

CLARK COUNTY STAFF REPORT

DEPARTMENT: Public Works / Clean Water Division

DATE: June 21, 2016

REQUESTED ACTION: Authorize the Public Works Department to submit three grant applications to the Lower Columbia Fish Recovery Board for \$391,500 to fund projects addressing water quality problems and habitat degradation associated with stormwater runoff.

 X Consent Hearing County Manager

PUBLIC WORKS GOALS:

- ☐ Provide safe and efficient transportation systems in Clark County
- ☐ Create and maintain a vibrant system of parks, trails and green spaces
- ☒ Continue responsible stewardship of public funds
- ☐ Promote family-wage job creation and economic development to support a thriving community
- ☒ Maintain a healthy, desirable quality of life
- ☒ Increase partnerships and foster an engaged, informed community
- ☐ Cultivate a nimble, responsive work force
- ☐ Make Public Works a great place to work

BACKGROUND

Pursuant to a negotiated settlement and consent decree in the case of Rosemere Neighborhood Association et al. versus Clark County, the Clark County Water Restoration Fund (CCCWRF) grant program was created to fund projects that address water quality problems and habitat degradation associated with stormwater runoff. The program is administered by the Lower Columbia Fish Recovery Board (LCFRB), with funding provided by Clark County as defined in the consent decree. Clark County will make six payments of \$500,000 from 2015 to 2020, of which ~\$2.85 million will be made available for projects through the CCCWRF. Under the consent decree, Clark County is eligible to apply for CCCWRF grant funds.

The Clean Water Division has developed proposals for several eligible projects during the 2016 CCCWRF grant cycle:

- 1) Urban Tree Canopy Restoration – partner with Friends of Trees to engage neighborhoods and local residents to plant street trees in public rights-of-way in front of homes and businesses. Street trees intercept significant amounts of rainfall, reducing and slowing runoff to the stormwater system. (\$150,000 grant; \$72,000 partner and volunteer match; \$20,000 county labor)
- 2) Downspout Disconnection – partner with Clark Conservation District to provide financial incentives and technical assistance for homeowners to disconnect existing downspouts from the county's storm sewer system. Disconnecting these systems reduces storm runoff and improves water quality, particularly in older developed areas with limited stormwater infrastructure. (\$91,500 grant; \$9,000 volunteer match; no county labor)
- 3) Volunteer Stream Monitoring – partner with local agencies to engage citizens and educate about our local waterways, stream health characteristics, and trends in stream health. Volunteer stream monitoring captures valuable data while building stewardship. Project will create a unified database

MM
OK

PW16-070

portal to share volunteer monitoring data. (\$150,000 grant funds; \$20,000 partner match; \$15,000 county labor)

COUNCIL POLICY IMPLICATIONS

Funding for the proposed projects will be included in the Clean Water Division 2017-2018 and 2019-2020 biennial budget submittals. Funding for initial implementation steps in 2016 is included in the approved 2015-2016 Clean Water Division budget. Clean Water Division revenues are generated through the annual Clean Water Fee assessed on properties in unincorporated Clark County to support stormwater management activities.

ADMINISTRATIVE POLICY IMPLICATIONS

The projects support the underlying goals of the County's Stormwater Management Program to protect surface water and groundwater resources from polluted stormwater. The CCCWRF grants may not be used to meet NPDES Municipal Stormwater Permit requirements; the proposed projects are not required, but represent opportunities to address stormwater issues in places that no regulated program activity is currently able to reach cost-effectively.

COMMUNITY OUTREACH

Each project includes a significant community outreach component. Clark County will actively coordinate with neighborhood residents to solicit project participation, provide training or technical assistance, and offer educational opportunities to enhance watershed stewardship. Project information and materials will also be maintained on the County website.

BUDGET IMPLICATIONS

YES	NO	
	X	Action falls within existing budget capacity.
	X	Action falls within existing budget capacity but requires a change of purpose within existing appropriation
X		Budget capacity will be requested in the 2017-2018 and 2019-2010 biennial budget submittals. If YES, please complete the budget impact statement. If YES, this action will be referred to the county council with a recommendation from the county manager.

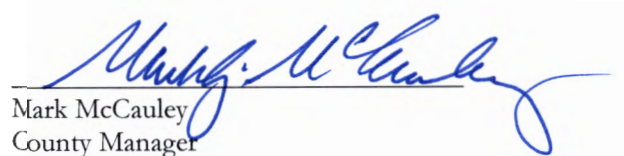
BUDGET DETAILS

Local Fund Dollar Amount	\$35,000
Grant Fund Dollar Amount	\$391,500
Account	Clean Water Fund (4420)
Company Name	

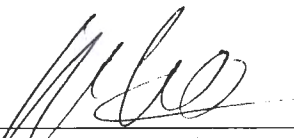
DISTRIBUTION:

Board staff will post all staff reports to The Grid. <http://www.clark.wa.gov/the-grid/>


Dean Boening
Clean Water Division Manager


Mark McCauley
County Manager

PW16-070

APPROVED: 
CLARK COUNTY, WASHINGTON
BOARD OF COUNTY COUNCILORS

DATE: June 21, 2016

SR# 130-16

BUDGET IMPACT ATTACHMENT

Part I: Narrative Explanation

I. A – Explanation of what the request does that has fiscal impact and the assumptions for developing revenue and costing information.

Authorize the Public Works Department to submit three grant applications to the Lower Columbia Fish Recovery Board for \$391,500 to fund projects addressing water quality problems and habitat degradation associated with stormwater runoff. The projects support the underlying goals of the County's Stormwater Management Program to protect surface water and groundwater resources from polluted stormwater.

Part II: Estimated Revenues

Fund #/Title	Current Biennium		Next Biennium		Second Biennium	
	GF	Total	GF	Total	GF	Total
Lower Columbia Fish Recovery Board/ CCCWRF Grant	\$0	\$21,900	\$0	\$335,300	\$0	\$34,300
4420/Clean Water Fund	\$0	\$10,000	\$0	\$15,000	\$0	\$10,000
Total	\$0	\$31,900	\$0	\$350,300	\$0	\$44,300

II. A – Describe the type of revenue (grant, fees, etc.)

The Clark County Water Restoration Fund (CCCWRF) grant program is administered by the Lower Columbia Fish Recovery Board (LCFRB), with funding provided by Clark County through six annual payments of \$500,000 from 2015 – 2020. The grant fund and payment schedule are defined pursuant to a negotiated settlement and consent decree in the case of Rosemere Neighborhood Association et al. versus Clark County.

Additional funding will be provided by the county's Clean Water Fund, using revenues generated from fees paid by property owners in unincorporated Clark County.

Part III: Estimated Expenditures

III. A – Expenditures summed up

Fund #/Title	FTE's	Current Biennium		Next Biennium		Second Biennium	
		GF	Total	GF	Total	GF	Total
4420/Clean Water Fund		\$0	\$31,900	\$0	\$350,300	\$0	\$44,300
Total		\$0	\$31,900	\$0	\$350,300	\$0	\$44,300

III. B – Expenditure by object category

Fund #/Title	Current Biennium		Next Biennium		Second Biennium	
	GF	Total	GF	Total	GF	Total
Salary/Benefits	\$0	\$16,000	\$0	\$238,800	\$0	\$44,300
Contractual	\$0	\$0	\$0	\$44,000	\$0	\$0
Supplies	\$0	\$15,900	\$0	\$67,500	\$0	\$0
Travel						
Other controllables						
Capital Outlays						
Inter-fund Transfers						
Debt Service						
Total		\$31,900		\$350,000		\$44,300

Project Name: Urban Tree Canopy Restoration (UTCR) project
Primary Sponsor: Clark County Clean Water Division of Environmental Services
Project type: Outreach and Education

1. Project Location.

This project area addresses some of the most urban areas in the Salmon Creek watershed in the unincorporated Vancouver Urban Area. Figure 1 outlines (black line) a general location of the potential project area. The approximate boundary of Phase 1 is highlighted with orange shading. Phase 1 neighborhoods include West Hazel Dell, Felida and North Salmon Creek Neighborhood Associations. The project area covers approximately 9.78 square miles of the unincorporated urban area.

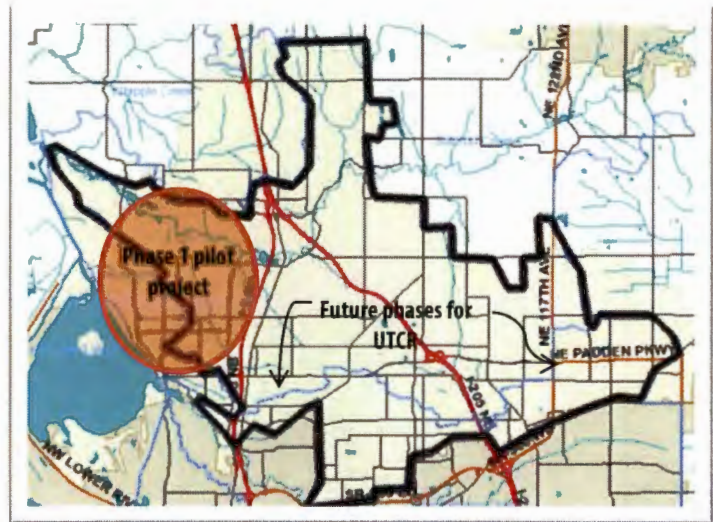


Figure 1. Clark County Urban Unincorporated Area in Salmon and Burnt Bridge Creek Watersheds

2. Brief Project Summary.

The Urban Tree Canopy Restoration (UTCR) project is a new pilot project for Clark County to increase the number of trees in neighborhoods, therefore increase the forest cover in the urban areas. While this project is new for Clark County jurisdiction, the project partner has successfully been implementing this type of project in the city of Vancouver for thirteen years and the Portland-region for over 25 years.

The goal of the project is to engage neighborhoods and local residents to plant street trees in public rights-of way in front of their homes and businesses. The trees are provided at a low cost to property owners including care instructions and support. Citizens will in turn provide on-going maintenance for the trees. During the project, connections with neighbors will highlight the values of trees in our community, including impacts on the watersheds. The project will raise awareness that trees help reduce stormwater flow and provide shade to cool water temperatures.

This grant will support Phase 1 of the pilot project in a heavily urbanized part of Clark County. If successfully received by the community, Clark County will identify opportunities to continue the UTCR in other parts of the urban unincorporated areas (between I-5 and I-205, as well as east of I-205).

3. Problem Statement.

Phase 1 primarily targets the Cougar Creek subwatershed of the Salmon Creek watershed as well as Salmon Creek (see Figure 2). Additionally, several small tributaries to Lake River flow through western portion of the project area. Refer to the attached *Project Area Map* for greater detail of the project area. According to the



Figure 2. Primary area of Phase 1 project area (boundary approximate orange dash)

2010 Clark County Stream Health Report¹, Cougar Creek has land use cover percentages of 51% “Developed” and only 7% “Forest” cover with a population density of 3,196/per square mile. This area includes the heavy commercial/retail zone along Hazel Dell Avenue as well as single-family and multi-family residential neighborhoods. The project area includes Columbia River High School, several elementary schools, and several parks.

Clark County has actively monitored the watershed for water quality, biological health and stream flow over the past decade. In 2008, Clark County published the *2008 Stormwater Needs Assessment Program - Salmon Creek (RM 03.83)/Cougar Creek Subwatershed Needs Assessment Report*² (SNAP) that outlines conditions and results. In general, “Cougar Creek is Category 4a listed (polluted waters with an approved TMDL) for fecal coliform bacteria, and Category 2 listed (Waters of Concern) for pH and dissolved oxygen. The Salmon Creek mainstem has multiple reaches listed within or upstream of the Salmon Creek (RM 03.83) subwatershed, including Category 4a listings (TMDL) for fecal coliform, temperature and turbidity, Category 5 listings (polluted waters that require a TMDL) for dissolved oxygen, and pH; and additional Category 2 listings for temperature, dissolved oxygen, and pH.”^{2B} As shown in Figure 3, the water quality for Cougar Creek ranked “Very Poor.”^{2D}

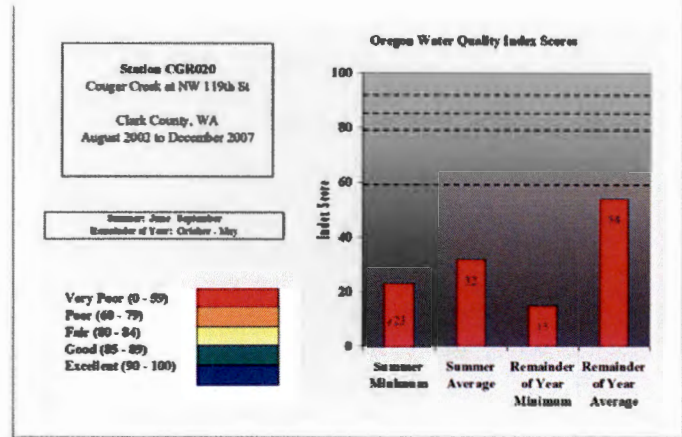


Figure 3. Average Water Quality, Cougar Creek station CGR020, 2002 through 2007, Oregon Water Quality Index^{2D}

Also described in the SNAP, biological integrity has been measured using the *Benthic Macroinvertebrate Index of Biological Integrity* (B-IBI) which indicates the health of the stream based on the sensitivity of the aquatic species that can live in those stream conditions. The B-IBI 5-year average scores in Cougar Creek rank “Low” for aquatic species diversity. “Station CGR020’s wide range of low scoring metrics suggest the presence of chemicals such as heavy metals, human disturbance impacts, less varied stream habitat, water quality degradation, habitat impacts on the most sensitive species, excess fine sediments, and reduced prey food sources.”^{2C}

The fish distribution mapping for the Salmon Creek suggests that anadromous fish use within the Salmon Creek (RM 03.83) subwatershed includes Coho salmon and winter steelhead. The SalmonScape fish distribution data also identified the known presence of fall Chinook within the mainstem of Salmon Creek. Fish passage into Cougar Creek is most likely limited due to significant grade changes within the channel near the mouth of the creek to Salmon Creek.^{2E} Improvements to water quality could contribute to increased viability of habitat for fish species in Salmon Creek.

The existing monitoring and assessment data on the Cougar Creek and Salmon Creek reaches indicate poor conditions that require multiple solutions to improve quality of stream conditions. This project is one approach to reduce stream quantity flows and improve water quality by educating the public about stormwater pollution while increasing forest cover throughout the upland areas of the watershed.

¹ https://www.clark.wa.gov/sites/all/files/environmental-services/Stormwater/Main%20documents/2010_WatershedReport.pdf

² <https://www.clark.wa.gov/sites/all/files/environmental-services/Stormwater/Main%20documents/SC%200383%20SNAP%20report.pdf>; B-page 32; C-page 132; D- page 34; E-page 140

The project outcome of urban canopy restoration has a direct improvement on water quality and hydrology. "The [historical] forest system [in western Washington] provided protection by intercepting rainfall in the canopy, reducing the possibility of erosion and the deposition of sediment in waterways. The trees and other vegetative cover evapotranspired at least 40% of the rainfall."³ The Washington Department of Ecology *Stormwater Management Manual for Western Washington* includes specific credits for tree planting in development projects to encourage restoration of the urban tree canopy.⁴ That concept can be used to provide a direct link between tree planting and stream benefits. LID BMP T.5.16 provides flow control credits for planted trees that meet design standards. The trees planted by the proposed project will meet the standards of the state manual equal to 50 square feet of impervious area for an evergreen tree and 20 square feet of impervious area per deciduous tree.

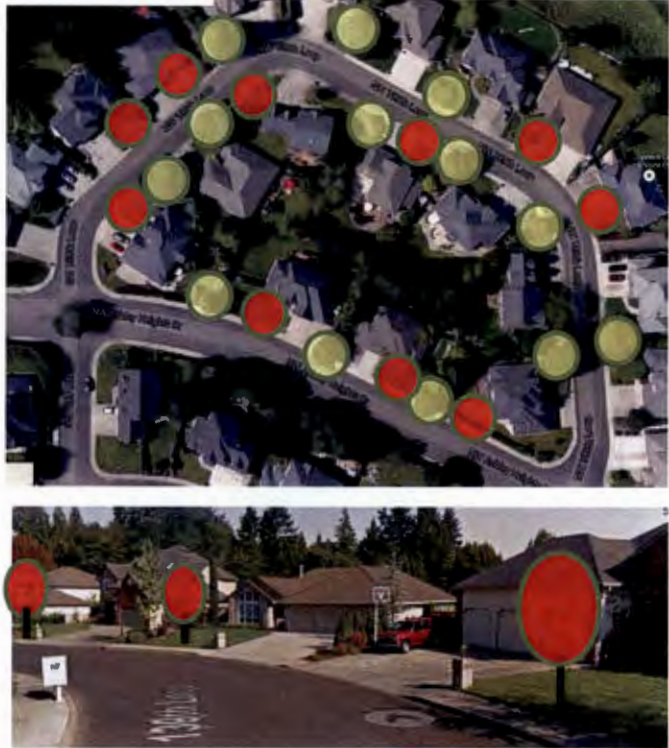


Figure 4. Example neighborhood (Felida): green= existing trees; red= potential for additional tree plantings in ROWs.

Street trees provide a wide range of economic, environmental, social and public health benefits to the communities in which they live. A healthy, street tree intercepts an average of 1,162 gallons of rainfall per year, thereby substantially reducing runoff from impervious surfaces into stormwater treatment systems or unimproved discharge systems.⁵ The addition of 500 new street trees to the West Hazel Dell, Felida, and Salmon Creek Neighborhoods as proposed in this project will slow the surge of stormwater runoff after storm events and increase the "pre-treatment" of over 50,000 gallons of runoff before it enters the Salmon Creek system.

A Portland, Oregon study found that a single street tree removes approximately 0.2 pounds of particulate matter from the air annually, which would amount to an increase of 100 pounds of particulates removed from the air we breathe each year under our proposal. Additionally, a mature large canopy tree can sequester upwards of 150 pounds of carbon per year⁶—potentially, 75,000 additional pounds of CO₂ removed annually from our project area. Another positive effect of shade is that when it is cast over pavement and buildings it can lower ambient temperatures by as much as 15 degrees, thereby, helping offset the accumulation of urban heat islands. Interestingly, research has shown that shaded streets last 40-60% longer than unshaded asphalt.⁷

³ <http://www.ecy.wa.gov/programs/wq/stormwater/manual.html> page 1-18

⁴ <http://www.ecy.wa.gov/programs/wq/stormwater/manual.html> page 5-27

⁵ Portland's Green Infrastructure: Quantifying the Health, Energy, and Community Livability Benefits, 2010. <http://www.portlandoregon.gov/bes/52055>

⁶ iTree software report, 2016. <https://www.itreetools.org/>

⁷ Burden, D. "22 Benefits of Urban Street Trees." Glatting Jackson and Walkable Communities, Inc., 2006. http://www.cityofsalem.net/Residents/Parks/UrbanForestry/Documents/forestry_strategic_plan.pdf

As these trees grow toward maturity, they will have a significant impact on urban heat mitigation, and given warming climate trends, it will be wise to plant trees now to allow full establishment before “normal” temperatures rise to levels that increase stress on young trees which could impact their ability to provide maximum benefits. Although, the gains from this green infrastructure investment will take time to mature, the benefits provided will continue to grow over time, delivering many decades worth of valuable environmental services to the community.

4. Project Goals and Objectives.

A. What are your project’s goals?

Goal 1- Restoration: The Urban Tree Canopy Restoration (UTCR) project will increase the number of trees in the Cougar Creek watershed and lower reach of the Salmon Creek watershed by adding trees throughout the neighborhoods in the street rights-of-way. The program will work to increase the overall tree canopy to add shade to the watershed, increase rainwater interception rates and evapotranspiration rates as well as increase infiltration capacity in the watershed.

Goal 2 – Outreach and Education: The UTCR will engage citizens and homeowners in stewardship and educational activities to learn about the values of trees in their watershed and plant trees in their neighborhoods. Residents will be the maintenance stewards of the trees in front of their homes, businesses or schools. This project will increase their awareness of trees in the watershed and influence their behavior by directly participating in tree plantings throughout their neighborhood.

Goal 3 – Partnerships: The UTCR will leverage partnerships to efficiently and effectively utilize resources to plant the maximum number of trees possible while reaching out to a diverse audience. The Friends of Trees is a regional partner with a long track record of successfully engaging citizens and business partners, while working in cooperation with local jurisdictions.⁸ Other partners sought for this project could include the neighborhood associations, local business sponsors and schools.

B. What are your project’s objectives?

Objective 1 – Restoration:

- a. For Phase 1, develop a three-year contract with Friends of Trees (FOT) as primary partner in coordination the UTCR. Clark County will serve as the grant coordinator and project manager with the various partners and key stakeholders. FOT will be the primary lead for tree selection and procurement, planting events and volunteer coordination.
- b. Host at least one event each planting season in the project area. FOT will coordinate with neighbors, businesses and community partners to identify tree locations, trainings, event logistics, etc. Target two events in years 2 and 3.
- c. Planting events should plant 50-100 trees. The project area is approximately 9.78 square miles (6,258 acres). The project will plant up to 500 large canopy trees over the course of the three years. Assuming the mature tree canopy coverage is 1,256 square feet a tree, this project will generate 14.42 acres of new tree canopy.
- d. Develop a relationship with each neighbor for on-going stewardship and maintenance for the trees.
- e. Develop reporting on program success for Phase 1 and develop recommendations for future phases of the UTCR.

Objective 2 – Community Awareness:

- a. Work with FOT to develop overall outreach plan for the UTCR. Plan will cover three years, with an annual update to refine the plan. The plan will look at multiple outreach tools to educate the

⁸ <http://www.friendsoftrees.org/>

project area residents about the Friends of Trees and the project. Outreach tools will build upon successful efforts by FOT, including billboards, new media information, targeted fliers, and local signage.

- b. Provide annual train-the-trainer workshop for tree planting crew leaders to prepare them to plant properly and to work with volunteers at the planting events. Target 20 volunteers for each workshop. Also provide training for summer inspector volunteers (target 5 for each summer).
- c. Develop overall marketing and outreach messaging for extending FOT planting services to Clark County neighborhoods, as well as each planting event. Include messaging related to UTCR project, values of trees in our community and watershed, stewardship, etc.
- d. Reach out to a variety of audiences for volunteer base, including neighbors, businesses, schools, faith-based organizations, etc. Event recruitment goal of 50-100 volunteers/event at 4 hours of service each for a total of 200-400 hours/event. Set a target for 65 planters and 2 neighborhood coordinators for each event, in addition to the crew leaders.
- e. Coordinate press release information with neighborhood associations, local newspaper/TV coverage, advertisements, billboards, etc. Work with Clark County Green Neighbors program to connect messaging to various programs and audiences.
- f. Measure success of the project, including pre-post questionnaires of participants on basic watershed information and the roles of trees in the watershed. Participants will be surveyed after follow-up inspection visits, via mailers for on-line surveys. Each year's data will influence the next year's planning efforts.

Objective 3 – Partnerships:

- a. Contract with Friends of Trees as primary contractor to coordinate work plan, including neighbor canvassing, arborist specialist for plant selection and site reviews, host train-the-trainer workshop, planting event coordination and outreach coordination.
- b. Reach out to local businesses for partnership opportunities, including workshop/event hosting site, business sponsorship for events, donations, volunteer community engagement, etc. Work with Clark County's Green Businesses for potential partnerships.
- c. Coordinate with Neighborhood Associations for outreach and seeking interested citizens to participate in UTCR project.
- d. Work with local schools, school programs and clubs to identify interested students for community service hours. Also, contact local scout troops would like to participate in the program. Utilize Clark County volunteer coordination to support outreach to volunteers.

C. What are the uncertainties and constraints that could impact whether you achieve your objectives?

Possible challenges include finding willing project participants to have trees in front of their house/business and who are willing provide on-going maintenance. Other challenges include on-going maintenance to ensure the viability of the plants beyond initial plantings, especially during dry conditions when the plants are most vulnerable.

Developing a strong work plan will be the key to minimizing constraints, uncertainties and project surprises. Phase 1 is meant to be a pilot three-year project so that adjustments can be made each year, based on lessons learned from each event. It is the goal that by the end of Phase 1, Clark County and its partners will have a reasonably strong foundation to continue seeking funding and growth in the UTCR program. Uncertainties can be expected in any project and open communication amongst the project team will be key to identifying problems and finding reasonable solutions as quickly as possible.

5. Project Details.

A. Provide a narrative description of your proposed project.

The Friends of Trees (FOT) Urban Tree Canopy Restoration project coordinates the planting of street and yard trees within selected neighborhoods during a community planting day. FOT will conduct targeted outreach including mailings and door-to-door canvassing to encourage residents to purchase low cost trees for their yards or along adjacent rights-of way. To make signing up and tree selection fast and convenient, FOT have developed an easy to use, online store where people can browse trees, sign-up to get trees, and learn how to get involved. "Treecipients" and other volunteers contribute to the planting event by participating on planting crews, assisting with morning set-up activities, providing food for the post-planting potluck lunch, or helping to inspect newly planted trees during their first summer season in the ground—to name just a few of the volunteer roles. Regardless of ability or income, FOT does not turn interested folks away from planting; FOT strives to include as many community members as possible in growing resilient urban forests across our region.

On event day, Crew Leaders trained in proper planting technique and volunteer management provide guidance and leadership to volunteers as they plant about 10 trees on nearby properties. Treecipients are assigned to the crew that will be planting their trees to facilitate nearby neighbors meeting and working together to improve their "neck of the woods." After a morning of planting and making new friends, volunteers are welcomed back to the staging site for a hot lunch of soup, stew, chili and other homemade dishes. As a follow up, FOT sends watering reminder emails and postcards to those who have received trees for 3 years, and coordinates neighborhood volunteers to help keep an eye on the well-being of the newly planted trees by inspecting and leaving a feedback doorhanger twice during a tree's first summer in the ground. Trees are guaranteed for one year after planting in cases of failure due to improper planting or bad stock. Given the technical expertise and education strategy, FOT is very proud to report a 94% or better survival rate for all trees planted through its Neighborhood Trees program.

B. Provide a scope of work.

No.	Task	Responsibility	Time Period
1	Contract finalization with LCFRB	Clark County (CC)	August 2016
2	Develop outreach plan/ marketing strategy	CC and Friends of Trees (FOT)	Fall 2016
3	Organize planting event (including canvassing/targeted outreach, trees/procurement/delivery, hole digging, event coordination, etc.)	FOT	Fall / Winter 2016
4	Host volunteer crew leader training	FOT	November 2016
5	Host volunteer planting event	FOT / CC	Spring 2017
6	Document and develop reporting for event(s)	FOT / CC	Spring 2017
7	Continue marketing efforts for future event(s)	FOT	Summer/Fall 2017
8	Host volunteer crew leader training	FOT	Fall 2017
9	Host volunteer planting event (2)	FOT / CC	Fall 2017-Spring 2018
10	Document and develop reporting for events	FOT / CC	Spring 2018
11	Continue marketing efforts for future event(s)	FOT	Summer/Fall 2018
12	Host volunteer crew leader training	FOT	Fall 2018
13	Host volunteer planting event (2)	FOT / CC	Fall 2018-Spring 2019
14	Document and develop reporting for events	FOT / CC	Spring 2019
15	Final grant reporting and close-out	CC	Summer 2019

C. Is the project scalable?

Yes, the project can be scaled to meet available funding. We would like to keep the contract with FOT for three-years so that we can manage staffing expectations, provide the planting follow-up with “treecipient” and build for on-going program success. We can aim to plant fewer trees to some extent or target a smaller project area as needed. Ensuring the viability of the tree plantings is crucial in the first three years of the planting so a long-term commitment with FOT will be essential.

D. Explain how you determined your cost estimates.

Friends of Trees has significant experience with tree planting projects in Portland, Vancouver and Salem. Their cost estimates are inclusive of all necessary materials, supplies, marketing, volunteer recruitment, trainings, event logistics and trees. Clark County will work with Friends of Trees to support outreach effort, GIS mapping and grant administration, which will be matching funds to the grant work by Friends of Trees.

E. Describe your preferred approach for achieving your project’s objectives and the alternatives you considered.

The preferred project approach is based on the success that Friends of Trees (FOT) has had in other communities and learning from their experience how best to apply this type of project in our community. Identifying neighborhoods in the urban area in the key watersheds is critical to the success of the project.

Neighborhood Associations (NHA) in Phase 1 have a long track record of working with the county on community based projects and involving a large base of citizens. The target NHAs have active board members, regular community newsletters and numerous projects in their neighborhood. Clark County has had a staff person from the Public Information Office work as a liaison to the neighborhoods for many years with the goal to maintain positive and proactive conversations with the neighbors.⁹

Clark County will work closely with FOT to apply and adapt the Neighborhood Trees planting approach to our community.¹⁰ Clark County staff will coordinate with all appropriate regulatory agencies and stakeholders to ensure the selected tree planting locations meet all regulatory requirements. The Friends of Trees team of certified arborists will ensure that planting locations are appropriate for species type based on soil, light, and site specific conditions.

F. How have lessons learned from completed projects or existing studies and monitoring data informed your project?

The data results and trends analysis for Cougar and lower Salmon Creeks monitoring clearly indicate a multi-prong approach will be required to address the health of the watershed and the creeks. Clark County is addressing some of the issues currently through local business technical assistance to identify pollution through source control Best Management Practices. On-going storm sewer system inspections and maintenance play a role as well as targeted capital projects to address treatment and flow control.

The UTCR project is an added element for stormwater protection by addressing the issue where it starts, by capturing and using rain water before it has a chance to enter the storm sewer system. Many studies have indicated the value of increasing urban tree canopy to intercept rain, increase evapotranspiration, increase infiltration capacity, etc. The City of Vancouver’s urban area had an 18.6%

⁹ <https://www.clark.wa.gov/public-information-outreach/neighborhood-outreach-program>

¹⁰ <http://www.friendsoftrees.org/plant/neighborhood-trees>

tree canopy cover in 2010, well below their target of 28%.¹¹ This equates to adding approximately 176,312 medium sized mature trees (30-ft crown diameter) needed to meet their target goal. In the city of Vancouver, the Friends of Trees has planted 565 trees in 2015-2016 (an 18% increase from their 2014-2015 volunteer planting season). Their plantings have included over 500 volunteers per planting season and leveraged local grants, sponsors and partnerships. The survival rate for their tree plantings is over 94%!

While Clark County has not completed an urban wide Urban Tree Canopy Assessment per se, the various subwatershed studies have documented the limited forest cover in most areas. Initiating a project to restore canopy cover can be one of the key elements in the upland areas of the watersheds to address water quality. For example, it is estimated that a 12" diameter deciduous tree, like a maple, could intercept over 900 gallons of water in one year.¹² There are numerous other benefits for adding trees including improved air quality, increased property values, providing shade and wildlife value, improved aesthetics and mental health benefits.

G. Describe the long-term stewardship and maintenance needed to sustain the project's benefits?

Friends of Trees street trees have a high rate of survival due in large part to the organization's sustained outreach with "treecipients" regarding establishment tree care needs. In the first summer after planting, FOT street trees have consistently enjoyed a 94%+ rate of survival, and after 6 years in the ground still maintain an 84% survival rating. FOT has found that after year 3, mortality tapers drastically and only a very small percentage of trees (<1%) are lost in succeeding years.

Each "treecipient" is responsible for the purchase, selection, and maintenance of their tree with help and guidance from FOT. FOT sends watering reminder emails and postcards to those who have received trees for 3 years, and coordinates Summer Tree Inspector volunteers to help keep an eye on the well-being of the newly planted trees. Volunteer tree inspectors visit and assess each tree twice during its first summer in the ground and leave a feedback doorhanger. FOT also guarantee trees for one year after planting in cases of failure due to improper planting or bad stock.

6. Context within local Stormwater and/or other Plans.

A. Discuss how this project fits within or work to implement the strategies of existing stormwater and/or other relevant plans for reducing or eliminating the negative effects of stormwater runoff.

WRIA 28 Watershed Management Plan (2008)

Page 4-48 discusses a number of tools that could be used to moderate surface water flows in the Salmon Creek, including "Plant trees to restore ground water recharge and baseflow...."¹³

The plan also lists target priorities for watersheds including (Table 5-3): 2nd Priority is Salmon Creek due to 1) Significant development anticipated; 2) Water quality threatens listed salmon species; and, 3) Potential human health impacts from contact recreation.^{4A}

In Table 7-5 Habitat actions for the Salmon Creek Basin, one of the priorities states: "***Salm 6. Within authorities, increase technical assistance to landowners and increase landowner participation in conservation programs that protect and restore habitat and habitat-forming processes. Includes***

¹¹ CITY OF VANCOUVER URBAN TREE CANOPY ASSESSMENT, SEPTEMBER 2011 (page iii)
http://www.cityofvancouver.us/sites/default/files/fileattachments/public_works/page/1389/canopy_report.pdf

¹² Tree Benefit Calculator. <http://www.treebenefits.com/calculator/ReturnValues.cfm?climatezone=Pacific%20Northwest>

¹³ WRIA 28 Watershed Management Plan (Implementation Plan); A- page 5-11;

increasing the incentives (financial or otherwise) and increasing program marketing and outreach.”
The “Expected Biophysical Response includes: “*High: Increased landowner stewardship of habitat. Potential improvement in all factors.”*

Washington Lower Columbia Salmon Recovery and Fish & Wildlife Subbasin Plan (May 2010)¹⁴

M.1.1 Key Priorities (page 5) states 7 priorities to affect recovery and mitigation of the Salmon Creek Basin. The plan discusses actions to “protect watershed processes and habitat conditions” including “...much of the population growth is likely to occur in river valleys and along the major stream corridors. This growth will result in the conversion of forest, rural residential and agricultural land uses to high density residential uses, with potential impacts to habitat conditions and watershed processes. Land-use changes will provide a variety of risks to terrestrial and aquatic habitats.”

Fecal coliform and temperature / TMDL will be directly impacted by this work.

B. Explain why it is important to do this project now instead of later.

Due to the number of challenges within the Cougar Creek and lower Salmon Creek watershed basins, there needs to be multiple approaches to restore stream health. Adding tree canopy addresses both stream hydrology and water quality. Any step that the County and its partners can take to correct problems at the source would be a benefit to the watershed health. Planting trees in the upland areas can start to have an immediate effect on interception and evaporation rates. The outreach and stewardship as part of the effort can immediately broaden the dialogue about how to protect those watersheds. Every effective method of outreach can have immediate benefits by address stormwater pollution at its source, including individual properties.

C. If your project is part of a larger overall project or strategy, describe the goal of the overall strategy, explain individual sequencing steps, and which of these steps are included in this application for funding. Attach a map that illustrates how this project fits into the overall strategy, if relevant.

The Urban Tree Canopy Restoration project fits with several overall strategies to improve the health of the Salmon and Burnt Bridge Creeks. As outlined in the previously mentioned reports, various efforts are moving forward to improve water quality health, biological diversity and habitat in these creeks. Clark County is under a Phase I Municipal NPDES Stormwater Permit and has a stormwater management program to address stormwater pollutant discharges to protect and restore designated uses such as fish habitat. The city of Vancouver’s Surface Water Division is also working to improve conditions within the Burnt Bridge Creek greenway. There are numerous other agencies in our community that also work to improvement conditions such as the Salmon Creek Watershed Council, the Clark Public Utilities Stream Team, Vancouver Watershed Alliance and many others. The collective work combines to improvement the overall health of the creeks.

7. Project Proponents and Partners.

A. Describe your experience managing this type of project.

Clark County has managed numerous large scale projects during the tenure of the Clean Water Division, including large-scale capital projects and long-term stream monitoring. The project partner Friends of Trees (FOT) has been the premier community tree planting organization in southwest Washington and in Oregon’s Willamette Valley for 26 years and counting. Their mission is to bring people together to plant and care for city trees and green spaces across the Pacific Northwest through

¹⁴ http://media.wix.com/ugd/810197_1b80ee6cc5514280bc55eb19c2347434.pdf

our Neighborhood Trees and Green Spaces planting programs. FOT engage residents, students, and civic organizations in taking an active role in improving the health of their local watersheds and in creating healthier, more livable communities. So far, FOT have coordinated the planting of over 600,000 trees and native shrubs with thousands of local volunteers in 18 cities, 5 counties, and 2 states.

In Clark County, since 2003, FOT has partnered with Vancouver's Urban Forestry program to plant 4232 trees during 47 community events across the City of Vancouver using its Neighborhood Trees volunteer planting model. More recently, FOT has begun to work with the Port of Vancouver to replant 300 trees along rights-of-way along Vancouver as a way for the Port to give back to the community for trees removed for port-related development.

B. List all landowner names.

All trees are to be planted on publicly owned land. Locations could include public rights-of-way planting strips, parks, schools, etc. The project team will coordinate with land owners to ensure stewardship and maintenance agreements are completed prior to planting event days.

C. List project partners and their role and contribution to the project.

Friends of Trees will be the primary contractor to host events and coordinate tree planting. FOT will reach out to other community partners such as the neighborhood associations, homeowner's associations and local businesses to host events in the specific neighborhoods.

D. Stakeholder Outreach.

Outreach efforts - The project team will develop an overall outreach plan to bring awareness to the planting program and its goals, as well as to educate local residents on why trees are essential elements of healthy, urban environments. FOT will utilize advertising opportunities in local publications, community bulletins, area billboards, and in local businesses. The marketing effort will also include targeted outreach to neighborhood residents and businesses through mailings and direct canvassing to identify qualifying planting locations and willing property owners. Methods of outreach to recruit additional planting volunteers will include listings on FOT's public planting calendars, postings on social media, and direct recruitment through area schools and local community service outlets.

Community feedback – Clark County will contact the neighborhood association leaders as part of the project outreach.

Public opposition – There is no known opposition to this project at this time.

Safety concerns – As with any citizen stewardship program, safety is always a primary consideration. Friends of Trees requires all volunteers to sign a legal waiver acknowledging inherent risks and waiving liability against the organization, its agents, and co-sponsors. Volunteers will be asked to lift heavy objects, work next to roadways and use various tools to plant the trees. Volunteers will be working with a trained team leader who will have received all the necessary safety training. Citizens will be instructed on proper use of tools and safety near roads. Safety equipment will be available to team members as required per the task.

Supplemental Questions

A. Who is your target audience?

The target audience for this project is the general public, especially single-family residential homeowners. According to census data, in 2014 there were over 172,000 dwelling units in Clark County with 64% of those units being owner-occupied.¹⁵ Educating the general public about the general impacts of stormwater as well as impacts about impervious surfaces, pollution and stormwater treatment are requirements of the various NPDES municipal stormwater permits in our community. Educating the public about the role of trees in our community is a great avenue to touch on required education topics. Tree planting is a simple task that can be done by most people and is a tangible change that they can make. The lessons about interception, evaporation, infiltration, water uptake, erosion control and pollution control are easier to translate to their everyday life as opposed to some regional stormwater project that they may not see or understand. This type of project has a high success rate to raise awareness, but is also very likely to affect people's behavior to protect stormwater. The project goals can then translate to other properties such as private businesses, schools, faith-based facilities, etc.

B. What are the target pollutants you expect to address?

The UTCR project will target water flow primarily through interception and uptake of water as well as increasing infiltration by the roots. The addition of trees will increase shade in the urban area thereby reducing temperatures of the water reaching the waterways. The pollutants addressed will include the various pollutants in the urban areas such as zinc, fecal coliform, and bacteria.

C. What is your strategy for changing behaviors related to watershed health?

All outreach efforts will include educational messaging about the benefits of trees in the urban watershed including interception, infiltration, update and temperature cooling. By giving citizens hands-on stewardship opportunities, the affecting behavior success is greatly increased. Messaging left on the tree supports provides on going awareness to passerbys. Additional marketing tools will reach a broader audience in the project area as well as local media markets.

D. How would you define success in this outreach and/or education project?

Success is measured by a couple of parameters for this project:

1. **Number of citizens reached with messaging:** This project will have the potential to reach citizens in several ways including homeowners wishing to participate in planting a trees, volunteers who help at the events, the volunteer crew leaders as well as the general citizens who read about about the project through the various outreach messages (volunteer solicitation, workshops for volunteers, and people who read the tags on the trees after the plantings). Target number of direct participants is 410 with additional audience reached through marketing of the program.
2. **Number of trees planted:** Knowing that each tree has the potential to intercept precipitation, control erosion, provide shade and control pollution, adding trees in urban areas with limited vegetation is a targeted goal. Friends of Trees has expertise in the number of trees to be successfully planted during an event to ensure their viability and reach the maximum number of people. Total target trees to be planted for the entire project is 500.



Figure 5. Typical tree tag on all planted trees. Alternate message for Clean Water messaging is available.

¹⁵ <http://www.census.gov/quickfacts/table/PST045215/53011>

Lower Columbia Fish Recovery Board
Clark County Clean Water Restoration Fund Application Narrative and Supplemental Questions

Project Name: Downspout Disconnect Project
Primary Sponsor: Clark County Environmental Services, Clean Water Division
Project type: ☒ Restoration ☐ Design ☒ Outreach & Education

Please respond to each question individually. Do not summarize your answers collectively in essay format. Applications are limited to ten (10) pages (single sided) – *you may delete the italicized portion of the questions and the inapplicable supplemental questions to shorten the proposal.*

1. **Project Location.** *Describe the geographic location, water bodies, and the location of the project in the watershed, i.e., tributary, main stem, off-channel, etc.*

The project is located in the lower Salmon Creek watershed in the unincorporated area of Clark County, north of the City of Vancouver. Salmon Creek is included in Water Resource Inventory Area 28. The project will focus on two subwatersheds: Cougar Creek and Salmon Creek (r.m. 03.83). Cougar Creek is a major tributary to lower Salmon Creek, while the Salmon Creek (r.m. 03.83) subwatershed encompasses Suds Creek, Tenny Creek, Lalonde Creek, and several other smaller tributaries.

2. **Brief Project Summary.** *Summarize your project in a few sentences (1200 characters).*

The Downspout Disconnect Project will provide financial incentives and technical assistance to homeowners to disconnect existing roof downspouts from the county's Municipal Separate Storm Sewer System (MS4). Roof drainage contributes significant volumes of stormwater to many Clark County streams where downspouts are piped directly to the curb. Disconnecting these systems and infiltrating the water on-site reduces flow and water quality impacts to streams, especially in older developed areas where stormwater treatment and flow control facilities are limited or nonexistent.

The project will determine priority drainage areas within the Cougar Creek and Salmon Creek (r.m. 03.83) subwatersheds, then identify subdivisions with connected downspouts within those priority drainages. Outreach will direct homeowners to a web site that describes the project and offers technical assistance to interested property owners. Sixty (60) dollars per disconnected downspout will be reimbursed to each landowner upon successful and documented disconnection of each downspout.



Figure 1. Cougar Creek and Salmon Creek (r.m. 03.83) subwatersheds, Clark County WA.

3. **Problems Statement.** *Describe the specific stormwater impacts or problems your project seeks to address. Describe the current project site, reach, and watershed conditions and how they are affected by stormwater inputs. Describe how those conditions impact watershed health. Include current and historical factors important to understanding the problem.*

Cougar Creek and the streams within the Salmon Creek (r.m. 03.83) subwatershed are among the most heavily developed areas in Clark County. The project subwatersheds have impervious surfaces covering approximately 50 percent of their area, while only about 10 percent remains forested. Stream channels show obvious evidence of erosion from increased stormwater volumes, and many streams have degraded water quality. The county's most recent comprehensive Stream Health Report (2010) found poor water quality, depressed biological health, and severe flow impacts in Cougar Creek. The mainstem of lower Salmon Creek was in fair condition; however, many of the small tributaries within subwatershed 03.83 show impacts similar to those in Cougar Creek.

The project area is subject to several state Water Cleanup Plans (TMDLs), due to high fecal coliform bacteria levels, elevated stream temperatures, and excessive turbidity. A Clark County study in 2007 found widespread fecal coliform contamination continues in lower Salmon Creek tributaries.

Salmon Creek is used by Coho salmon and winter steelhead, and sustains a limited fishery. The watershed is a medium priority for regional fish recovery, comprised of primarily Tier 3 and Tier 4 reaches. Cougar Creek and Tenny Creek (a tributary in the r.m.03.83 subwatershed), although blocked by natural barriers to anadromous fish, are among the coldest tributaries in the Salmon Creek watershed, providing important cool-water inputs to the mainstem during summer. Flashy stormwater flows and limited infiltration pose a threat to these cool-water inputs by limiting the amount of groundwater available to sustain summer flows.

Installing retrofits to improve stormwater treatment or flow control is challenging in heavily developed areas due to lack of space and high costs. In many cases, the best available option is to prevent stormwater from entering the MS4 in the first place. The 2010 Stream Health Report and the Stormwater Needs Assessment Program (SNAP) report for Cougar Creek/Salmon Creek (r.m. 03.83) suggest increasing infiltration of storm runoff and working with property owners to eliminate pollution sources are among the most beneficial strategies for improving watershed health in Salmon Creek.

Downspout disconnection addresses both of these strategies. Assuming an average roof size of 1500 square feet and average rainfall of 40 inches per year, each disconnected house can remove approximately 5000 cubic feet of stormwater from the system annually. This 37,000 gallons per house adds up to an acre-foot of infiltrated stormwater for every ten houses disconnected. This infiltrated roof runoff returns to the creeks as base flow that will improve summer low flows. Roofs can also be significant contributors of fecal coliform from bird feces, which contain high levels of these bacteria compared to many other animal wastes. Stormwater that is added to streets through direct connection can also wash oils, greases, debris and other contaminants into the MS4.

4. Project Goals and Objectives.

A. What are your project's goals?

- 1) *Reduce stormwater volumes discharged to lower Salmon Creek tributaries.*
- 2) *Improve water quality in areas subject to the Salmon Creek bacteria Water Cleanup Plan.*
- 3) *Increase summer base flows.*
- 4) *Promote citizen stewardship and understanding of stormwater impacts.*

B. What are your project's objectives?

- i. *Reduce stormwater volumes and pollutants discharged to lower Salmon Creek tributaries by disconnecting 400 downspouts (~100 homes) currently discharging to the county's MS4.*
- ii. *Provide technical assistance for up to 80 homeowners to select and design disconnection alternatives, including splash blocks, drywells, and rain gardens.*

C. What are the uncertainties and constraints that could impact whether you achieve your objectives?

There are two primary areas of uncertainty in this project. First is the uncertainty of finding sufficient locations where downspout disconnection is feasible. Second is the willingness of landowners to commit to the project.

In the first case, the geographic scope of the project may be adjusted to encompass areas with additional suitable locations. The Lakeshore subwatershed draining toward Vancouver Lake and Lake River is a likely candidate, as well as areas in upper Curtin Creek and Whipple Creek. The second issue is less easily solved; however, the project would consider increasing the per-downspout financial incentive and/or sponsoring neighborhood meetings to discuss the project and solicit buy-in from additional landowners in targeted areas.

5. Project Details. Please answer the questions below and all pertinent supplemental questions at the end of the application form.

A. Provide a narrative description of your proposed project.

The Downspout Disconnect Project is a two-year, pilot-scale effort to develop and implement a disconnection program in Clark County. The scope is intended to be scalable within the current grant submittal, and expandable into an ongoing programmatic activity if public interest and success rate are favorable.

Project elements include planning, marketing, technical assistance, confirmation, and reimbursement. Each element is described briefly below.

Planning:

Planning will begin with GIS analysis of existing Clark County datasets to select candidate drainage areas within the target subwatersheds. Subdivisions with connected downspouts will be identified through GIS and field verification. Candidate subdivisions will be evaluated for feasibility of successful disconnection based on soil type, lot size, and infiltration potential.

Marketing and Outreach:

Homeowners in priority subdivisions will be contacted initially via mailer inviting participation in the project. Information will be patterned after existing disconnection programs in Portland and Gresham, OR, and will include steps to disconnecting, materials lists, safety considerations, and contact information for technical assistance. A map of eligible areas will be provided on the county's website, along with electronic versions of program materials. Outreach will include existing resources such as neighborhood association connections (newsletters and meetings), social media, temporary yard signs, and programs such as Green Neighbors.

Technical assistance:

Technical assistance will be provided, on request, to assess site conditions, design options and safety considerations. Clark County staff will provide technical assistance for up to 40 homeowners. Clark Conservation District will partner on this project and provide technical assistance visits for up to an additional 40 homeowners.

Confirmation:

Regardless of whether technical assistance is provided, Clark County staff will conduct a site visit to confirm disconnection has been properly completed before authorizing reimbursement.

Reimbursement:

For each confirmed disconnected downspout, the project will reimburse the homeowner \$60. Reimbursements will be administered by Clark Conservation District, which has the capacity to directly reimburse landowners for conservation work.

- B. Provide a scope of work. Provide a detailed description of the proposed project tasks, who will be responsible for each, what the project deliverables will be, and a schedule for accomplishing them.*

Task A. Planning

This task will include:

- Identify candidate drainage areas within Cougar Creek and Salmon Creek (rm. 03.83) subwatersheds. Using the county's existing L7StmCatchments GIS layer, select drainage catchments lacking flow control facilities, water quality treatment facilities, or both. Priority will be given to catchments lacking both, followed by those lacking flow control or water quality treatment, in that order.
- Identify candidate subdivisions within the priority catchments. Using the county's existing subdivision GIS layer, select subdivisions constructed prior to 2000. Development prior to 2000 was more likely to include roof drains connected to the MS4 through direct piping or weep holes at the curb.
- Field verify candidate subdivisions. Staff will visit each candidate subdivision to confirm the presence of connected downspouts; in some cases this may be accomplished through street-view reconnaissance using Google Maps or other suitable applications.
- Evaluate subdivisions for feasibility of disconnection. Using the county's existing soils and tax lot GIS layers, along with infiltration potential maps from the Public Works design section, rank subdivisions as feasible or infeasible. Soil types in the county's SG1, SG2, and SG3 categories, and with sufficient depth to groundwater (10 feet or greater) are likely suitable for downspout disconnection. Larger lot sizes allow for more area to disperse and

infiltrate water without infringing on neighboring properties. At minimum, candidate lots must have sufficient space to comply with program guidelines from Portland and Gresham.

- Generate mailing list for all tax lots within areas where disconnection appears feasible.

Deliverables

- Map of prioritized candidate subdivisions
- Mailing list

Task B. Marketing

This task will include:

- Develop project outreach plan and supporting documents based on materials from similar projects in Portland and Gresham, OR. Documents will include design guidelines, safety considerations, material lists, potential suppliers, etc.
- Technical assistance forms to be used on site while meeting with homeowners to document site specific conditions and considerations
- Develop project application form
- Develop marketing brochure promoting the project
- Create page on the county Clean Water website containing map of the project area, application materials, and supporting documents.
- Contact up to 800 landowners in candidate subdivisions via mailer, inviting participation in the project

Deliverables

- Project outreach plan
- Web page
- Application form
- Project guidance and supporting documents
- Marketing mailer

Task C. Technical Assistance

This task will include:

- Confirm participation by individual homeowners in the project and complete landowner agreement forms.
- On request, staff provide up to 4 hours of on-site evaluation and technical assistance for up to 80 homeowners. Clark County staff and Clark Conservation District staff provide technical assistance for up to 40 homeowners each. Technical assistance may include site assessment (e.g. safety, feasibility, etc.), measurements, design options, and advice on obtaining materials.

Deliverables

- Documentation of on-site visits on site assessment forms

Task D. Confirmation

This task will include:

- County staff will visit each participating property to confirm correct and functional disconnection
- Confirmation is required prior to issuing landowner reimbursement

Deliverables

- Documentation of on-site visits – project completion forms

Task E. Reimbursement

This task will include:

- Upon confirmation of disconnection, issue payment of \$60 per eligible downspout to participating homeowners
- All reimbursements administered through Clark Conservation District

Deliverables

- Documentation of payments

Task F. Project Documentation

This task will include:

- Document project tasks, including completion of outreach plan, marketing, technical visits, follow up visits (including homeowner assessment) and reimbursements
- Develop project analysis and recommendations for future phases.

Deliverables

- Final project report

Project Schedule

Year 1:	Task A:	October 2016 – March 2017
	Task B/Task C:	April 2017 – August 2017
	Task D/Task E:	June 2017 – October 2017
Year 2:	Task A:	October 2017 – March 2018
	Task B/Task C:	April 2018 – June 2018
	Task D/Task E:	May 2018 – August 2018
	Task F:	August 2018 – October 2018 (project end)

- C. **Is the project scalable?** *Can your project be scaled back in the event that full funding is not available, or expanded if additional funding becomes available?*

The project is scalable; increase or decrease in funding will affect the total number of homeowners contacted and the number of downspouts that can potentially be disconnected.

D. Explain how you determined your cost estimates.

See attached budget spreadsheet. Project costs are limited to staff labor, mailings, outreach materials and landowner incentive reimbursements.

E. Describe your preferred approach for achieving your project's objectives and the alternatives you considered. Why did you choose your preferred alternative?

There are numerous neighborhoods that were designed with downspouts directly or indirectly connected to the MS4 with no opportunity to infiltrate into the ground. This project will address a primary concern related to flow reduction in heavily urbanized watersheds of Salmon Creek (see images attached).

F. How have lessons learned from completed projects or existing studies and monitoring data informed your project? Sources of results may be from individual sponsors, lessons learned from previously implemented projects, stormwater plans, technical reports or other sources.

The proposed project builds on a large body of monitoring and studies in the Salmon Creek watershed and its lower tributaries. Clark County reports such as the Stormwater Needs Assessment Program (SNAP), 2010 Stream Health Report, and focused evaluations of fecal coliform bacteria provide quantitative results and recommendations for how to improve stream health. Downspout disconnection can be another in a series of steps taken by Clark County and other local stakeholders to respond to these identified needs, implement Ecology's Salmon Creek fecal coliform Water Cleanup Plan, and support the objectives of Clark County's Stormwater Management Plan.

The County's work in pollution source control, illicit discharge detection and elimination, and stormwater capital construction has found top-down approaches to reducing stormwater impacts are often the most cost-effective. Reducing pollutants at the source is often easier than removing them after they enter runoff. The County has also recognized the value of on-site retrofits in heavily developed areas where large-scale stormwater projects are infeasible due to cost or space constraints.

G. Describe the long-term stewardship and maintenance needed to sustain the project's benefits?

Participating landowners will be responsible for the long-term maintenance of disconnected systems. Maintenance needs will depend on the selected method. Splash blocks require little to no maintenance, while drywells or infiltration trenches may require periodic removal of leaf litter or sediment. Rain gardens require a higher level of attention to maintain plant health and aesthetic appeal. There is no on-going monitoring component for this project.

6. Context within local Stormwater and/or other Plans.

- A. Discuss how this project fits within or work to implement the strategies of existing stormwater and/or other relevant plans for reducing or eliminating the negative effects of stormwater runoff. (*i.e., addresses a priority action, occurs in a priority area, or targets a priority fish species*).**

This project directly supports the underlying goals of the County's Stormwater Management Plan, the findings of the 2010 Stream Health Report, and the recommendations of the Stormwater Needs Assessment Program to protect local water resources from degradation due to stormwater. The project also directly benefits local implementation of the Salmon Creek Fecal Coliform TMDL by specifically targeting removal of runoff likely to be carrying bacteria from roofs to streams.

The Salmon Creek Basin Water Resources Management Plan (1996) and Salmon Creek Watershed Assessment (2002) established instream flow targets and made recommendations regarding protection of fish habitat components. The 2002 Watershed Assessment noted stormwater runoff had increased 40 percent since predevelopment. Instream flow recommendations focused on actions to maintain flows during summer low flow periods and reduce peak flows during storm events.

Downspout disconnection is not a required activity under the NPDES Municipal Stormwater Permit; however, as an additional activity beyond the permit mandates, this project can address stormwater flow reduction, groundwater recharge, and water quality improvements in places that no regulated program activity is able to reach cost-effectively. The project is focused on some of Clark County's most heavily developed and stormwater-impacted areas, as evidenced by poor stream health scores, eroded channels, and water quality degradation.

- B. Explain why it is important to do this project now instead of later. (*Consider its sequence relative to other needs in the watershed and the current level and imminence of risk to watershed health. Are there other actions or constraints that need to be addressed first, before desired outcomes can be fully achieved?*).**

The benefits of this project are independent of other watershed actions. There is no mandate to perform this work and delay of this project would not cause harm to other efforts. However, as this project helps address ongoing, chronic watershed impacts with known detrimental effects, and fills an unmet need for additional programs to address stormwater at its source, it is reasonable to prioritize downspout disconnects sooner than later.

- C. If your project is part of a larger overall project or strategy, describe the goal of the overall strategy, explain individual sequencing steps, and which of these steps are included in this application for funding. Attach a map that illustrates how this project fits into the overall strategy, if relevant. **NA****

7. Project Proponents and Partners. *Please answer the following questions about your organization and others involved in the project.*

- A. Describe your experience managing this type of project.** *Please describe other projects where you have successfully used a similar approach.*

Clark County routinely manages successful capital, restoration, and public involvement projects in the course of implementing our Stormwater Management Plan under the NPDES Phase I Municipal Stormwater Permit. The County employs experienced technical assistance staff with extensive stormwater knowledge and a record of successful collaborations with private landowners. Our GIS resources and web capabilities are substantial and well-developed, and outreach staff have extensive experience developing high-quality marketing materials for County projects.

- B. List all landowner names.**

Participating landowners will be determined during project planning and marketing. Per the grant requirements, each participating landowner will be required to sign an agreement to maintain the disconnection of downspouts for a period of ten years.

- C. List project partners and their role and contribution to the project.** *Attach a Partner Contribution Form from each partner (obtain from LCFRB).*

Clark Conservation District will partner with the County on this project. District involvement in the project includes:

- District staff will administer the reimbursement of funds to participating private landowners
- District staff will provide technical assistance to reach an additional 40 landowners beyond the 40 visits to be provided by the County

The County will provide referrals to the District for landowners who wish to install rain gardens and may be able to apply for District cost-sharing for this more costly disconnection option.

- D. Stakeholder Outreach.**

Public outreach is limited to targeted marketing focused on homeowners in candidate areas. There are no public safety concerns with the project; however, private property damage can be a concern if disconnected downspouts cause flooding of neighboring lands or buildings. The risk of property damage will be addressed through following proper setbacks and site evaluations per the guidelines from well-established nearby programs. County staff will also inspect each disconnection for safety and proper implementation prior to landowner reimbursement.

Supplemental Questions

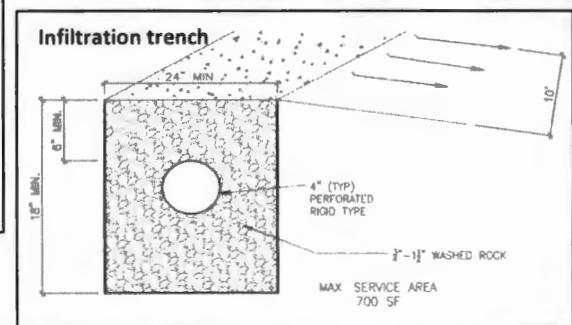
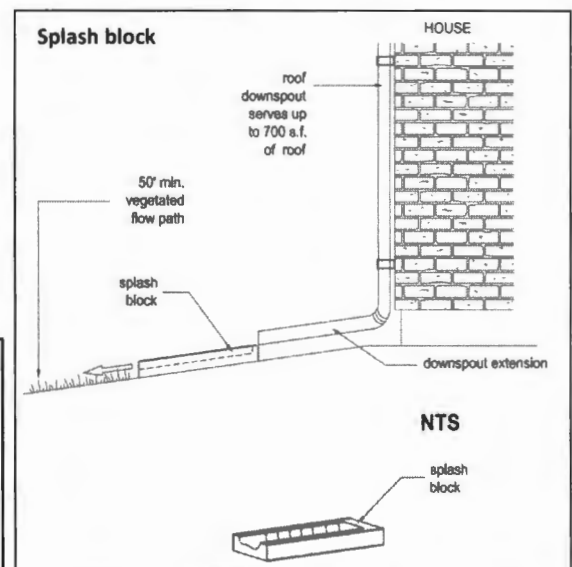
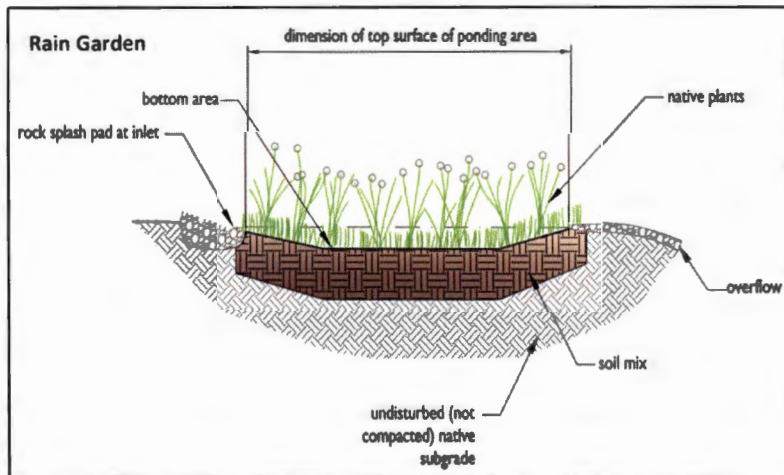
Restoration and Design Project

Answer the following supplemental questions (these are not included in the ten-page limit):

This project includes elements of both Restoration and Outreach. Responses are provided as applicable in each section.

- A. Will you complete, or have you already completed, a preliminary design, final design, and design report before construction?
1. If no, please describe your design process and list all pre-construction deliverables you will submit to LCFRB for review. *Including riparian planting plans.*

Disconnection and routing of water to splash blocks is anticipated to be the most common design; standard drawings from the **2015 Clark County Stormwater Manual** and existing guidance from Portland and Gresham, OR will be provided. The Stormwater Manual also includes designs and guidelines for dispersion trenches, on-site drywells and rain gardens. Examples of some typical design drawings are shown here.



Figures 2, 3 and 4. Examples of improvements for disconnections: rain garden, splash block and infiltration trench.

- B. Will your project be designed by a licensed professional engineer?
1. If not, please describe the qualifications of your design team.

Downspout disconnection typically will not require additional design by a licensed professional engineer. County technical assistance staff utilized for this project are experienced in stormwater requirements and drainage issues. A professional stormwater

engineer is available on staff to provide higher level review of complex drainage situations and answer questions regarding the feasibility or safety of disconnection at challenging sites.

- C. If this project includes measures to stabilize an eroding stream bank, explain why bank stabilization there is necessary to accomplish improved watershed health, and how the proposed design incorporates beneficial habitat elements while avoiding adverse impacts to upstream, downstream or adjacent properties? NA**
- D. Describe the steps you will take to minimize the introduction and spread of invasive species during construction and restoration. *Specifically consider how you will use un-infested materials and clean equipment entering and leaving the project area.* NA**

Supplemental Questions

Outreach/Education Project

Answer the following supplemental questions (these are not included in the ten-page limit):

This project includes elements of both Restoration and Outreach. Responses are provided as applicable in each section.

- A. Who is your target audience?** Explain why this audience is appropriate for improving watershed health by reducing the impacts of stormwater runoff.

The target audience is single-family residential homeowners in priority areas for downspout disconnection. In highly developed areas, actions taken by landowners to eliminate pollution sources and/or limit stormwater delivery to the drainage system are often the only cost-effective or feasible means of reducing impacts from existing stormwater runoff.

- B. What are the target pollutants you expect to address?**

Fecal coliform bacteria and stormwater flows.

- C. What is your strategy for changing behaviors related to watershed health?** Explain how this approach has been successful in the past by your organization or by other organizations with similar missions.

Homeowners will directly partner in this project to implement the disconnection of their downspouts into splash blocks, infiltration features or rain gardens. A side-benefit is the opportunity to engage and educate homeowners on watershed health topics beyond the immediate focus on downspout disconnection. Hands-on projects typically provide a significant opportunity to raise awareness about watershed issues as well as affect future behaviors. Clark County programs such as Green Neighbors and Canines for Clean Water have existing educational materials available for distribution, and we anticipate incorporating discussion and materials for these programs during technical assistance visits whenever appropriate.

- D. How would you define success in this outreach and/or education project?**

Success for the outreach element of this project is measured by the number of public contacts and the participation rate in the disconnection program. Success for the restoration element of this project is measured by the estimated volume of stormwater removed from the county MS4 through disconnection of downspouts.

Staff will track contacts with homeowners, number of homes identified for potential disconnection, number of homes and downspouts disconnected, and estimated stormwater volume removed from the MS4. The information will be compiled into a brief final report summarizing the pilot effort and providing recommendations for the future of the project.

Lower Columbia Fish Recovery Board
Clark County Clean Water Restoration Fund Application Narrative and Supplemental Questions

Project Name: Volunteer Stream Monitoring Project

Primary Sponsor:

Project type: ☐ Restoration

☐ Design

☒ Outreach & Education

1. **Project Location.** *Describe the geographic location, water bodies, and the location of the project.*

The Volunteer Stream Monitoring Project (VSMP) will identify stream monitoring sites throughout all available watersheds in the grant program, including Gee Creek, Flume Creek, Whipple Creek, Salmon Creek, Burnt Bridge Creek, Lacamas Creek, Little Washougal River and Vancouver Lake/Lake River. The project sites will be at publicly accessible locations on the main stem channels and tributaries in the identified watersheds.

2. **Brief Project Summary.** *Summarize your project in a few sentences (1200 characters).*

The VSMP is a hands-on stewardship project to engage citizens and educate about our local waterways, stream health characteristics and trends in stream health. The project builds on the network of successful citizen monitoring work such as the Student Watershed Monitoring Network, Critter Count and former volunteer monitoring efforts in Clark County. This proposed project includes two parts, to capture valuable stream data while engaging citizens. First, the project will create a centralized database portal for all local citizen-based stream monitoring data to be collected and used for analysis. The existing volunteer monitoring programs collect a variety of data but that data is not used beyond the school or program. Second, a series of new monitoring events will engage, inform and educate citizens about stream health while gathering basic stream health parameters. The events will include "train the trainer" workshops to create volunteer stream team leaders who lead citizen teams during monitoring events. The project will work with numerous partner agencies to share resources and maximize project success throughout the various communities.

3. **Problems Statement.**

Multiple agencies in Clark County use a variety of outreach tools to share information about the health and quality of our local waterways. This information can be correlated to activities in the watershed that could impact the creeks, streams and rivers. Water quality is important for the livability of our community, including recreation, wildlife habitat, drinking water and aesthetic values. Hands-on monitoring projects have successfully engaged citizens, including tree plantings, restoration projects and monitoring.

Several government agencies monitor Clark County stream health using scientific standards, including Clark County, City of Vancouver, and the Department of Ecology. Collectively they manage approximately 75 stream monitoring stations throughout the county. The data collected follows standards for collection, measurement and analysis to identify trends for water quality and biological health. According to the *2010 Clark County Stream Health Report*, monitoring results from the majority of urban watersheds ranked poor to fair for stream health and biological integrity, suggesting there needs to be improvements to upland activities to minimize damage to local waterways.¹



Considering that rivers and streams are dynamic and changing systems, it is difficult for any one agency to successfully monitor and observe all of them. Citizen-science stream monitoring programs have been successfully

¹ 2010 Clark County Stream Health Report. Clark County Department of Environmental Services. [Web link.](#)

utilized across the country for over 40 years to assist in understanding local stream health. According to research, "... adaptive management [strategies for stream health] include monitoring the effects of human intervention, revision of policy and management plans in the light of new learning, and consequently, increasingly local or place-based management. [Volunteer] Monitoring is seen as a way to track the constantly changing conditions of the resource and provide feedback to resource managers about the adequacy of their policy experiments (assumptions)."² This research supports that other benefits of citizen monitoring programs include social networking to share information learned during the project as well as community building. Other research supports that citizen volunteer collected data can be useful tools: "... [research] demonstrated that volunteer biological monitoring programs can provide reliable information about ecological condition, but every protocol needs to be validated by standard quantitative methods."³

By utilizing a citizen stewardship project such as stream monitoring, the general public can get hands-on experience looking at streams and the factors that affect their overall health. Streams throughout Clark County have various problems that contribute to impacts to health, including pollution, illicit connections, high storm flows and erosion as well as decreased habitat quality. Citizens can help by being watershed observers, providing key information to agencies in the event of degradation. Hands-on learning creates meaningful outreach opportunities for a broad audience while reviewing sites that are beyond agency monitoring stations.

4. Project Goals and Objectives.

A. What are your project's goals? (*Education project*)

Multiple agencies in Clark County strive to increase protection of water resources by developing a greater understanding and appreciation of water resources in our community. This project will create a citizen stewardship project that provides hands-on opportunities for the public to learn where the waterways are located, the parameters that support healthy waterways, and understand how pollution can directly impact waterways. The data that is collected can then be uploaded to a shared portal to distribute information with a variety of users.

B. What are your project's objectives? (*Education project*)

- i. **Create a centralized portal** to collect citizen stream monitoring data to make information available to users. Portal should include a database of the various monitoring parameters, web page, and mobile app to assist users in uploading data and viewing the results.
- ii. **Engage multiple partners** who manage citizen monitoring to share resources and maximize project effectiveness. The partners will form a steering committee to help develop the various aspects of the project including monitoring parameters and protocols, locations for monitoring stations, and outreach event support.
- iii. **Utilize a project coordinator to host monitoring events** that include all of the elements to successfully engage citizens in meaningful data collection and education. Events will include annual "train the trainer" workshops to have volunteer team leads to guide citizen teams at monitoring stations. The project coordinator will host one monitoring event in the first year and up to two events in years 2 and 3.
- iv. **A summary report of the project** will document the various tasks in the project along with the project outcomes. For example, number of volunteer participants, educational messaging, number of sites monitored, analysis of data collected and recommendations for upcoming project tasks. An annual

² "Volunteer Stream Monitoring and Local Participation in Natural Resource Issues" Overdevest, Orr and Stepenuck (2004). Human Ecology Review, Vol. 11, No. 2, 2004. [Web link.](#)

³ "Volunteer Biological Monitoring: Can it Accurately Assess the Ecological Condition of Streams?" Sarah R. Engel and J. Reese Voshell, Jr. AMERICAN ENTOMOLOGIST • Fall 2002, p. 164. [Web link.](#)

summary will be completed after each year of the project and will include lessons learned and adjustments to the program for each year.

C. **What are the uncertainties and constraints that could impact whether you achieve your objectives?**

There are minimal constraints known at this time. Given the variety of example volunteer stream monitoring programs throughout the country, this project can utilize examples and protocols from other successful programs and adapt to our community's needs. The program can also take into account active local monitoring projects or those that have been completed within the last 10 years.

Challenges will include finding publicly accessible monitoring sites along the various tributaries. The committee will need to consider parks, natural areas, schools and rights-of-ways that are safe for volunteers to access. Safety of the volunteer monitors is a key priority and sites will need to be accessible to small groups to get down to the stream banks.

Because this is a new project, outreach to recruit volunteers will need to be thoughtful. The volunteer base from the various partner agencies should provide a sufficient network of volunteers to initiate the project.

5. **Project Details.**

A. **Provide a narrative description of your proposed project.**

The Volunteer Stream Monitoring Project (VSMP) has two main project elements, described below:

- 1) **Volunteer Stream Monitoring Database** – a contractor will develop a package for use by the project partners. The site will be hosted on a separate server so that is accessible to the partners. A designated partner will assist with the on-going maintenance and upkeep of the site:
 - a. **Database** – The contractor will establish a database for all of the monitoring parameters that will be collected by the volunteers. The format will need to be very user-friendly. Database reports the findings in a “dashboard” system based on the parameters following within rankings for each parameter. The parameters and rankings will be based on scientific standards similar to that information collected by the government agencies. Other parameters will also be captured such as photo stations that could use hashtag (#) for uploading to the correct geo-located station, etc.
 - b. **Web page** – Clark County partners will work with the contractor to create a stand-alone web page to document the volunteer stream monitoring efforts. The web page will include descriptions of the volunteer monitoring efforts. The site will include descriptions of the monitoring parameters, watershed map information with active links to the monitoring stations (click on the link to see the dataset), volunteer success stories, partner's page, etc.
 - c. **Mobile app (application) for smart device technology** – To assist volunteers in the field, the contractor will create a mobile app to assist with the upload of real-time, geo-referenced data in the field. Similar to how iNaturalist⁴ or Creek Watch⁵ work, the app will track basic site data, such as tree cover, erosion presence, trash, water discoloration, and pictures from predetermined photo stations.
- 2) **Volunteer Monitoring events** – These events will be open to the general public of all ages, as opportunities to visit predetermined sites with small teams. Each team will be led by a trained volunteer. The project committee will support the monitoring events at a base station to welcome volunteers and provide the materials for the event.

⁴ <http://www.inaturalist.org/>

⁵ “A Picture Saves 1,000 Streams – Water Quality Monitoring on Your Smartphone” SciStarter blog. Melinda T. Hough September 9th, 2013. [Web link.](#)

Lower Columbia Fish Recovery Board

Clark County Clean Water Restoration Fund Application Narrative and Supplemental Questions

- a. **Train the trainer volunteers** – Interested volunteers will be trained to lead volunteer teams in the field. These Stream Team lead volunteers will take a specialized volunteer workshop to learn about safety for the team, how to collect all of the various monitoring parameters, locations of the sites, etc. The workshop will include a classroom session as well as in-the-field training. At the end of the workshop, the volunteers will be eligible to be a Stream Team leader. These volunteers will be the in-water collectors of specimens/samples.
- b. **Volunteer Monitoring Events** – Each event will be marketed to the general public as well as student groups, scouts, faith-based organizations, corporate community service businesses, etc. Volunteers will show up at the event, be assigned to a team, enjoy snacks and then head out to monitor 2-3 pre-determined sites with a Monitoring Team leader. The volunteers will be assigned a task for their team, including note taker, specimen sorter, equipment lead, photo station lead, habitat assessor, etc. The monitoring should take less than an hour at each site. Volunteers will take hand written notes, collect water samples, macroinvertebrate samples, smart device photo, and upload specified data to the mobile monitoring app. When monitoring is complete, folks return to the base location, clean and return equipment, enjoy lunch (by sponsors), and share their observations from the day.
- 3) **Reporting of data** – Reporting from the project will include real-time data from the app (linked to a map, such as Google Maps), analysis and summary of the database and reporting of results from each event.
 - a. **Annual report** – Each year (anniversary of the contract authorization), the project committee will finalize a report that summarizes the project tasks and volunteer events. The report will summarize the data collected and share results of information.
 - b. **Final project report** – At the end of this project, the project committee will finalize a report that outlines how the project was implemented by tasks, lessons learned, recommendations for future volunteer monitoring efforts in our community and other pertinent information.

B. Provide a scope of work.

NOTE: There are two main elements for this project: A) volunteer monitoring database development; and, B) volunteer monitoring events. The schedule below reflects activities related to each with an "a" or "b."

Task	Task Description	Responsibility	Schedule	Deliverable
1	Finalize contract with LCFRB	Clark County	September 2016	
2	Steering committee of project partners establishes project coordination outline	Clark County and all partners	September – October 2016	Project outline
3a	Clark County works with steering committee to finalize scope of work for contractor to develop monitoring database, web page and mobile app	Clark County and all partners	October 2016	
3b	Project Coordinator (PC) outlines volunteer monitoring strategies, tasks, detailed schedule	Vancouver Watershed Alliance	October 2016	Volunteer monitoring outline
4a	Clark County to issue request for qualifications/bid for contractor support for database development	Clark County	November 2016	
4b	PC works w/ steering committee to establish monitoring protocols	All	October – November 2016	
5a	Clark County to issue contract to contractor for database development	Clark County	November 2016	Contract for database
5b	PC works w/ steering committee to identify potential monitoring sites	PC with all	November – December 2016	
6	PC develops and starts to obtain monitoring equipment (loan from partners & purchase new)	PC with all	December 2016 – January 2017	

Lower Columbia Fish Recovery Board
Clark County Clean Water Restoration Fund Application Narrative and Supplemental Questions

Task	Task Description	Responsibility	Schedule	Deliverable
7a	Steering committee reviews drafts of monitoring database, web page and mobile app	Clark County with all	March 2017	
7b	PC hosts "Train the Trainer" stream team lead volunteers	PC with all	March 2017	Training workshop
8a	Steering committee reviews final versions of volunteer monitoring database, web page and mobile app	Clark County with all	May 2017	Final database, web page and mobile app
8b	PC hosts volunteer monitoring day event – Each team of volunteers monitors 2-3 sites within 3-4 hour shifts	PC with all	May 2017	Volunteer event
9	PC uploads/verifies data for Event #1 data into database	PC	May – June 2017	
10	PC issues preliminary Event #1 results	PC with all	July 2017	Event #1 results
11	Adjust database, web page and mobile app based on initial run with Event #1 and close out contract	Clark County	July 2017	Complete database, web page and mobile app development
12	Steering committee reviews Event #1 and makes recommendations for improvements for Events #2 and #3	All partners	August 2017	
13	Host training workshop for other volunteer monitoring groups to upload data to new web page and database	PC with all	Fall 2017	
14	Prepare for Volunteer monitoring Event #2	PC with partners	August – September 2017	
15	Host Volunteer Event #2	PC with all	September – October 2017	Event
16	Upload data from event and analyze in database, prepare event results	PC with all	October – December 2017	Event #2 results
17	Prepare for Volunteer Monitoring Event #3	PC with all	January – March 2018	
18	Host Volunteer event #3	PC with all	April 2018	Event
19	Upload data from event and analyze in database, prepare event results	PC with all	May – July 2018	Event #3 results
20	Host training workshop for other volunteer monitoring groups to upload data to new web page and database	PC with all	Fall 2018	
21	Prepare for Volunteer Monitoring Event #4	PC with all	August – September 2018	
22	Host Volunteer event #4	PC with all	September – October 2018	Event
23	Upload data from event and analyze in database, prepare event results	PC with all	October – December 2018	Event #4 results
24	Prepare for Volunteer Monitoring Event #5	PC with all	January – March 2019	
23	Host Volunteer Monitoring Event #5	PC with all	April 2019	Event
24	Upload data from event and analyze in	PC with all	May – July 2019	Event #5

Lower Columbia Fish Recovery Board
Clark County Clean Water Restoration Fund Application Narrative and Supplemental Questions

Task	Task Description	Responsibility	Schedule	Deliverable
	database, prepare event results			results
25	Host training workshop for other volunteer monitoring groups to upload data to new web page and database	PC with all	Fall 2019	
26	Prepare final summary of project including all statistics, results and recommendations for the future of a volunteer monitoring program	All partners	December 2019	Final Project Report

C. Is the project scalable?

The project is scalable to some extent in the number of volunteer events hosted each year. The benefit of two events a year is to capture a broader audience of potential participants (spring vs. fall). If the project is to scale back, we would aim to host one event in the fall. If additional funds were available, we would recommend hosting two events each year and adding more years to the effort, to expand the available database for each site, possibly add more monitoring stations, and increase the number of participants.

D. Explain how you determined your cost estimates.

All costs for the project are based on comparable programs that have been completed by other agencies or older programs that were run in Clark County. All numbers have been updated to anticipate current costs for materials, supplies and laboratory fees, etc.

E. Describe your preferred approach for achieving your project's objectives and the alternatives you considered.

Why did you choose your preferred alternative?

The preferred approach for this effort is to maximize the value of the collective partnership, rather than an individual agency moving forward to take on this type of project. Multiple agencies are trying to reach similar audiences with similar messages. Plus, watersheds cross jurisdictional boundaries and the partners bring a wealth of experience and expertise to maximize the effectiveness of the project. Many of the partners involved have participated in some level of volunteer monitoring projects in the past or have an interest in pursuing this type of project to reach the general public with water quality messaging.

F. How have lessons learned from completed projects or existing studies and monitoring data informed your project?

Many of the project partners have participated in citizen volunteer stream monitoring in the past, including Clark County (2002-2008), Lower Columbia Estuary Partnership (2001-2007), City of Vancouver (Student Watershed Monitoring Network 1997 - present), City of Ridgefield (informal support of teams at Gee Creek). All of these programs followed similar approaches to engaging citizens and various monitoring parameters. The main lessons learned are helping to guide how this proposal is structured, including:

- 1) This effort will produce a usable resource to manage the data so that it can be viewed, analyzed and used by the various parties. Make the database simple to use and allow for ease of uploading. Some programs have attempted this in the past such as SalmonWeb and NatureMapping, so these will be reviewed to understand how they were set up and why they stopped collecting data.
- 2) In order to attract the general public, the data parameters need to be simple to collect and generally easy to understand. There will be some basic training so the cause and effect need to be straight forward (i.e. higher diversity of macroinvertebrates and sensitive species typically means better water quality as indicators). Calculating channel shape and its impact may be better suited to college level projects as opposed to the general public.

G. Describe the long-term stewardship and maintenance needed to sustain the project's benefits?

Once the project is established, the project partners and committee members will identify the role that volunteer monitoring can make in reaching our general public and identify future funding sources, including grants, partner contributions, sponsors, etc. We see this project as having a significant role in watershed planning and with the collective support of the partners should be able to identify long-term funding to sustain the effort, perhaps as a regional stewardship program by interested agencies.

6. Context within local Stormwater and/or other Plans.

A. Discuss how this project fits within or work to implement the strategies of existing stormwater and/or other relevant plans for reducing or eliminating the negative effects of stormwater runoff.

According to the WRIA 27 & 28 Watershed Management Plan⁶, there are descriptions regarding the need to monitor water quality in the streams to identify status and trends of water quality, areas of impairment and management strategies. Per Chapter 8-3, it is important to monitor across jurisdictional boundaries, data management, and providing data access. In Table 8-2, under surface water quality, there is a priority statement to expand water quality monitoring to improve the understanding of status and trends throughout the watersheds. This project is aligned to meet these strategies as outlined in the plan. As described in Chapter 8.7.2, *Recommendations for Implementing an Adaptive Management Program for the Watershed Plan*, many of the tasks in this proposed project align with the need to establish broader monitoring goals and objectives for this WRIA planning area.

B. Explain why it is important to do this project now instead of later.

The sooner the communities can implement a volunteer stream monitoring project, the better. Multiple agencies are implementing water quality education and outreach with various levels of effectiveness. There is an urgency to increase the number of citizens who understand where their local waterways are located, the health of those waterways and how they can change their behaviors to minimize impacts to the waterways. As well as the fact that there are limited staff in the government agencies to be eyes along every tributary. There are gaps in monitoring data throughout the community so gathering more data will assist with understanding where there are impacts and potential sources of pollution. More importantly, as an outreach and educational tool, this work is important to provide hands-on opportunity to engage citizens.

C. If your project is part of a larger overall project or strategy, describe the goal of the overall strategy, explain individual sequencing steps, and which of these steps are included in this application for funding.

This project is a separate and stand-alone project from the other monitoring efforts, but will run parallel with the various governmental outreach and data collection activities. Figure 2 identifies the existing monitoring locations for the various agencies.

For the sake of consistency, the steering committee will review pertinent volunteer monitoring protocols, such as the EPA's *Volunteer Stream Monitoring: A Methods Manual*.⁷ Manuals such as this outline all of the parameters and protocols that support a successful volunteer

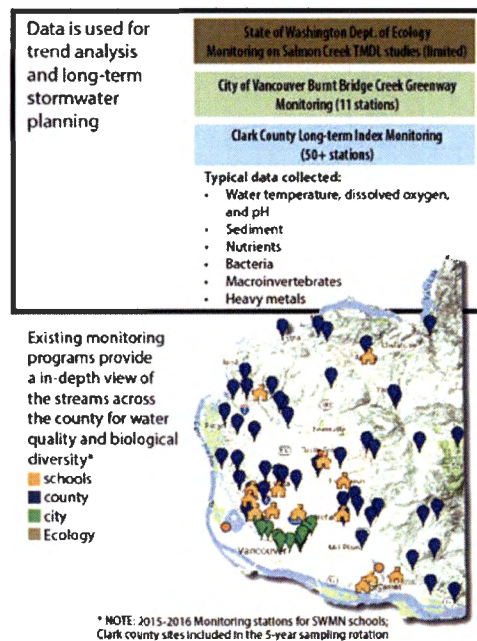


Figure 2. Existing monitoring programs in Clark County

⁶ WRIA 27 & 28 Watershed Management Plan 2006. Sections 5.4 Water Quality Monitoring, 8-3 Monitoring of Water Quality, Table 8-2 Implementation by Organization and 8-7 Monitoring and Adaptive Management. [Web link.](#)

⁷ Volunteer Stream Monitoring: A Methods Manual. EPA's Office of Water. 1997. [Web link.](#)

monitoring project.

7. Project Proponents and Partners.

A. Describe your experience managing this type of project.

Clark County, the City of Vancouver's Water Resources Education Center (WREC) and Lower Columbia Estuary Partnership have all managed volunteer monitoring projects within the past ten years. The WREC has coordinated the Student Watershed Monitoring Network⁸ since 1997. The program engages over 1,000 students a year in monitoring data and hosts the Watershed Congress each spring where 200 students and teachers present their findings. The WREC staff and contractors visit the schools to educate on monitoring protocols and parameters and then visit a local site to collect data.

B. List all landowner names.

All monitoring stations will be publicly owned (rights-of-way, parks, natural areas, stormwater facilities, etc.). No private landowners will be impacted by this project.

C. List project partners and their role and contribution to the project.

- **Clark County Department of Environmental Services, Clean Water Division** – grant coordinator with LCFRB, steering committee member and project support. Coordinate contractor contract for database, web page and mobile app.
- **Vancouver Watershed Alliance** – Project Coordinator for the volunteer monitoring events. Will be the lead agency to recruit volunteers, manage events and work with the steering committee to formulate monitoring parameters, protocols, materials and equipment.
- **City of Vancouver, Water Resources Education Center** – Project steering committee member and lead expert on volunteer monitoring events. Coordinate to upload Student Watershed Monitoring Network data into the new database.
- **Lower Columbia Estuary Partnership** – Project steering committee member and lead expert on volunteer monitoring events.
- **Salmon Creek Watershed Council** – Project steering committee member and project support on monitoring stations in the Salmon Creek Greenway.
- **City of Battle Ground** – Project steering committee member and project support on monitoring stations in the city limits.
- **City of Ridgefield** – Project steering committee member and project support on monitoring stations in the city limits.
- **Other partners** – The project steering committee will reach out to other potential partners as the project moves forward, including Clark College, Washington State University-Vancouver, etc. for their support of various parts of the project.

D. Stakeholder Outreach. *Describe your public outreach efforts taken or planned. Discuss any community feedback, endorsements, and expressions of support you have received for the proposed project. Describe any public opposition or concerns expressed and how you have addressed it. Are there any public safety concerns with the project? How will you address those concerns?*

The project is a public outreach effort to serve our need to educate the public about watershed health. All of the partners listed above have expressed interest and support in this project (see attached for letters of endorsement). Many of these agencies have received comments from citizens inquiring about the possibilities of volunteers to help monitor stream health, so we are aware of the interest from the public in this type of project.

⁸ City of Vancouver Water Resources Education Center's student monitoring network. [Web link.](#)

Many of the project partners have volunteer coordination programs that we will work with to maximize outreach to the general public.

Safety concerns will be reviewed carefully prior to engaging any citizens. The project will develop safety protocols for all volunteers who register for events. Knowing that some monitoring sites will have rough terrain to access, the steering committee will review all concerns and address to the extent possible. Specific training for steam team lead volunteers will outline safety in the water. Unless volunteers have gone through the specific water based training, they will not be allowed in the stream.

Supplemental Questions

Outreach/Education Project

Answer the following supplemental questions (these are not included in the ten-page limit):

- A. Who is your target audience?** Explain why this audience is appropriate for improving watershed health by reducing the impacts of stormwater runoff.
- The general public who live on or near waterways, as well as residents in the affected watersheds. It has been suggested that polluted stormwater runoff is the number one threat to the health of our local waterways. Educating the public on the role that their everyday actions play in polluting waterways is incredibly important. By getting people down to their creeks, they will most likely see the effect of pollution including oil/greases, trash, low diversity of aquatic species and other indicators of human generated pollution. The cause and effect education can be a powerful tool to help raise awareness that can lead to changing behaviors to minimize polluting.
- B. What are the target pollutants you expect to address?**
- The monitoring will look at standard monitoring parameters, including temperature, dissolved oxygen, metals, fecal coliform, etc. Macroinvertebrate collection will provide diversity data on the species in the waterway. The volunteers will also look for the presence of human generated trash that is visible in the stream or in the riparian habitat, including trash, oils, debris, etc.
- C. What is your strategy for changing behaviors related to watershed health?** Explain how this approach has been successful in the past by your organization or by other organizations with similar missions.
- Stewardship projects that get the public to the waterways to see the streams first hand have been effective throughout Clark County to educate about the health of our waterways. Once people have seen the creeks, streams, and rivers first hand, the agency can then provide information to connect activities and behaviors in the surrounding watershed that can impact the health of the waterway. As part of the training and participation in this project, volunteers will receive a primer on what is a watershed, watershed processes (water runs downhill and collects pollutants), as well as the overview of the stormwater sewer system that may or may not have treatment facilities to remove pollutants (depending on the age of the development).
- D. How would you define success in this outreach and/or education project?**
- There are several measures of success for this project including:
- Database development set up complete** – The steering committee has successfully worked with a contractor to develop a new web page, mobile app and linked database that can collect and share monitoring data. The resulting projects need to be user friendly for uploading new data and reviewing the final data results.

- ii. **Volunteer engagement** – Complete Stream Team leader training for at least 30 volunteers who participate in multiple monitoring events as well as 80 participants at every monitoring event. Outreach for all of these participants results in raising awareness and affecting behaviors to minimize activities that pollute waterways.
- iii. **Data collection and sharing**– Upload data from all volunteer monitoring programs in the county, including Student Watershed Monitoring Network, this project and other existing programs. Once data has been uploaded, the results can easily be seen by interested users, including stormwater planners, schools, and interested citizens.