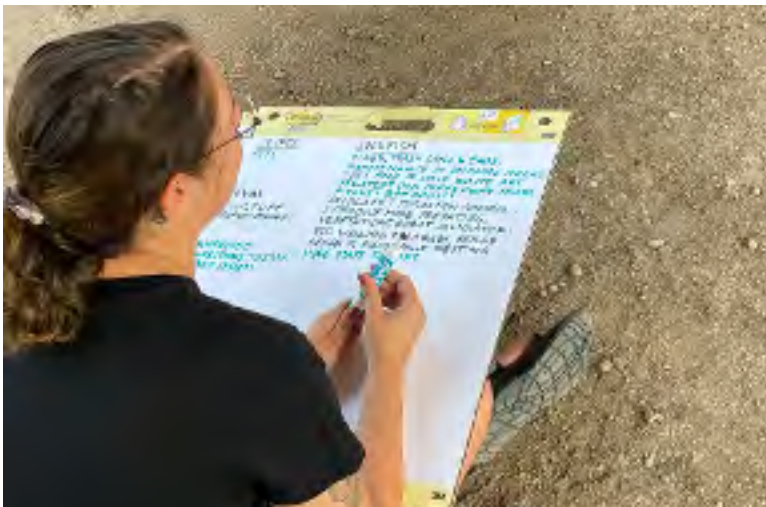
Guiding Principles

- **Increase reforestation**
- **Prioritize water efficiency and conservation**
- **Advance corporate responsibility**
- **Reduce waste into the river**
- **The future belongs to youth; we have to prepare for the future we want**

Actions

- **Understand the implications of climate change—including adaptation and mitigation—on the river and its health, through activities and dialog**
- **Communicate what we are learning about climate change and action, including hosting an annual river festival**

▲ Figure 12: The amount of water available in the river in the future will impact wildlife, like this female American kestrel getting ready to fly. (Photo: Flickr, Tony's Takes, NonCommercial-NoDerivs 2.0 Generic (CC BY-NC-ND 2.0))



▶ Figure 13: Theresa Centola records recommendations during a youth brainstorming session.

Diverse Voices and Communities

Value: Diverse Voices & Communities

Challenges: Under-represented communities have long been denied a voice regarding environmental impacts due to institutional racism, economic disparity, classism, environmental and social injustice, citizenship status, and lack of respect for the language and cultural diversity within the communities.

Guiding Principles

- **Put the community first and meet people where they are**
- **Listen to local voices before reaching out to other partners and project planning**
- **Respond in a timely and appropriate manner to community needs**
- **Prioritize equal access to information in multiple languages**
- **Embrace inclusivity**

Actions

- **Understand diverse perspectives by communicating in ways that are accessible and inclusive**

▲ Figure 14: Under-represented communities—including inter-generational representatives—have long been denied a voice regarding environmental impacts and yet they have much to contribute to the conversation.

◀ Figure 15: (left to right) Leslie Rivera, Swee Tee, and Nancy Delarosa Marmolejo, learn techniques for sampling chemical and other properties of river water. (Photo: LaRae Goldsmith)

Authentic Partnerships

Value: Authentic Partnerships

Challenges: The communities, committees, and decision-making bodies that are trying to heal the South Platte River are often not connected. This lack of collaboration promotes personal agendas and prevents mutual understanding.

Guiding Principles

- **Use a unified effort in healing the South Platte: We are all in this together**
- **Be responsible and accountable**
- **Understand that we are all equal, regardless of different capacities and influence**

Actions

- **Help others connect on shared interests, regardless of social, economic, or other interests.**

▲ Figure 16: There is power in working together through authentic, respectful partnerships.

▶ Figure 17: Lincoln Hills Cares youth make a stop along the river corridor during a river exploration by bicycle. (Photo: LaRae Goldsmith)

C.

What this kind of collaboration can look like

Although the word *advisory* is in SPRAY's title, and we look forward to engaging anyone willing to listen, we don't see SPRAY as a passive effort. We discuss and we act to help solve real-world problems and take advantage of important opportunities through collaboration.

In the summer of 2021 we piloted some major ways we see working in the future, but we want to maintain an open mind about proceeding. Always we intend to keep in mind our community values and guiding principles.

We discuss and we act to help solve real-world problems and take advantage of important opportunities through collaboration.

The following activities from the summer of 2021 illustrate the broad range of collaboration we were able to accomplish and they inspire us to imagine what is possible in the future.

The first four activities each involved collaboration with an environmental agency or organization (e.g., Adams County Stormwater program, Mile High Flood District, Colorado Water Center, and Wright Water Engineers) for differing periods of time. Each of these involved being in the field and working alongside professionals, sometimes after considerable data analysis.

The fifth activity included meeting weekly for two months and hearing project proposals ("pitches") from more than a dozen agencies. We invited agencies to understand how to effectively engage youth and communities and propose meaningful, compelling activities to get youth approval.

High school and college youth involved in these activities were coordinated and paid by Lincoln Hills Cares and Groundwork Colorado.

◀ **Figure 18: Swee Tee (foreground) joins water professionals and other youth in investigating stormwater control measures along Denver's 39th Avenue Greenway, recently constructed innovative green infrastructure.**

1. Marking Storm Drains

On July 20, Adams County Stormwater program (Juliana Archuleta, Stormwater Administrator), worked with high school and college youth to mark storm drains and place hang tags in an urbanized unincorporated area of Adams County.

The markers and tags teach people about what shouldn't be put down a storm drain. Juliana had previously worked with youth doing similar activities. El Laboratorio, as the collaboration consultant, was able to suggest complementary STEM tasks, such as visiting the outfalls of some of the storm drains and calculating the travel time for water to reach them.

Afterwards, youth evaluated the activity so that it could be subsequently improved. One wrote, "My favorite part was learning how everything works."

▲ **Figure 19: Adams County's Juliana Archuleta (center, front) guides youth in marking storm drains and understanding stormwater systems**

2. Crowd-sourcing conditions of stormwater control measures

On July 27 and 28, Mile High Flood District (Brik Zivkovich, Staff Engineer), gave background on stormwater control measures and enlisted the help of youth in testing a new, phone app-based procedure for evaluating and documenting conditions of existing stormwater control measures.

Youth comments included:

- "My favorite part was checking out all the [stormwater] pipes."
- "I liked helping out the community."
- "Learning how water works underground was my favorite part."
- "It was fun meeting others that I could ask questions about if I'm interested in a career like theirs"
- "Brik's app sounds like it could be really useful for implementation at the community level."

▶ **Figure 20: Groundwork Denver and Lincoln Hills Cares youth (Lucius Voyner, Jonathan Galvan, Derek Tarrent, and Amanda Marquez) and others join Swee Tee, and David Crooks (Mile High Flood District) student Intern) in testing aspects of a mobile app being developed by Mile High Flood District's Brik Zivkovich.**

3. Envisioning a community-based, low-cost water quality monitoring system

On August 4, the Ag Water Quality Program at Colorado State University (Eric Wardle, Christina Welsh, and Emmanuel Deleon), introduced youth to surface and groundwater issues and monitoring. This began preparation for future collaboration on developing low-cost monitoring systems that can be built, installed, and monitored by communities interested in improving water quality in Segment 15.

Youth were also instructed in the use of drones as another possible monitoring tool.

El Laboratorio helped CSU to tailor the activity, and its further offerings, to the needs of an urban youth audience.

Afterwards, youth wrote:

- "I liked learning about percolation."
- "I would like to learn more about the lab part of water testing."
- "I learned a lot of things that I didn't know before."
- "I learned that even if you're far away from waste, there is still a good chance your water could get contaminated."
- "I liked flying the drone. I'd like more time for that."

▼ **Figure 21: CSU's Emmanuel Deleon demonstrates the use of a drone and coached interested youth in drone aviation as a possible technique for aerial monitoring the South Platte River corridor.**

▶ **Figure 22: Anahi Sebastian uses a drill to help filtrate muddy river water.**

▶ ▼ **Figure 23: Jamar Holmes (left) and Aniwna Francis (right) join Maggie Lewis (Wright Water Engineers) in recording stream parameters in an activity orchestrated by the CSU Ag Water Quality Program's Erik Wardle, Christina Welch, and Emmanuel Deleon.**

4. *E. coli* bacteria hotspot identification and protocol creation

Throughout the summer, Wright Water Engineers (Maggie Lewis, Water Resources Engineer) worked with two undergraduate environmental engineers (Theresa Centola and Swee Tee) supported by the Colorado Water Center at CSU to develop and apply a procedure for identifying sources of *E. coli* bacteria and creating solutions to reduce *E. coli* loading to Segment 15 of the South Platte river. They used existing data collected since the TMDL was released, rainfall measurements, and remote sensing observation to identify *E. coli* hotspots.

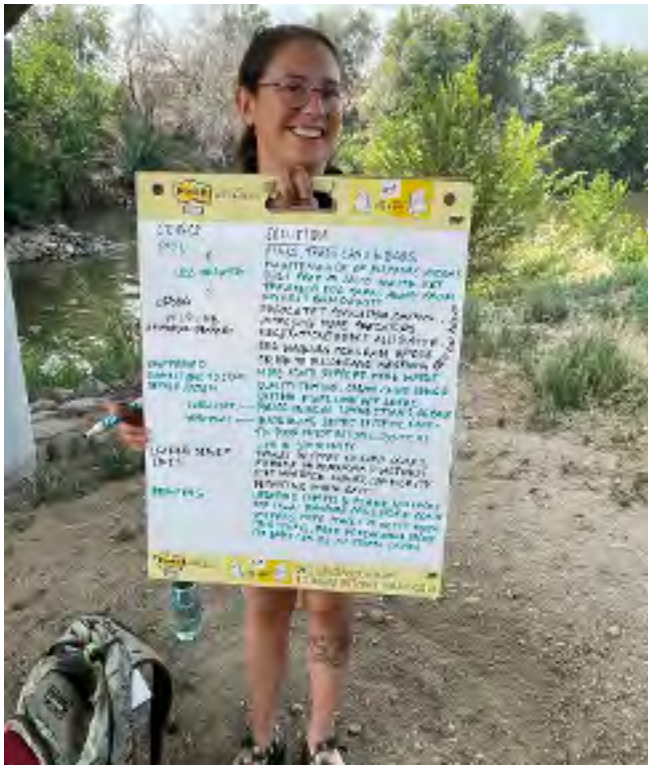
The three outlined a broader protocol for similar analyses of other water pollutants.

The three engaged with youth teams in the field, who helped develop solutions to decrease the amount of *E. coli* that enters the river. They also outlined a broader protocol for similar analyses of other water pollutants that might be of interest to neighborhoods.

Afterwards youth wrote:

- "Brainstorming with Maggie was exciting since she knows a lot about water, infrastructure, and pollution reduction"
- "I really enjoyed discussing *E. coli* sources and solutions with the youth teams. It was so clear that they have learned so much and understand how the South Platte is being harmed."
- "Visiting hotspots was really cool and allowed us to put a visual to places and things that can harm the river."
- “I really like working with such amazing people!”
- “I've learn a lot about Colorado's major basins throughout this summer.”

The 2019 Water Infrastructure Improvement Act, defines **green infrastructure** as "the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or to surface waters."



◀ **Figure 24: Krishna Ludwig (center) discusses pollution issues with water engineer Maggie Lewis (right) and other youth.**

▲ **Figure 25: Theresa Centola shows the results of brainstorming potential sources of *E. coli* bacteria pollution and possible solutions.**

5. "Pitching" to the SPRAY Council

Each Friday in September and October (2021) the South Platte River Advisory Youth Council met to hear proposals ("pitches") from environmental agencies and organizations interested in working with youth on projects to improve water quality in the South Platte River.

Council members were selected from youth who had been involved in summer river activities as youth team leaders. Each was a college student. Council member Lizette Saucedo served as chair of the meetings, which were held virtually.

The Council heard two, 30-minute proposals each week, asking questions of those making the pitches and evaluating the potential project success with youth and communities. All the proposals, which included activities piloted over the summer as well new possibilities, envisioned active, contributing, problem-solving roles for youth. None proposed simply conducting youth education programs, but all had strong, project-based educational potential.

In the final meeting of the Council (on October 22, 2021), Council members presented to agency invitees an overview of their work. See their comments in the sidebar.

Council member Theresa Centola co-edited this final plan, *Our River, Our Voices, Our Future: A Youth Guide to a Healthier South Platte River,* with Paul Hellmund (El Laboratorio).

Commenting on continuing the SPRAY Council work, members said youth:

- "will learn more leadership experience and be able to voice the opinion of the youth and community needs,"
- "the community will have a voice in the water coalition process, being more informed to create change that will positively impact the community."

On October 22, 2021, the SPRAY Council hosted a virtual meeting to review the summer's work. Twenty-five people participated, including thirteen first-time participants. Here are some of their comments:

- "Please let the council know that this is really important work that they are doing! It is great that you are giving youth the tools to get involved!!!"
- The strength of the SPRAY approach is "being youth driven with a focus on tying water quality in the river to the community at large."
- "Getting [youth] to stay connected and engaged will require that they feel they're benefiting personally, particularly at younger ages."
- The strength of the SPRAY approach is "strong youth leaders [and] staff organizational support."
- "Do participants feel like they have enough in their toolkit to be confident to have these conversations to address water quality issues in the South Platte? If not, are there specific topics that would increase that confidence, e.g., how does the permitting process work, how is a TMDL [Total Maximum Daily Load Assessment] written, how can the public participate in Water Quality Control Division public input, etc."

▲ **Figure 26: SPRAY Council members and support staff meet virtually each week for two months, hearing two proposals each week from environmental agencies and organizations. Approved proposals were included in this plan, (Section D).**


organic
APPLE CIDER
VINEGAR

D.

Things we learned

We learned important lessons in planning and implementing the pilot SPRAY efforts described in earlier sections of this plan. Our successes and failures were equally helpful. Here is some of what we learned and plan to apply to our future efforts.

1. Acknowledge that youth have important contributions to make, and are not simply persons to be "educated" over to someone else's viewpoint. Youth have a stake in the future—it's ours—and we should have a say in how the river is treated today and tomorrow. Also, some youth have cultural and language skills that allow us to guide environmental agencies and organizations in understanding communities which might not otherwise easily be accessible.

2. Doing is one of the most powerful forms of learning and changing attitudes and behaviors. Conventional ways of teaching youth about the river and its problems can't compare to the effectiveness of youth having direct experience in helping solve problems that matter to their communities.

3. Successful implementation of real-world problem-solving activities takes more than throwing together youth and agency representatives. We found that some agencies had a long track record of working with youth, while for others it was a new adventure. It is important to move away from talking at young people to working along side them, and showing respect for their perspectives. Professionals with youth and community experience can be useful consultants in guiding agencies in understanding youth needs and suggesting bridging for technical concepts.

4. Youth—and people in general—have trouble caring about a river they have never experienced. Creating fun experiences at the river can be powerful.

◀ **Figure 27 CSU's Emmanuel Deleon helps youth understand water monitoring concepts, like pH and at the same time is a professional role model**

5. Expect a lot of youth, even if their backgrounds in STEM aren't strong, but support them a lot, too. Youth may have had spotty exposure to STEM topics, but given the time and tools, their input in invaluable.

6. Working shoulder to shoulder with river professionals is one of the most powerful forms of exploring career and educational options. Firsthand observations of professionals at work can be a valuable experience for youth with limited exposure to career choices.

7. Some youth who care about the river are interested in career options other than river scientist, planner, or activist; they may want to understand options for entrepreneurial green jobs. Exposure to STEM learning may inspire river-related business options.

8. Give youth choices within an activity so they can find tasks best suited to their interests and abilities, while recognizing that as youth participate over the years they will be interested in greater engagement and responsibility. Rather than requiring all members of a youth team to do the same task, it can be empowering for young people to be given work that relates directly to their individual interests.

9. To be truly successful, it is better to build the SPRAY Council organically over time with a few interested youth than it is to impose a structure from the outside.

10. Engaging in real-world projects creates opportunities for youth to gain Twenty-First century life/jobs skills. It's not just STEM knowledge and experience that will aid career advancement, but also the kinds of skills needed for problem solving in any profession, such as communication, working in teams, critical thinking, and finding and applying information. Activities should be structured to give youth experience with these also.

▶ **Figure 28: Some youth may be more appropriately engaged in activities when their families are involved, as we found when young Jesus and Diego and their mother, Gladys, joined their big brother, Luis, in water sampling.**

11. Youth and their organizations must understand that working on real-world projects for agencies necessitates useful outcomes. Environmental agencies may not have a strong educational mission, but may still be eager to collaborate with youth if they feel there will be tangible outcomes.

12. With some cultural backgrounds—which may differ from those of agency

◀ Figure 29: As youth participate in river programs over the years they should find opportunities for greater engagement and responsibility. This is what Nancy Delarosa Marmolejo (left) and Alicia Martinez found as they moved from high school participants to involvement last year as college students.

▼ Figure 30: Working shoulder to shoulder with river professionals is one of the most powerful forms of exploring career and educational options, as 2021 youth found in working with water engineer, Maggie Lewis, of Wright Water Engineers.

professionals— inter-generational collaboration is especially important. Some youth may be more effectively engaged when their families are involved. During several of our summer activities, a parent and younger siblings came along and fully participated in and added to the activity.

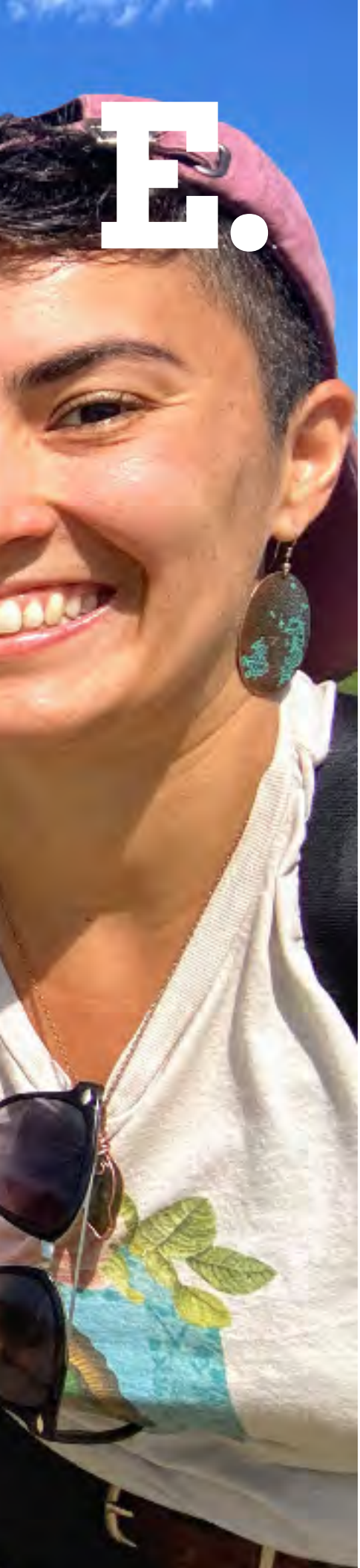
13. Evaluating activities and the overall SPRAY program has to be consistently carried out to substantiate to communities and funders the outcomes and value of the efforts. In some cases evaluation will be possible with a simple verification that certain tasks were completed. In other cases, evaluation may require youth participants to self-report changes in their attitudes, knowledge, or beliefs.

14. Everyone—youth, professional, or community member—investing substantial time in a program deserves to be compensated for their involvement. Professionals are getting paid for their involvement with the public. Youth and others who participate should also be compensated because they are giving of their valuable time.

15. Support youth leaders and others as they grow into leadership responsibility for appropriate river activities. Training the trainers helps more people understand river issues and spread what they learn more widely.

16. The professionals of the Task Force should transition to supportive, rather than leadership, roles. While professionals of different backgrounds have played important roles in developing the SPRAY Council, the coming developmental phase should include a transition to stronger youth leadership.

17. Include activities that focus on education and outreach (i.e., nonstructural BMPs), as well as structural BMPs, such as rain gardens and other forms of green infrastructure. Even youth-appropriate structural BMPs can be educational and forms of outreach. They also can offer career pathways to youth.



E.

Next steps : SPRAY Council and SPRAY Implementation Team

We have just begun to explore ways of how youth can help reduce nonpoint source pollution of the South Platte River. Here we present a plan for the next steps.

What we've done

As of December 2021, we have:

- field tested initial field activities, both of shorter and longer duration, that address nonpoint source pollution (pp. 23-27);
- conducted the business of the SPRAY Council, hearing and evaluating agency proposals about water quality (p. 27), and
- evaluated those activities in order identify the next steps forward in reducing nonpoint source pollution of Segment 15 of the South Platte River (pp. 33-39).

Building on our previous activities and those of youth before us, we see great potential in more formally establishing a SPRAY Council and Work Force.

What we'll do next

In 2022, using a patchwork of funding, we will:

- continue to hold Council meetings to coordinate SPRAY efforts,
- advise and collaborate with agencies and organizations to develop new activities focused on nonpoint source pollution and Segment 15,
- field test activities
- seek major funding and partnerships to build and secure SPRAY capacity to connect youth with meaningful problem solving opportunities.

A two-component strategy

Depending on the timing of future funding, but no later than 2023, we will start a two- to three-year effort to advance SPRAY:

◀ **Figure 31: Braylen Aldridge and LaRae Goldsmith help lead a bicycle tour of the South Platte River.**

Project profiles for each activity

We have gathered the following information about each of the activities we have developed with our collaborators and propose to implement. See Tables 1-4.

- What is proposed
- By whom
- Involving whom else as collaborators
- Year and time of year (including any phasing over time)
- Bringing what resources
- Requiring what resources
- How the activity will help improve river health or water quality in the target parts of the river (Segment 15 of the South Platte River)
- How the community would benefit from, be interested in, and want to support the activity
- What useful products/results will come from the activity
- Specific expertise the person/agency has for conducting the activity
- If the activity was piloted in summer 2021, how what was learned informs this proposal
- What will make youth go home after the activity and say, "guess what we got to do today?"
- What makes the activity hands-on (as opposed to mostly passive)
- What career opportunities youth will see firsthand
- How youth supervisors can be trained to conduct aspects of this activity without professional supervision
- Aspects of the proposed activity appropriate for different ages of youth so that youth are engaged even as (because) an activity is repeated
- What the proposing agency/organization wants to learn from interacting with youth, especially under-served youth and communities

Figure 32. Hands-on experience with the river and its complex land-use interactions helped us see a way forward for involving youth.

Component A. Develop the SPRAY Council as a coordinator of youth efforts and communicator of community values and interests (see Table 1). Establish appropriate ways for professionals to support and advise the SPRAY Council, while strengthening and respecting youth leadership. Provide expert program development help to agencies and youth-serving organizations to bridge the needs and interests of youth with those of environmental agencies and organizations, while advancing STE(A)M learning.

Component B. Establish a River Youth Implementation Team focused on reducing fecal coliform bacteria and other nonpoint source pollutants in the river, through monitoring, targeting, installation, and management of structural and nonstructural BMPs (see Tables 2-4).

Timing

We propose a two-year implementation phase targeting solutions to nonpoint source pollution of Segment 15 of the South Platte River appropriate for youth and community involvement.

During an initial six-month phase, the Council will convene and members will formalize Council procedures and be prepared to contribute to the Council's advisory role. Also during that time Youth and professional Task Force members will be preparing and refining materials and components of the activities to be offered in the summer by interested youth-serving organizations (see Table 1).

▲ **Figure 33. Lizette Saucedo, Ahtziri Rodriguez, and Aliyah Fard (from left) check water quality parameters in Segment 15. Such 2021 pilot activities helped the Council determine the scope and nature of future youth activities.**

At the start of the next twelve months, Council members and other youth leaders will be prepared to play leadership roles in the upcoming summer activities.

During the summer months—the busiest time of the project—dozens of youth will participate in and give feedback on the activities. Results from fully integrated evaluation techniques will allow us to determine the effectiveness of each activity. Those results will help environmental agencies and organizations revise and refine their public engagement.

The SPRAY Council will continue to advise environmental agencies and organizations on youth river projects and prepare itself for successive waves of youth involvement and leadership.

Throughout the two years of the project, we will be exploring options for an organization/institutional home and ongoing funding support.

Table 1: Proposed activities (Component A) to be implemented in establishing the South Platte River Advisory Youth Council and build bridges to communities with the goal of reducing nonpoint source pollution of the river.

Component A Proposed Activities: Council and Communications	Contacts at lead agencies/organizations
A.1 South Platte River Advisory Youth Council. Pilot organizational strategies for the Council, including public engagement.	• Nora Flynn, CSU Colorado Water Center • Shane Wright, Lincoln Hills Cares • Paul Hellmund and Nita Gonzales, El Laboratorio
A.2 Annual Youth River Festival. Annual youth-led STE(A)M-oriented festival to engage communities in the progress with the river and its prospects, as well as connect the public to other offerings and programming.	• Nita Gonzales and Paul Hellmund, El Laboratorio • Sarah Miley, CSU Spur • Alfredo Reyes, Latino Cultural Arts Center
A.3 River Digital Storytelling. Collaborate with Youth Council members to develop compelling river and community stories related to the Council and its work. A website, social media, and video materials will communicate and engage potential partners, including youth, community members, environmental organizations and agencies, and donors. Develop a communications system whereby youth document their own activities in support of the river and constantly share images and other information with the world.	• Lauren Stephenson, Progress Now Colorado
A.4 Oral histories and Photovoice. Develop and communicate an extensive and evolving understanding of youth and community attitudes, perceptions, values, and knowledge of the river and water issues through oral histories, photovoice image capture, and other surveys.	• Greg Newman and Isabella Harris, CSU CitSci.org
A.5 Community river tours and ambassadors on bikes. Introduce the river, its assets, problems, and potential to youth by bicycle and then train some of them to give such tours to community members and act as river ambassadors.	• Shane Wright, Lincoln Hills Cares
A.6 Conduct youth-led public information sessions ahead of public meetings and document review periods—including for future revisions to Segment 15's TMDL, to review topics.	• Juliana Archuleta, Adams County Stormwater Program Donny Roush, Stormwater Education and Outreach at City and County of Denver

Table 2: Proposed urban stormwater runoff implementation activities to reduce nonpoint source *(E. coli* bacteria*)* pollution of Segment 15 of the South Platte River through youth involvement (Component B).

Component B.1 Proposed Activities: Urban stormwater runoff	Contacts at lead agencies/organizations
B.1.1 Map, enhance through planting, and monitor riparian buffer areas, including surveys through annual community bioblitzes with drones	Greg Newman, CSU CitSci.org Eric Wardle, Christina Welsh, Emmanuel Deleon, CSU Ag Water Quality Program
B.1.2 Identify priority locations, and mark storm drains ("this drains to the river") and place hang tags	Juliana Archuleta, Adams County Stormwater Program Donny Roush, Stormwater Education and Outreach at City and County of Denver
B.1.3 - Participate in Certified Rain Garden Installer Training by Colorado Stormwater Center in order to become rain garden experts in their community, assist with community installations, and advocate for the installation of additional rain gardens.	Jessica Thrasher, CSU Colorado Stormwater Center Brik Zivkovich, Mile High Flood District
B.1.4 - Identify locations, install, and monitor rain garden installations in partnership with the Colorado Stormwater Center	Jessica Thrasher, CSU Colorado Stormwater Center
B.1.5 Continue to conduct *E. coli* data analysis to identify potential hotspots and conduct Environmental DNA (EDNA) testing at such places, especially at tributaries to Segment 15 that indicate high probability of human fecal contamination.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.1.6 Crowd source evaluations of stormwater control measures.	Brik Zivkovich, Mile High Flood District
B.1.7 Respond to community concerns about the river's water quality by engaging youth to help design, create, evaluate, and monitor a low-cost water monitoring system.	Eric Wardle, Christina Welsh, Manny Deleon, CSU Ag Water Quality Program

◀◀ Figure 34. We propose preparing youth to give community river tours and serve as ambassadors on bikes.

◀ Figure 35. Working with partners such as Emmanuel Deleon (CSU Ag Water Quality Program), we propose to learn how to design and create low-cost water monitoring systems useful in monitoring river pollution.

Table 3: Proposed implementation activities for youth involvement to reduce human and animal sources of nonpoint source *(E. coli* bacteria) pollution of Segment 15 of the South Platte River (Component B).

Component B.2 Proposed Activities: Human sources	Contacts at lead agencies/organizations
B.2.1 Look for possible leaking sanitary pipes or elicit connections by reviewing sanitary sewer systems maps, pipe materials, and proximity to dry weather *E. coli* bacteria hot spots. Identify agencies or organizations that have robots with cameras or other methods for inspecting pipes for leaks.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.2.2 Engage the public to address septic system issues through a public information campaign regarding septic systems and maintenance in areas with high levels of *E. coli.*	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.2.3 Map locations of public restrooms, get community input, and recommend new locations and hours as needed.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.2.4 Map locations of public septic dumping sites, get community input, and recommend new locations and hours as needed.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center

Component B.3 Proposed Activities: Animal sources	Contacts at lead agencies/organizations
B.3.1 Identify common wildlife in the area, consult wildlife sanctuaries and local wildlife experts. Research options for population control and road kill pickup programs.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.3.2 Work with ranchers and landowners to prevent certain livestock from entering waterways and riparian areas through fencing and education.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center
B.2.4 Study locations of existing pet poop pick up stations and determine locations where they might be needed through field assessment and community survey. Implement a campaign to include more frequent poop pick-up monitoring, dog poop composting, leash mandates, designated dog pooping areas, and/or no dog areas.	Maggie Lewis, Wright Water Engineers Nora Flynn, Colorado Water Center

Table 4: Other proposed implementation activities for youth involvement to reduce nonpoint source pollution of Segment 15 of the South Platte River (Component B).

Component B.4 Proposed Activities: Additional sources	Contacts at lead agencies/organizations
B.4.1 Request that facilities near *E. coli* bacteria hotspots be held accountable for any pollution exceedances. Youth and community could also request permit modification hearings.	• Maggie Lewis, PE, Wright Water Engineers • Nora Flynn, CSU Colorado Water Center
B.4.2 Develop a campaign for getting phosphorus out of lawn fertilizers. Encourage people to reduce the amounts of phosphorus they contribute to streams and water bodies through lawn fertilizers and encourage phosphorus removal from fertilizers themselves.	• Steve Lundt, Metro Water Recovery and Barr-Milton Watershed

Conclusion

We are ready and eager to address the well-being of our river, prepared to expand upon the efforts we have piloted, and excited to implement new activities and learning. With the support of our communities, environmental agencies and professionals, and sponsors, the actions outlined in this plan can come to fruition.

SPRAY is committed to the values of restoring the health of the river, responding responsibly to climate change, acknowledging and amplifying diverse voices, and developing authentic and symbiotic partnerships in order to build a better today and foster a better tomorrow.

What you can do right now

1. Give us feedback on this plan at: tinyurl.com/XXXXX
2. Apply for a youth summer job at: tinyurl.com/XXXXX
3. Propose a project in writing or arrange to give a live pitch for a river project at: tinyurl.com/XXXXX
4. Support our work financially at: tinyurl.com/XXXXX

Thank you!

It's time for us to do better by our river—the South Platte. It's too important to us—our past, our present, our future—to be treated the way has been.

“Our River, Our Voices, Our Future” is our plan, and an invitation, for youth who want to help create a healthier South Platte River. And its also a proposal for environmental agencies and organizations who want to collaborate with youth, families, and communities.

In this plan we report what we and other youth have been doing on behalf of the river. We also detail our next steps through collaboration, both through dialog and through action.

Spray

South Platte River
Advisory Youth Council

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December 1, 2021

To: Colorado Water Conservation Board (CWCB)

Re: Water Plan Grant Letter of Support for Lincoln Hills Cares

To Whom It May Concern:

I'm writing to support Lincoln Hills Cares in their statement of work for the CWCB Water Plan Grant application. I have been collaborating with Lincoln Hills Cares and El Laboratorio for the last year in developing a pollution reduction action plan for the South Platte River. This past year I worked closely with two students from the Colorado State University (CSU) Water Center in reviewing data and sources related to non-point source pollution of E. Coli in the Segment 15 of the South Platte River. I also attended many field work days with Lincoln Hills Youth related to watershed and river health. I am excited about this program and believe it fulfills an important role in my community and my profession.

Sincerely,

Magdalena Lewis

Magdalena (Maggie) Lewis, P.E.
WRIGHT WATER ENGINEERS, INC.