



DRAFT East Fork Lewis River Water Cleanup Plan

Bacteria and Temperature Alternative Restoration Plan

By

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For the

Water Quality Program

Washington State Department of Ecology

Southwest Regional Office

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Cross-referenced or relevant documents.

Publication 18-03-019: [East Fork Lewis River Bacteria and Temperature Source Assessment Report](#).

Publication 17-10-006: [Quality Assurance Project Plan East Fork Lewis River Fecal Coliform Bacteria and Temperature Source Assessment](#)

Publication 05-03-110: [Quality Assurance Project Plan East Fork Lewis River Temperature and Fecal Coliform Bacteria Total Maximum Daily Load Study](#)

Publication 09-03-002: [Streamflow Summary for Gaging Stations on the East Fork Lewis River, 2005-06](#)

Publication 09-03-037: [Surface Water/Groundwater Exchange Along the East Fork Lewis River \(Clark County\), 2005](#) f

Publication 20-10-016 : [Quality Assurance Project Plan Monitoring Fecal Coliform Bacteria in Western Washington Water Bodies Appendix B3: Southwest Regional Office Sampling Site for 2019 and 2020](#)

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Region	Counties served	Mailing Address	Phone
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Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	3190 160th Ave SE Bellevue, WA 98008	425-649-7000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

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Executive Summary

The East Fork Lewis River (EFLR) watershed is home to both the fastest growing city in Washington State, and five high priority populations of Endangered Species Act (ESA) listed salmon and steelhead. The watershed has seen a 47 percent increase in human population since 2000, and provides recreation, timber, agriculture, and water resources for this rapidly growing region of the State. At the same time, the watershed is key to the recovery of ESA-listed salmon and steelhead that rely on the mainstem and tributaries for critical spawning and rearing habitat. The diversity of functions the watershed supports has made the watershed a central focus of salmon recovery, water quality, and water quantity management and planning in Southwest Washington. These planning efforts began in the early 2000's, but continue today as new partnerships have formed.

Currently, the East Fork Lewis River and its tributaries are on Washington State's polluted waters list (303d list) for warm water temperatures and bacteria problems, which drives the need to develop a *Water Cleanup Plan* (Alternative Restoration Plan). Keeping the watershed clean is important because high levels of bacteria increase risks to people swimming, wading, or fishing. High water temperatures also create poor conditions for fish and other wildlife.

In 2018, the *East Fork Lewis River Watershed Bacteria and Temperature Source Assessment* was published to support water cleanup planning and implementation. Source Assessments are a new tool to support Alternative Restoration Plans and Water Cleanup projects. This is the first *Source Assessment* completed by Ecology in Southwest Washington to analyze water quality data, and identify critical areas to address temperature and bacteria issues. Priority areas for bacteria and temperature improvement are located in the middle and lower sections of the watershed. No sites sampled in the East Fork Lewis River met temperature water quality standards. The average shade deficit in the middle watershed was 35 percent. Shade deficits over 40 percent were measured between river miles 9 to 13. Priority areas to address bacteria are the Brezee and McCormick Creek tributaries in the lower watershed. To meet bacteria standards, bacteria reductions of 86 to 96 percent are needed in East Fork Lewis River tributaries.

To implement recommendations from the *Source Assessment*, the East Fork Lewis River Partnership was launched in May 2018 to work collaboratively with local, state, federal, and tribal governments, non-profits, watershed groups, and private landowners to develop and implement a *Water Cleanup Plan*. Since the partnership launched, over 50 different partners from 30 different organizations have engaged in East Fork Lewis River Partnership activities. The success of this Water Cleanup effort relies on establishing, maintaining, and leveraging partnerships, and increasing public awareness as principal tools to achieve improved water quality. Currently, multiple new projects and programs are being developed and implemented in the watershed. All of these programs help achieve water quality and salmon recovery goals. Priorities for long-term implementation include addressing impacts from septic systems, stormwater, and agriculture, and enhancing riparian forest restoration efforts in the watershed.

Chapter 1 – Introduction

Introduction

The East Fork Lewis River (EFLR) watershed is home to one of the fastest growing cities in Washington State, and five high priority populations of Endangered Species Act (ESA) listed salmonids. The watershed has seen a 47 percent increase in human population since 2000, and provides recreation, timber, agriculture, and water resources for this rapidly growing region of the State. At the same time, the watershed is key to the recovery of ESA-listed salmon and steelhead that rely on the mainstem and tributaries for critical spawning and rearing habitat. The social, economic, and environmental value of the watershed has made the EFLR watershed a central focus of salmon recovery, water quality, and water quantity management and planning in Southwest Washington. These planning efforts began in the early 2000’s, but continue today as implementation progresses and new partnerships have formed.

The East Fork Lewis River watershed is located in the Water Resources Inventory Area (WRIA) 27 in Southwest Washington. The headwaters originate in the Cascade Mountain Range in the Gifford Pinchot National Forest, draining 42 miles west to its confluence with the Nork Fork Lewis River, just west of the City of La Center and Interstate 5. The 235 square mile watershed consists of a variety of land uses ranging from state and federal timberlands in the upper and middle watershed, to bountiful agricultural lands in the middle and lower watershed, which are integral to sustaining Clark County’s rural character. More developed and residential areas of the watershed are located in the towns of La Center, Ridgefield, Battle Ground, and Yacolt. In addition to supporting fish and municipal water resources, the East Fork Lewis River provides significant recreational use for swimmers, hikers, anglers, and campers in the watershed. Rapid population growth, development, and urbanization have led to increased impervious surfaces, decreased forest cover, and water quality issues that affect the beneficial uses the watershed provides for humans and aquatic species.

Table 1. East Fork Lewis River watershed overview.

WRIA	27 – Lewis
Counties	Clark and Skamania
Population Increase	47 percent increase in human population since 2000.
Area	235 square miles.
River Length	42 miles total, 32.3 miles in study area.
Salmon Populations	5 primary populations of Endangered Species Act listed Salmonids (list these out).
Water Quality Impairments	State Polluted Waters List (303d) for bacteria and temperature.
Beneficial Uses	Aquatic Life and Recreational Uses
Jurisdictions	Clark County, City of Battle Ground, City of La Center, Yacolt, City of Ridgefield, Washington Department of Transportation
Permits	Phase I Municipal Stormwater, Phase II Municipal Stormwater, Construction Stormwater, Sand and Gravel, Municipal Wastewater

State's polluted waters list

The East Fork Lewis River and its tributaries are on the state's polluted waters list (303d list) for warm water temperatures and bacteria problems. Keeping the watershed clean is important because high levels of bacteria increase risks to people swimming, wading, or fishing. In addition, high temperatures create poor conditions for fish and other wildlife. To achieve clean water, the East Fork Lewis River Partnership was launched in May 2018 to work collaboratively with local, state, federal, and tribal governments, non-profits, and private landowners to develop and implement the *Water Cleanup Plan*.

East Fork Lewis River Water Cleanup Plan and Partnership

This *Water Cleanup Plan* provides a strategy to address nonpoint source pollution and improve water quality in a watershed where pollutant challenges are mostly nonpoint. Water Cleanup Plans rely on partnerships and collaboration to implement water quality improvement projects. Establishing, maintaining, and leveraging partnerships and public awareness are principal tools to achieve improved water quality. The East Fork Lewis River is not only a priority for water quality recovery, but also for salmon recovery.

Since the East Fork Lewis River Partnership was launched, over 50 different partners from 30 different organizations have engaged in East Fork Lewis River Partnership activities. These activities have included multiple East Fork Lewis River Partnership meetings, smaller bacteria and temperature workgroups, and a targeted meeting to discuss private landowner technical assistance needs in Clark County. A grant project development workshop and a water quality public town hall were also hosted

Multiple new projects and programs are being developed and implemented in the watershed through the East Fork Lewis River Partnership. All of these programs are in alignment with water quality and salmon recovery goals. Priorities for long-term implementation in the East Fork Lewis River watershed include addressing water quality impacts from septic systems, stormwater, and agriculture, and restoring riparian forest habitat in the watershed. All information and meeting materials are available on the East Fork Lewis River Partnership website. Multiple local, regional, tribal, state, and federal governments, nonprofits, and private landowners have been engaged in the East Fork Lewis River Partnership. Many Ecology staff have also provided technical assistance and resources to support water quality improvement in the watershed.

Table 2. Tribes and stakeholders in the East Fork Lewis River watershed.

Organization	Tribes and stakeholders
Tribal	Cowlitz Indian Tribe
Local and Regional	Clark County Public Works, Clark County Community Development, Clark County Public Health, City of La Center, City of Battle Ground, Yacolt, Clark Public Utilities, City of Vancouver, La Center Schools, Clark Conservation District, Clark Regional Wastewater District, Lower Columbia Fish Recovery Board, Southwest Washington Regional Transportation Council, and Lower Columbia Fish Enhancement Group.
State	Washington Department of Fish and Wildlife, Washington Department of Natural Resources, Washington Department of Transportation, Washington Department of Ecology, Washington State Conservation Commission, and Washington State University Clark County Extension
Federal	US Fish and Wildlife Service, US Forest Service, and US Department of Agriculture Natural Resources Conservation Service, USDA Farm Service Agency, Bonneville Power Administration, Environmental Protection Agency, NOAA Marine Fisheries Service.
Nonprofit	Lower Columbia Estuary Partnership, Columbia Land Trust, Watershed, Alliance of Southwest Washington, Friends of the East Fork, Friends of Clark County, Salmon Creek Fly Fishers, Clark-Skamania Fly Fishers, Trout Unlimited, Northwest Wild Fish Rescue, and the East Fork Community Coalition.
Private	Wapato Valley Mitigation and Conservation Bank, PC Trask & Associates, Interfluve, and Bonneville Power Administration.

East Fork Lewis River Source Assessment

To support development of a *Water Cleanup Plan*, which focuses on priority implementation actions, a *Source Assessment Report* was published to assess water quality challenges and identify priority areas to implement water quality improvement projects and programs. The *East Fork Lewis River Watershed Bacteria and Temperature Source Assessment Report* was completed by the Department of Ecology’s in May 2018. This report analyzed water quality data (bacteria and temperature) from 2005-2006 and 2017 to develop general recommendations to improve water quality, achieve water quality standards, and support beneficial uses in the watershed. The completion of the *Source Assessment* characterized the watershed by gathering and analyzing existing data to create a watershed inventory, identifying issues of concern, estimating pollutant load reductions needed to meet water quality standards, and identifying critical areas for the implementation of management actions. Water quality assessment completed by Department of Ecology and Clark County Clean Water enabled the development of this *Source Assessment*. This *Source Assessment* serves as the technical foundation to develop a *Water Cleanup Plan* for the watershed.

Environmental Protection Agency’s nine element watershed plans

Water Cleanup Plans follow the Environmental Protection Agency’s (EPA) recommended Nine Minimum Elements for watershed planning. Nine Key Element Plans are a common tool used nation-wide to identify priority water quality improvement projects. These plans also support implementation planning, and inform funding decisions at the watershed level. Table 3 outlines how the East Fork Lewis River Partnership and *Water Cleanup Plan* achieve the nine elements.

Water Cleanup Plans require creative implementation planning and partnership development to foster new projects and programs to improve water quality. Nonpoint Source investigation and monitoring are also critical within the *Water Cleanup Plan* process to support the identification and correction of pollution sources. Private landowner outreach, technical assistance, and conservation planning are also key components, to encourage private landowners to implement water quality improvement projects on their properties. Securing sufficient funding resources to support implementation is also a key step.

Multiple funding sources can help pay for water quality improvement projects including local, state, federal, and tribal dollars, as well as investments made by private property owners, ratepayers, and taxpayers. As improvement projects are implemented, effectiveness monitoring is necessary to evaluate if water quality improvement goals have been achieved. Effectiveness monitoring and implementation tracking also helps support adaptive management of the *Water Cleanup Plan* into the future.

Table 3. Achieving EPA’s nine minimum elements through the East Fork Lewis River Partnership and Water Cleanup Plan.

Element	Watershed Planning Step	East Fork Lewis River Planning and Implementation Tool
1	Identify causes of impairment and pollutant sources.	East Fork Lewis River Sources Assessment, Water Cleanup Plan, and Nonpoint Source Implementation.
2	Estimate load reductions needed.	East Fork Lewis River Sources Assessment and Nonpoint Source Implementation.
3	Describe nonpoint source implementation to achieve load reductions.	Water Cleanup Plan and Nonpoint Source Implementation.
4	Estimate technical and financial assistance needed.	Water Cleanup Plan.
5	Develop information and education component.	Water Cleanup Plan and Nonpoint Source Implementation
6	Develop implementation schedule.	Water Cleanup Plan.
7	Develop milestones and targets.	Water Cleanup Plan.
8	Develop criteria to measure progress.	Water Cleanup Plan.
9	Monitor to evaluate effectiveness of implementation efforts.	Water Cleanup Plan and Nonpoint Source Implementation.

Ecology's regulatory authority: Water Pollution Control Act (RCW 90.48)

Two primary statutes protect the quality of Washington's waters; the Federal Clean Water Act and the state Water Pollution Control Act (RCW 90.48), both implemented by the Department of Ecology. The State Water Pollution Control Act makes it unlawful for any person to, "cause, permit or suffer to be thrown, run, drained, allowed to seep or otherwise discharged any organic or inorganic matter that shall cause or tend to cause pollution of waters of the state" (RCW 90.48.080). Any person who violates, or creates a substantial potential to violate any part of the Water Pollution Control Act, is subject to an enforcement order from Ecology pursuant to RCW 90.48.120. More information on Washington State's Regulatory Framework can be found in Chapter Two of Washington's Water Quality Management Plan to Control Nonpoint Sources of Pollution.

Ecology also has regulatory authority through the Forest Practices Act RCW 76.09 and WAC 222 to implement and enforce Forest Practices Rules and the Timber, Fish, and Wildlife agreement. Instream flow rules established through WAC 173-527 provide regulatory authority for enforcement related to water consumption and instream flows in the watershed. Authority through the Shorelands and Environmental Assistance program, which oversees critical areas ordinances, shoreline management, and wetlands regulations, is also enforceable.

While many stakeholders in the East Fork Lewis River are implementing good management practices to protect water quality and pose no threat to Washington State waters, others are affecting State waters. Ecology's goal is to work with stakeholders to achieve voluntary compliance with state law and the water quality standards. This is often achieved through technical and financial assistance that promotes voluntary implementation of Best Management Practices (BMPs) necessary to protect water quality. Ecology invests heavily in technical and financial assistance and provides multiple opportunities and pathways for stakeholders to proactively address pollution problems before enforcement is pursued. Ecology uses regulatory authority as a backstop when technical assistance efforts fail to address identified pollution problems.

To improve water quality and achieve the goals of this *Water Cleanup Plan*, landowners with a direct impact to surface water quality must implement best management practices on their property to reduce pollution. Priority stakeholders for targeted outreach and implementation include homeowners with septic systems, landowners with livestock based agriculture, and streamside property owners with low riparian vegetation or shade. It is the goal of all participants in the process to achieve clean water through cooperative efforts. If water quality standards are not achieved through implementation of this *Water Cleanup Plan*, a traditional total maximum daily load (TMDL) study will be required in the East Fork Lewis River.

Table 4. Washington State Department of Ecology’s regulatory authority.

Program	Action
Water Pollution Control Act	Enforce the Water Pollution Control Act (Ch. 90.48 RCW).
Nonpoint Source	Environmental Complaint Response for nonpoint sources, including non-dairy agriculture complaints. Pursue enforcement action when necessary.
Municipal Permits	Conduct inspections of stormwater sites and other permitted facilities. This includes the Municipal Stormwater Phase I and Phase II, Construction Stormwater, Sand and Gravel, and Industrial Stormwater General Permit.
Wastewater Treatment Plant Permits	Conduct inspections and oversee compliance with Wastewater Treatment Plant Permits.
Forestry	Oversee implementation of the Forest and Fish Program.
303(d)	Develop and Implement Alternative Restoration Plan (Water Cleanup Plan) and TMDLs.
Combined Water Quality Funding	Provide funding opportunities through its competitive water quality grants and loan funding cycle, to projects addressing the objectives and BMPs identified in this Water Cleanup Plan.

Chapter 2 – Impairments and Pollutant Sources

Watershed summary

The *East Fork Lewis River Source Assessment* analyzed water quality data collected along 32.3 River Miles (RM) of the East Fork Lewis River mainstem and tributaries. To support on-the-ground implementation and planning, the *Source Assessment* divided the East Fork Lewis River into three sections to summarize water quality information. The three sections of the East Fork Lewis River are the lower (RM 0 – 5.7), middle (RM 5.7 – 20.3), and upper (RM 20 - 32.3) watersheds. These three sections have different land uses, land cover, jurisdictions, permits, and different water quality monitoring stations.

Upper watershed

The Upper East Fork Lewis River Watershed extends from RM 20 to RM 32.3, where the watershed crosses the boundary of Gifford Pinchot National Forest. A mix of public and private forestlands dominate the upper watershed, where active timber management and forest practices are implemented. Some residential and commercial development is present. The primary jurisdictions include the Town of Yacolt, unincorporated Clark County, Department of Natural Resources, and Gifford Pinchot National Forest. Significant tributaries in the upper watershed include King, Yacolt and, Big Tree Creeks, and Rock Creek South.

Middle watershed

The Middle East Fork Lewis River Watershed extends from RM 5.7 – 20.3. The land use is forest dominated and there are mixed agricultural, residential, and commercial land uses. The middle watershed has multiple parks including Lewisville and Daybreak Regional Parks, which are a part of the Clark County Legacy Lands Program. The primary jurisdictions include the City of Battle Ground, and unincorporated Clark County. Washington State Department of Transportation's Highway 503 also bisects this portion of the watershed. There is some industrial development in the middle watershed, including sand and gravel mining operations. Significant tributaries in the include Mason, Manley, Dean Creeks, Lockwood, and Riley Creek, and Rock Creek North.

Lower watershed

The Lower East Fork Lewis River Watershed begins at the river's confluence with the North Fork Lewis River, just west of Paradise Point State Park and the Interstate 5 (I-5) Bridge. The lower watershed extends to RM 5.7, just east of the La Center. The land use is mixed, with some forestland, and significantly more commercial, residential, and agricultural land use compared to the middle and upper watersheds. Although there is more development and urbanization in the lower watershed, there is significant riparian connectivity and public access due to the Clark County Legacy Lands Program, Paradise Point State Park, and City of La Center parks. The primary jurisdictions include the City of La Center, Ridgefield, and unincorporated Clark County. A portion of the Washington State Department of Transportation's I-5 corridor also passes through the lower watershed. Significant tributaries include Brezee, Jenny, and McCormick Creeks.

Land use change assessment

In 2019, the Lower Columbia Fish Recovery Board (LCFRB) contracted with PC Trask and Associates to complete an extensive land use and land cover assessment of the East Fork Lewis River for the *East Fork Lewis River Recovery Plan* Review, which will be published by 2021. This assessment quantifies land use change and population growth in the East Fork Lewis River since the early 2000s. According to the assessment, human population in the East Fork Lewis River watershed has increased by approximately 47 percent between 2000 and 2018, from 24,159 to 35,593 residents. Ridgefield has experienced the most significant population at 259 percent, followed by 124 percent growth in Battle Ground, 101 percent in La Center, and 69 percent in Yacolt.

With increased population, there has also been an increase in developed land cover. According to the National Land Cover Database (NLCD), around 500 acres of developed land cover was added to the East Fork Lewis River watershed between 2001 and 2016. In 2001, there were 18,223 acres of development, and by 2016, the watershed had 18,731 acres of developed land cover. With increased development, the total acres of impervious land cover also increased in the watershed. Between 2004 and 2018, Urban Growth Boundaries have increased by 160 percent in La Center, 84 percent in Battle Ground, 83 percent in Ridgefield, and 37 percent in Yacolt.

Research shows that watersheds with less than 10 percent impervious land cover are associated with healthy rivers and better watershed health. According to the NLCD, in 2016 there were 12,585 acres of land with impervious surfaces at densities greater than 10 percent. In total, the watershed added 416 acres of impervious surfaces greater than 10 percent since 2001, resulting in 8 percent impervious surface for the whole watershed, just under the 10 percent health indicator.

Table 5. Summary of land use statistics in the East Fork Lewis River.

Category	Statistics
Population Change	47 percent increase in population in watershed between 2000 and 2018. Between 2000 and 2018, population has increased by 124% in Battle Ground, 101% in La Center, 259% in Ridgefield, and 69% in Yacolt.
Urban Growth Boundary	Between 2004 and 2018, Urban Growth Boundaries have increased by 160% in La Center, 84% in Battle Ground, 83% in Ridgefield and 37% in Yacolt.
Critical Areas Impacted	9,956 building footprints are located in 364 acres of critical areas.
Shoreline Management Areas Impacted	787 building footprints are located in 26 acres of shoreline areas
Septic System Permits	8,249 tax lots with septic system permits in 2018.
Wetlands	11,135 acres.
Forestlands	74,305 acres in 2016.
Harvested Forest	27,452 acres permitted for harvest from 2004 to 2018.
Developed Landcover	18,731 acres, of which 12,585 acres have impervious surface densities greater than 10% in 2016.
Non-Impervious Surfaces	132,366 acres in 2016.

Source: LCFRB and PC Trask & Associates, 2020.

Development patterns in the watershed can also be measured using building footprints and septic system records. Clark County building footprint data indicates that there are 9,956 building footprints in the East Fork Lewis River watershed located in 364 acres of critical areas. Additionally 787 building footprints are located within 26 acres of shoreline management areas. In 2018, there were 8,249 tax lots in the East Fork Lewis River watershed with septic system permits. Commercial and multi-family residential land uses have increased in the watershed while single-family residential, industrial, and agricultural land uses have decreased.

Table 6. Land use changes in the East Fork Lewis River watershed from 2004 to 2018.

Zone	Acres (2004)	Acres (2018)	Percent Change
Single-Family Residential	41,353	40,563	-2%
Multi-Family Residential	272	764	+181%
Commercial	621	1,075	+73%
Industrial	814	735	-10%
Agricultural	16,339	14,827	-9%

Source: PC Trask & Associates, 2020

From a natural resource perspective, the East Fork Lewis River watershed had 82,787 acres of forestland in 2001, and 74,305 acres of forestland in 2016, indicating a loss of 8,482 acres of forested land cover. Between 2004 and 2018, the Washington Department of Natural Resources permitted approximately 27,452 acres of private and public forestlands for harvest. Although there has been an overall loss of forested land cover, it may not all be a permanent loss. The Washington State Forest Practices Rules require reforestation of harvested timberlands.

While the watershed has seen rapid growth, development, and land use change, there were 132,366 acres of non-impervious surfaces in the watershed in 2016. Today, Clark County currently owns over 2,000 acres of public land in the East Fork Lewis River watershed, and an additional 9,000 acres have been targeted for acquisition and preservation through the Legacy Lands program. A significant portion of this land is located in important forestlands, riparian, and shoreline management areas. Clark County’s wetlands inventory documents 11,135 acres of wetlands in the East Fork Lewis River watershed. Various project sponsors have implemented restoration projects in the watershed to protect, restore, and enhance natural resources to benefit water quality and salmon recovery. Much of this restoration work has been focused in the lower watershed, which is a priority for long-term implementation.

Water quality standards

The East Fork Lewis River supports recreational uses and core summer habitat for aquatic life and. The temperature water quality standard for the East Fork Lewis River is 16° Celsius (C). Portions of the river have applicable supplemental spawning and incubation criteria of 13° C from February 15 to June 15.

The watershed also supports recreational uses, which includes swimming, wading, fishing, and other contact activities. In 2018, Ecology adopted an *E. coli* recreational water quality standard to protect public health and support primary recreational contact in Washington’s waterways. Water quality criteria applicable in the East Fork Lewis River watershed are shown below.

Table 7. Water quality standards in the East Fork Lewis River.

Beneficial Use	Parameter	Water Quality Standard
Core Summer Habitat, Aquatic Life	Temperature	16.0°C (60.8°F) 7-DADMax Supplemental spawning and incubation criteria of 13° C from February 15 to June 15
Primary Contact, Recreation	Bacteria (<i>E. coli</i>)	Geometric Mean: 100 cfu/100 ml 90 th Percentile: 10% samples not to exceed 320 cfu/100 ml cfu = colony forming units

New bacteria water quality standards for recreation.

The *East Fork Lewis River Source Assessment* identified bacteria impairments in the watershed using Fecal Coliform as an indicator for bacteria pollution. In January 2019, Ecology revised Surface Water Quality Standards and adopted *E. coli* as the new fresh water indicator for bacteria and recreational uses. Generally, *E. coli* is a better indicator for assessing risks to public health. After December 2020, water quality assessment will utilize *E. coli* as the primary indicator to demonstrate impairment or attainment of bacteria water quality standards for recreational use. It is possible that current listings outlined in this *Water Cleanup Plan* and the *Source Assessment* may change due to new assessment methodologies and adoption of the new bacteria standard for recreation. To support this transition, all future bacteria monitoring should utilize *E. coli* as the primary indicator for water quality assessment.

Source Assessment results

Temperature

No temperature monitoring sites in the East Fork Lewis River met the temperature water quality standard in 2005-2006. Overall, water temperatures increased downstream from the upper watershed, to the lower watershed. The warmest water temperatures were measured in the middle and lower watershed.

Warm water temperatures are associated with loss of riparian vegetation and high shade deficits. A shade deficit analysis identified priority river miles for riparian forest restoration. Opportunities for riparian restoration are outlined in Chapter 3. Other factors contributing to warm temperatures include climate change, decreased snowmelt, increased water withdrawal, decreased groundwater recharge, and increased impervious surfaces.

Table 8. Temperature priorities in the East Fork Lewis River.

Temperature priorities
<ul style="list-style-type: none">• All monitoring sites on the East Fork Lewis River exceeded temperature criteria.• Lower & Middle Watershed are priorities for warm water temperatures.• Warmest temperature measured was 26.1 degrees Celsius at Dean Creek.• Largest average shade deficit is 35 percent in the middle watershed.• Rive miles with shade deficit over 40 percent are located between river miles 9 and 13.

Bacteria

The highest bacteria concentrations measured in the East Fork Lewis River watershed are in the lower watershed, specifically in McCormick and Brezee Creeks. Brezee and McCormick Creeks are top priorities for bacteria reduction based on high bacteria concentrations in the wet and dry seasons. These subwatersheds also have the highest recommended load reductions needed to achieve bacteria water quality standards. Brezee and McCormick Creeks need bacteria reductions of 86 to 96 percent to achieve water quality standards.

Table 9. Bacteria priorities in the East Fork Lewis River.

Bacteria priorities
<ul style="list-style-type: none">• Lower & Middle Watershed are priorities for bacteria reduction.• Priority 1 is addressing bacteria in Brezee and McCormick Creeks.<ul style="list-style-type: none">• 40.5 river miles, 545 parcels• Priority 2 is addressing bacteria in Jenny, Rock Creek North, Riley Creek, and Lockwood Creek<ul style="list-style-type: none">• 140.5 river miles, 1,674 parcels• Priority 3 is addressing bacteria in Mason and Yacolt Creeks.<ul style="list-style-type: none">• 76 river miles, 919 parcels• Bacteria Reductions needed<ul style="list-style-type: none">• Wet Season<ul style="list-style-type: none">• 91-96% McCormick Creek Sites• 90-91% Brezee Creek Sites• 57% Rock Creek North• Dry Season<ul style="list-style-type: none">▪ 86-87% Brezee Creek Sites▪ 86% McCormick Creek▪ 83% Lockwood Creek▪ 60% Mason Creek▪ 52% Jenny Creek▪ 51% Riley Creek

Other important creeks for bacteria reduction include Jenny, Riley, Lockwood, Mason, Rock Creek North, and Yacolt Creeks. In total, there are 257 priority river miles for water quality improvement due to bacteria impairments. On these priority tributaries there are 3,138 parcels

within 100 feet of water that should be targeted for outreach, investigation, and implementation of best management practices. Some potential sources of bacteria pollution include poorly functioning septic systems, agriculture and farming practices that do not control contaminated runoff, direct livestock access, wildlife, and dogs.

Additional water quality information and details are available in *the East Fork Lewis River Watershed Bacteria and Temperature Source Assessment*.

Table 10. Priority river miles for addressing bacteria pollution.

Subwatershed	Miles of River	Number of Parcels within 100 feet of water
Breeze Creek	18	262
McCormick Creek	22.4	283
Jenny Creek	27.3	289
Riley and Lockwood Creek	51.6	580
Rock Creek North	61.5	805
Mason Creek	51	614
Yacolt Creek	25.5	305
TOTAL	~257 miles	3,138 parcels

Chapter 3 –Clean Water Implementation Priorities

To achieve clean water in the East Fork Lewis River, there are four priority implementation areas. These include addressing water quality impacts from septic systems, agriculture, and stormwater, and increasing riparian forest restoration in the watershed.

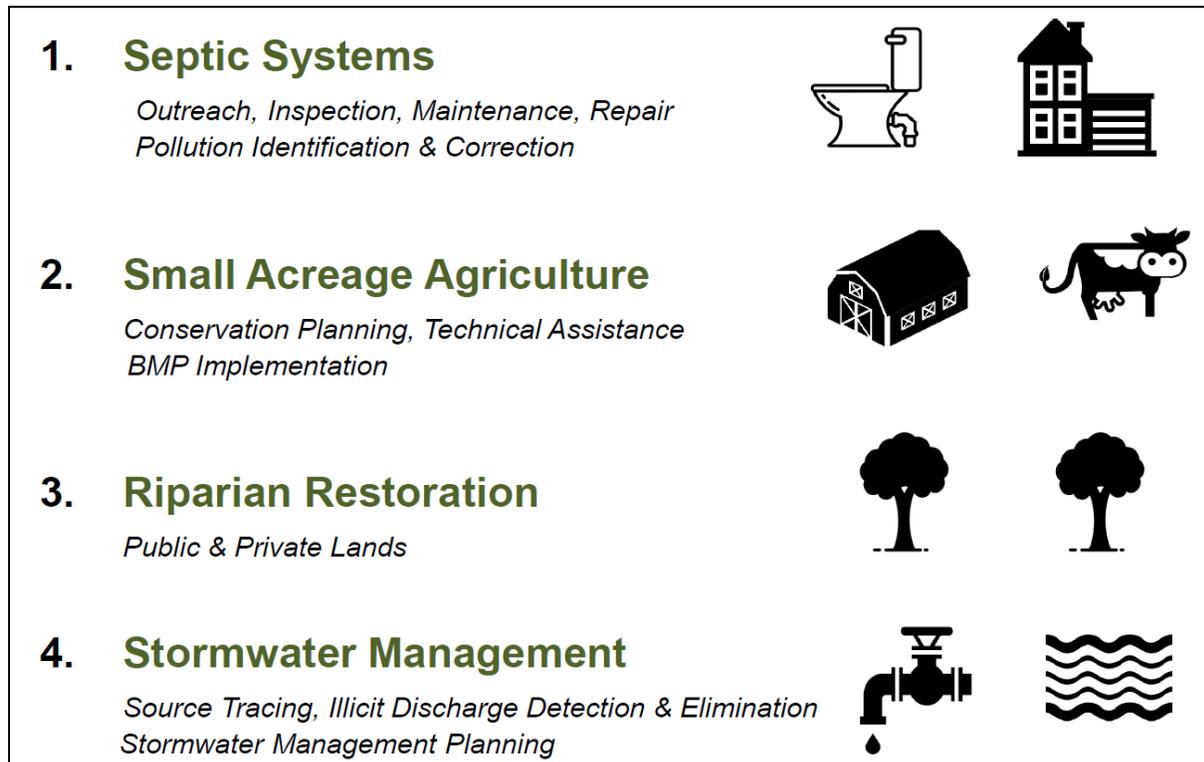


Figure 1. Clean water implementation priorities in the East Fork Lewis River watershed.

The first priority implementation area is to address and eliminate the water quality impacts from septic systems. To make progress on improving septic systems, additional outreach to septic system owners is needed to increase septic system inspections, maintenance, and repair. Pollution identification and correction (PIC) programming can help identify areas that need septic system assistance. Currently, septic system inspections are voluntary in Clark County. Mandatory inspections would help increase inspection frequency, and provide information on the location, condition, and criticality of septic systems in the East Fork Lewis River. One opportunity is to develop and implement a new septic system fee rebate program to eliminate the financial burden associated with septic inspections, and help increase septic inspection rates in Clark County.

Eliminating water quality impacts from agriculture is also a priority in the watershed. Efforts to increase outreach, nonpoint source investigation, and complete site visits to agricultural properties are necessary. Conservation planning to identify and assess water quality improvement opportunities is also needed, as well as technical assistance targeted towards water quality improvement. Financial assistance for agricultural landowners to implement

BMPS can also help address temperature and bacteria challenges in the watershed. Recently, Clark Conservation District received \$1.4 million dollars to support livestock BMP implementation in Clark County.

Stormwater management is also a priority in the East Fork Lewis River, especially in the lower watershed. The second highest bacteria concentrations entering the watershed are from a stormwater outfall in Brezee Creek that drains a significant portion of the City of La Center's urban area. Efforts to complete stormwater source tracing, illicit discharge detection and elimination, and bacteria source control are needed in this watershed. Some progress has been made to eliminate illicit cross connections in La Center's stormwater drainage, but more work is needed. Comprehensive stormwater planning and adoption of the Western Washington Stormwater Manual for development standards and operations can also help support long-term water quality protection in the East Fork Lewis River, specifically in Brezee Creek in City of La Center's and in McCormick Creek in the City of Ridgefield.

The final clean water priority for the East Fork Lewis River is riparian forest restoration on public and private lands. Currently, there are over 2,000 acres of publicly owned land in the East Fork Lewis River due to Clark County's Legacy Lands Program and Columbia Land Trust conservation efforts. Additional acreage has been targeted for acquisition. Efforts to implement projects that increase riparian tree canopy and shade are needed to lower water temperatures. Other cold-water projects such as wetland restoration, floodplain reconnection, streamflow restoration, cold-water refugia enhancement, and water conservation are also important.

Achieving clean water in the East Fork Lewis River will require long-term cooperation, coordination, and collaboration across organizations and jurisdictions. While significant progress has been made in the watershed, continued implementation of clean water projects is needed to achieve clean water, meet water quality standards, and support beneficial uses for people, fish and wildlife.

Report outline

This *Water Cleanup Plan* focuses on priority project and program areas for water quality implementation in the East Fork Lewis River, to improve bacteria and temperature pollution challenges. The top four priorities in the East Fork Lewis River are addressing nonpoint source pollution from septic systems and agriculture, increasing riparian forest restoration efforts, and improving stormwater management in the watershed. For each of these clean water priorities, the following information is provided.

- 1. Background information.**
- 2. Implementation goals.**
- 3. Implementation actions.**
- 4. Milestones, targets, and timelines.**
- 5. Criteria to measure progress.**
- 6. Funding and partnerships.**

For each implementation priority, there are goal statements established for achieving clean water in the East Fork Lewis River. To achieve clean water goals, there are actions that need to be implemented in priority areas. A unique identifier is provided for each implementation action. Organizations seeking Ecology funding to implement specific actions in this *Water Cleanup Plan*, should reference the unique identifiers in funding applications.

Where appropriate and feasible, this *Water Cleanup Plan* seeks to align with salmon recovery planning, local government priorities, and relevant permit programs that are in the watershed. This *Water Cleanup Plan* also recognizes the historical and ongoing work of multiple salmon recovery and water quality partners that have worked in the East Fork Lewis River, long before Ecology conducted its initial water quality assessment. Water quality improvement in the East Fork Lewis River will require long-term, coordinated implementation, and collaboration amongst many partners.

Clean water goals



Overarching Goal

- ***Achieve clean water, meet water quality standards, and support all beneficial uses in the East Fork Lewis River.***

Septic Systems

- ***Eliminate septic system impacts on water quality in the East Fork Lewis River.***

Small Acreage Agriculture – Livestock

- ***Eliminate impacts of small acreage agriculture (livestock) on water quality in the East Fork Lewis River.***

Riparian Forest Restoration

- ***Achieve system potential riparian vegetation, of 85 percent tree canopy cover, in the East Fork Lewis River.***

Stormwater Management

- ***Achieve a high level of stormwater management in the watershed.***

Septic systems

Introduction

Septic systems are one source of bacteria in the East Fork Lewis River watershed. In 2018, there were around 6,045 septic systems in the watershed, and 32 percent, or approximately 1,929 septic systems, needed inspections. Septic system inspections are important to determine septic system age, condition, and maintenance needs, and to ensure septic systems are not impacting water quality.

Clark County Public Health (CCPH) has jurisdiction and regulatory authority over septic systems in the East Fork Lewis River Watershed. CCPH regulates septic systems under Washington State Administrative Code 246-272A and Clark County Code 24.17, which requires all homeowners who are not connected to municipal sewer to have an approved, and correctly functioning septic system to manage household sanitary waste.

Efforts to inspect and maintain septic systems are critical to keep septic systems functioning, and to protect public and environmental health. Septic Tanks that are in disrepair or need maintenance are one source of bacteria that can affect surface water and groundwater quality. In Clark County, 98 percent of drinking water comes from groundwater sources. Failing or poorly maintained septic systems can cause risks to drinking water quality, especially in zones of contribution. Addressing septic system impacts in the East Fork Lewis River will help achieve clean water for people, fish, and wildlife. The following table describes key septic system facts in the East Fork Lewis River.

Table 11. Septic system facts in the East Fork Lewis River watershed.

Septic system facts
<ul style="list-style-type: none">• 69 percent of unincorporated tax lots in watershed have septic systems.• 6,045 septic systems in EFLR watershed.• 32 percent have not been inspected.• Around 1,929 septic systems need inspections in the watershed.• \$120 dollars is the average inspection cost.• Every 3 years is when septic should be inspected.• The average cost to failing septic systems is \$8,000 to \$15,000 dollars.

Septic system inspection and maintenance

Clark County recommends homeowners conduct septic system inspections every 3 years to ensure systems are maintained and functioning properly. While inspections are recommended

by Clark County, they are not currently required. Efforts to make septic system inspections and maintenance mandatory would provide greater water quality protection and assurances.

To teach homeowners how to take care of their septic systems and encourage inspections, multiple public education and outreach efforts have been implemented in Clark County. Most notably, free Well and Septic Workshops are held by Washington State University Extension to encourage voluntary septic system inspections and maintenance.

Washington State University Well and Septic Workshops

Through a partnership between Clark County Public Works, Clark County Public Health, and Washington State University Extension, Well and Septic Workshops are hosted to teach private homeowners how to self-inspect their own septic systems. After attending a workshop, septic system owners are able to self-inspect their system every 6 years. Between self-inspections, septic system owners must hire a certified septic system inspector.

Table 12. Recommended septic system inspection frequency.

Year	Inspector
Year 1	Attend Well and Septic Workshop to Self-Inspect
Year 3	Hire Certified Inspector
Year 6	Attend Well and Septic Workshop to Self-Inspect
Year 9	Hire Certified Inspector

While these workshops have been successful and well attended, there is often more demand for workshops than capacity. From 2012 to 2018, Washington State University hosted 21 well and septic workshops, which were attended by around 671 septic system owners. Today, Clark County has 34,500 septic systems countywide, and 10,350 have not been inspected. Around 1,929 of these uninspected septic systems are in the East Fork Lewis River watershed. More workshops are needed educate septic system owners. Some outcomes from workshops held from 2012 to 2018 are listed below.

- 21 Well and Septic workshops hosted.
- 671 attendees.
- 33 percent responded to workshop survey.
- 384 survey respondents installed BMPs.
- 63 survey respondents inspected systems.

In addition to hosting more workshops, there are other education and outreach options to increase septic system inspection rates. One option is to provide septic system inspection and maintenance training online. Online training would provide easier and broader access to septic system education. The first online Well and Septic workshop was held in 2020.

Another option is to proactively send letters to septic system owners that need inspections. In 2015, only 49 percent of septic system owners had completed septic inspections countywide. CCPH worked to proactively send out Past Due Operation and Maintenance Notification Letters to septic system owners. This lettering effort resulted in an almost 20 percent increase in voluntary septic system inspections in Clark County between 2015 to 2018, achieving a 70

percent septic inspection rate countywide. Direct door-to-door outreach is another option to provide septic system owners with education and technical assistance. Ecology's nonpoint source staff have started door-to-door outreach to septic owners in the lower East Fork Lewis River watershed, but more outreach is needed.

Septic system assistance

On average, it costs around \$120 to complete a septic system inspection. To inspect the 1,929 septic systems needing inspections in the East Fork Lewis River, it will cost around \$231,500 dollars to achieve a 100 percent inspection rate. Investing in septic system inspections will provide more information about septic system age, design, and condition, and any maintenance, repair, or replacement needs in the watershed. This information can help implementing organization prioritize and target the most critical septic systems for technical and financial assistance.

New septic systems can cost around \$15,000 dollars to replace and public sewer connection can cost \$8,000-\$15,000 dollars. Staying up to date on septic inspections, operations, and maintenance needs can extend the lifecycle use of septic system infrastructure, and offset future costly repair associated with poor maintenance and septic failure.

Septic System Inspection and Tank Pumping Rebate Program

To provide septic system owners with financial assistance, organizations in Clark County should consider developing a new septic system inspection rebate program. This program would provide reimbursements to property owners in the East Fork Lewis River that complete certified septic system inspections. Developing a rebate program for septic system maintenance and tank pumping is another solution to provide financial assistance for essential septic system services. Opportunities to establish public-private agreements with septic system companies to address septic issues should be explored.

Craft 3 Loan Program for Septic Repairs or Replacement

Property owners needing replacement or significant repair of their septic system may qualify for financial assistance through different funding sources. Clark County collaborates with Craft3, a nonprofit lender in Oregon and Washington, to offer homeowners an affordable loan to repair or replace failing septic systems. The loan covers the full costs of designing, permitting, installing and maintaining a septic system, or public sewer connection. Owner and non-owner occupied properties, including commercial, secondary, rental, and vacation properties are eligible to apply for Craft3 assistance. Low interest rates and deferred payment options may be available for homeowners with lower incomes. The program was launched in Clark County in 2016 and has provided assistance at least 300 septic system owners in Clark County since its inception.

Clark County Community Services Single-Family Housing Rehabilitation Program

Another financial assistance option for septic owners is the Clark County Housing Rehabilitation Program, which is available to low-to-moderate income homeowners who live in Clark County.

Funding for the program is through the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grant (CDBG) Program under Title 1 of the Housing and Community Development Act of 1974.

United State Department of Agriculture (USDA)

The USDA also offers rural residents with properties outside city limits and urban growth boundaries with two types of loans that can support septic system improvements. Single Family Housing Direct Home Loans (Section 502 Direct Loan Program) assists low and very low-income applicants and Single Family Housing Repair Loans and Grants (Section 504 Home Repair Program).

Connecting to Sewer

In urbanized areas, some homeowners may have the option to connect to municipal sewer, rather than maintaining or repairing septic systems. To help septic system owners connect to public sewer, some public wastewater treatment entities have financing options available to help connect properties with septic systems to public sewer. In Clark County, Clark Regional Wastewater District and the City of Vancouver have programs that support and incentivize septic owners to connect to sewer. In the East Fork Lewis River, there are two Wastewater Treatment Plants. One is at the City of La Center, and the other is at Larch Corrections Facility. Clark Regional Wastewater District also provides services within the watershed. The City of La Center should consider developing financial resources to help septic system owners connect to sanitary sewer services. Additionally, updating local codes and ordinances to require septic system owners to connect to sewer can help address water quality challenges associated with septic systems.

La Center's Wastewater Collection System

The City of La Center has made significant financial and technological investments in its wastewater treatment plant. With significant population growth and residential development in the community, La Center has expanded its wastewater treatment capacity from 1 million gallons per day (MGD), to 3 MGD, with the ability to expand to 6 MGD in the future. La Center's treatment plant utilizes advanced Membrane Bioreactor (MBR) technology to maximize the facility's performance. La Center is regulated through the Department of Ecology's State Waste Discharge Permit, which requires the city to submit daily monitoring reports on water quality from the treatment plant's discharge. Additional monitoring was completed in the East Fork Lewis River near the wastewater treatment plant's discharge point in 2005 and 2006, and water quality standards for bacteria were generally met near the facility's discharge. Potential temperature impacts from the wastewater treatment plant are unknown.

Today, there are homeowners that still rely on septic systems within the City of La Center's sewer service area. Opportunities to connect remaining septic system owners to municipal sewer should be pursued within the City of La Center's urban growth area.

Pollution Identification and Correction Programs

Pollution Identification and Correction (PIC) Programs provide a comprehensive framework to find, and remove sources of bacteria in watersheds. PIC programs often include monitoring, nonpoint source investigation, financial and technical assistance, public education and outreach, and implementation of corrective actions. Priorities for PIC programs include septic system implementation, and implementation of agricultural best management practices. The Washington State Department of Ecology and Department of Health has developed guidance for PIC program development and implementation. Entities wishing to develop a new PIC program, or seeking funding for PIC program implementation should utilize DOH and Ecology guidance.

PIC programs in the East Fork Lewis River

Multiple organizations in Clark County have expressed interest in developing a new, pilot PIC program in the lower and middle East Fork Lewis River watershed. PIC efforts in the East Fork Lewis River should target implementation in subwatersheds with known bacteria issues. In the East Fork Lewis River, McCormick and Brezee Creeks are the highest priority subwatersheds for bacteria reduction due to consistently high, dry season bacteria concentrations. Jenny, Lockwood, Mason, Riley, and Yacolt Creeks, as well as Rock Creek North, and the East Fork Lewis River mainstem near Paradise Point are also priorities for PIC efforts.

To begin implementing a new PIC program, it is important to establish an Interlocal Agreement, which outlines how partner organizations will work together to administer, manage, and implement the PIC program. In addition, it is important to establish responsibility for PIC program coordination, communication, and oversight. One opportunity is to establish a PIC Coordinator, PIC Advisory Group, charter, or governance structure, which outlines how partners will coordinate on PIC program planning and implementation. In addition to developing an Interlocal Agreement, it is critical to establish a PIC Program Flowchart, which defines a chain-of-command and details the different authority and responsibility of organizations.

Defining how site visits and property inspections will be completed and how public education, technical assistance, and financial assistance will be provided to landowners is also important. Having a clear enforcement process and regulatory backstop for addressing bacteria pollution is essential. Without an enforcement mechanism, it is difficult to implement a PIC program that relies solely on voluntary compliance, education, BS technical assistance. Listed below are some of the foundational elements of a successful PIC program.

- Establish a PIC Program Interlocal Agreement.
- Establish a PIC Program Coordinator, Advisory Group, Charter, or Governance Structure.
- Establish a PIC Program Flowchart and Chain-of-Command.
- Develop protocols for site visits and property inspections.
- Outline how technical and financial assistance will be provided.
- Develop an enforcement process and regulatory backstop.

Within PIC program development, various definitions and protocols need to be developed. For example, implementing organizations will need a Quality Assurance Project Plan (QAPP) to

support PIC monitoring efforts. Any monitoring efforts implemented in the watershed must incorporate the new *E. coli* standard for bacteria. In addition to utilizing this new bacteria indicator, it will be important for the monitoring team to determine thresholds for how to confirm a bacteria hot spot, and complete investigative sampling. Additionally, having established protocols for completing sanitary surveys and dye tests, site visits, shoreline surveys, and property investigations can support field staff that visit properties of concern. Listed below are some of the monitoring actions needed to establish a successful PIC program.

- Develop a Quality Assurance Project Plan (QAPP), which incorporates new *E. coli* standard.
- Select initial monitoring locations.
- Determine thresholds for confirming bacteria hotspots and a threshold for resampling.
- Develop an investigative sampling and source tracing process.
- Establish protocols for sanitary surveys and dye tests.
- Develop protocols for site visits, nonpoint source surveys, illicit discharge detection and elimination, and property investigations.

PIC programs should focus on the most critical drainages for water quality improvement. To prioritize properties for initial investigation, land use analysis and mapping should be completed to identify parcels that may be contributing bacteria sources. Watershed evaluation and windshield surveys may help support property prioritization. Prioritizing properties within 200 feet of a river should be considered. Completing a septic system record assessment can also support PIC program efforts. Having clear criteria for how properties will be prioritized for investigation, follow-up, and corrective action will also support targeted implementation. In addition to addressing bacteria from septic systems, developing strategies for addressing other sources, such as agriculture, stormwater, pet waste, and wildlife sources should also be incorporated into PIC implementation. Having a clear strategy for how to communicate with landowners and provide technical and financial assistance for BMP implementation is also needed. Action items for assessment and mapping are listed below.

- Complete land use analysis and mapping.
- Establish geographic prioritization and project scope.
- Complete watershed evaluation and windshield surveys.
- Complete septic system record assessment.
- Establish clear criteria for how properties will be prioritized for investigation, outreach, and implementation.

Successful PIC program not only find and fix sources of bacteria, but also foster public awareness to prevent bacteria pollution in the future. Developing a strong public education and outreach plan is one element of PIC program establishment, as well as developing criteria to measure progress, and an evaluation process, which includes long-term effectiveness monitoring. Some of the action items related to PIC program education and outreach are listed below.

- Develop a communication, education, and outreach strategy.
- Develop implementation targets and criteria to measure progress.

- Develop an evaluation process to measure success.
- Develop a long-term effectiveness-monitoring plan.

Poop Smart Clark – PIC Program

Clark Conservation District, Clark County Public Works, Clark County Public Health, Washington State University Extension, and Watershed Alliance of Southwest Washington are developing a new Pollution Identification and Correction Program in Clark County called *Poop Smart Clark*. This collaborative program is seeking funding to implement a pilot PIC program to address multiple source of bacteria in the East Fork Lewis River watershed including livestock, human, and canine sources.

Work within this program will include source identification, technical assistance, outreach, education, and implementation of livestock and septic best management practice. Tasks associated with the PIC program include completing water quality monitoring, a land use assessment, and septic system records assessment. Door-to-door outreach and education efforts will help promote implementation of septic and agricultural projects. To support septic system correction, a new septic system fee rebate program will be developed, as well as additional resources to support septic system repair and replacement, and more workshops on septic system maintenance. Livestock technical assistance, BMP implementation, and workshops will also be hosted.

To support to development of a PIC program, Clark Conservation District and Watershed Alliance of Southwest Washington issued a survey to find landowners who could benefit from water quality improvement projects in the East Fork Lewis River. Some landowners have already expressed interest in implementing water quality BMPs on their properties, but more outreach to landowners is needed.

In addition to starting outreach to landowners, Poop Smart Clark is developing a new website called “poopsmartclark.org” which is a social marketing, public education and outreach tool to raise public awareness about what individuals can do to reduce bacteria pollution in Clark County watersheds. This Poop Smart framework was initially developed and implemented in Skagit County and has had significant, measurable success, including generating more willing landowners to implement voluntary best management practices for water quality. Additional details related to this program were provided in the Agriculture section of the *Water Cleanup Plan*.

Septic system enforcement

Ecology’s goal is to work with stakeholders to achieve voluntary compliance with state law and the water quality standards. Ecology invests heavily in technical and financial assistance and provides multiple opportunities and pathways for stakeholders to proactively address pollution problems before enforcement is pursued. Ecology uses regulatory authority as a backstop when technical and financial assistance efforts fail to address identified pollution problems. Any

person who violates or creates a substantial potential to violate any part of the Water Pollution Control Act, is subject to an enforcement order from Ecology pursuant to RCW 90.48.120

If water quality standards are not achieved through implementation of best management practices for septic systems outlined in this *Water Cleanup Plan*, a traditional total maximum daily load (TMDL) study will be required in the East Fork Lewis River.

Implementation – Septic Systems

To achieve clean water in the East Fork Lewis River, meet water quality standards, and support recreational uses, it is necessary to address water quality impacts from septic systems. Significant progress has been made to develop a new, comprehensive Pollution Identification and Correction program in Clark County, but more work and coordination is needed to launch this program into the future. The following implementation tables outline septic system implementation goals, and additional septic system actions needed to achieve clean water in the East Fork Lewis River. The long-term goal is to eliminate septic system impacts on water quality, and to achieve 100 percent septic system inspection compliance, maintenance and correction in the watershed. To achieve this goal, local organizations should prioritize septic system implementation efforts in the lower and middle watersheds where known bacteria problems exist.

Table 13. Septic system implementation goals.

Implementation Goals
<ul style="list-style-type: none">• Eliminate septic system impacts on water quality in the East Fork Lewis River. Achieve 100 percent septic system inspection compliance, maintenance, and correction. Prioritize septic system inspection and maintenance in the lower and middle watershed where known bacteria problems exist. Initial efforts should be targeted to McCormick and Brezee Creek, followed by Lockwood, Riley, Jenny, Rock Creek North, Mason, and Yacolt Creeks.

Implementation actions – septic systems

Table 14. Septic system implementation actions.

No. OSS1	Inspection and Maintenance
OSS1.1	Pilot a septic system inspection, maintenance, and operation enforcement program in the East Fork Lewis River watershed. Prioritize outreach, investigation, and enforcement to subwatersheds where there are known bacteria problems, and the highest density of septic systems that are past due for inspection. Prioritize past due septic systems for compliance related outreach. Complete outreach to past-due septic system owners. Achieve 100% septic system inspections to confirm system age and condition.
OSS1.2	Develop and implement a rebate, discount, or coupon program for septic system inspection, tank pumping, and maintenance.
OSS1.3	Develop and implement a pollution identification and correction program that supports long-term identification and correction of septic systems contributing to bacteria pollution in surface waters.
OSS1.4	Complete a septic system records assessment to identify and map septic systems that are past due for inspection. Create an inventory of parcels that are serviced by septic systems in priority subwatersheds. Utilize information from past inspection report to evaluate likelihood of failure and prioritize subwatersheds for compliance actions.
OSS1.5	Implement a past due operation and maintenance lettering effort, with the goal to increase voluntary inspection rates.
OSS2	Repair and Replacement
OSS2.1	Develop a rebate, discount, coupon, reimbursement, or cost-share based program to for septic system repair and replacement.
OSS2.2	Continue Clark County’s participation in the Craft3 Regional Loan Program for septic system repair and replacement.
OSS3	Sewer Extension and Connection
OSS3.1	Where feasible, extend sanitary sewer to critical sewage areas and connect septic system owners to sanitary sewer.
OSS3.2	Continue Clark Regional Wastewater District’s (CCRWD) Septic Elimination Program (SEP) to facilitate sanitary sewer extensions to critical sewerage areas. Utilize CCRWD financial assistance programs to incentivize septic system owners to connect to sewer
OSS3.3	Replicate CCRWD’s Connect to Sewer Program or the City of Vancouver’s Sewer Connection Incentive Program in Brezee and McCormick Creeks to promote more septic system owners to connect to sanitary sewer services and provide financial assistance to facilitate sewer connections.

Table 15. Septic system implementation actions (cont.)

OSS4	Education and Outreach
OSS4.1	Promote more septic system inspections, maintenance, and repair by encouraging participation in Washington State University Extension and CCPH Well and Septic workshops. Increase promotion of the Craft 3 regional loan program, USDA funding, and other sources of funding for septic system repair and replacement. Where appropriate encourage septic system owners to connect to sewer.
OSS4.2	Host more Well and Septic Workshops, to increase the number of septic system owner's eligible to self-inspect their systems.
OSS4.3	Update septic system educational materials.
OSS4.4	Utilize Poop Smart Clark to educate on septic systems.
OSS4.5	Provide technical support, training, and continuing education opportunities to septic system professionals.
OSS5	Other
OSS5.1	Calculate expected bacteria load reductions from septic system improvement projects.
OSS5.2	Update local codes, ordinances, and increase enforcement to ensure proper siting, and setbacks on septic systems to avoid water quality impacts.
OSS5.3	Utilize investigative monitoring, illicit discharge detection and elimination (IDDE) methods, including dye and smoke testing to identify sources of bacteria pollution.
OSS5.4	Track septic system implementation and complete effectiveness monitoring post implementation.

Milestones, targets, and timelines for septic systems

Table 16. Septic system milestones, targets, and timeline.

Septic System Milestones	Target Date
Inspection and Maintenance	
Achieve 100% septic system inspection compliance by 2030.	2030
Repair and Replacement	
Correct 100 % of failing septic systems by 2030.	2030
Correct any failing septic systems identified within 6 months of identification.	
Sewer Extension and Connection	
Connect 100% of homeowners within the sewer service area to municipal sewer services by 2030.	2030
Public Education and Outreach	
Educate 100% of septic system owners by 2030.	2030

Criteria to measure progress on septic systems

An annual survey will be sent to implementing partners to track and measure implementation progress for septic systems. Information collected from the annual survey will be used to develop an annual report. Every five years, an East Fork Lewis River Progress Report will be published as a part of the adaptive management process, to track implementation progress, and update implementation actions. The following criteria should be utilized to measure progress on septic system implementation in the East Fork Lewis River.

Table 17. Septic system criteria to measure progress.

Septic System Criteria to Measure Progress
Number of homeowners connected to sewer.
Total dollars spent on providing septic system owners with financial assistance to improve septic systems or connect to sanitary sewer.
Number of homeowners benefiting from Craft 3 Financial Assistance.
Number of homeowners benefiting from sewer connection financial assistance.
Number of residents participating in WSU Extensions Septic Workshops.
Number of septic system inspections and number of property owners in compliance with septic system inspection program.
Number of residents participating in WSU Extensions Septic Workshops.
Number of homeowners benefiting from sewer connection financial assistance.
Number of septic systems repaired or corrected.
Number of site visits to properties with septic systems.
Number of homeowners self-inspecting their systems.
Number OSS failures.
Number of reduced OSS failures.
Number of OSS corrected or with correction plan.
Number of parcels current with OSS inspections.
Percent increase of septic systems with inspections.
Reduction of septic system failures
Septic system failure rate (number and percent) inside and outside of geographic area of emphasis.
Number of OSS maintenance rebates issued to property owners within project focus area.
Number of homeowners certified to perform septic inspections
Bacteria monitoring.

Funding and partnerships for septic systems

The Department of Ecology provides funding for septic systems through the Water Quality Combined Funding Program. The full list of eligible BMPs may be updated annually when new information or technology becomes available

Table 18. Ecology funding for septic system implementation.

Best Management Practice	Description
Onsite Sewage System	Septic System projects are eligible for both grants and loans. Eligible projects include: planning, design, and construction of community large onsite sewage systems; surveys of existing septic systems throughout watersheds; local government loan programs provided to homeowners and small commercial enterprises for the repair and replacement of failing septic system; and homeowner education and outreach on the topic of septic system operation and maintenance.

Information on BMP costing can be obtained by contacting Ecology’s grant project managers and financial managers. The USDA Natural Resources Conservation Service also serves as a strong resource for BMP cost estimation. To achieve water quality standards in the East Fork Lewis River, significant financial investment is needed to address water quality impacts from septic systems.

Table 19. Septic system implementing organizations and partners.

Implementation	Stakeholders
Primary organizations	Clark County Public Health, Clark County Public Works, Clark Regional Wastewater District (City of Battle Ground, and City of Ridgefield), City of La Center, Clark Conservation District, Watershed Alliance, and Washington State University Extension
Partners	Department of Ecology, Craft3 Regional Loan Program, Clark County Regional Wastewater District, Discovery Clean Water Alliance, United States Department of Agriculture, and Washington Department of Health.

Agriculture

Introduction

The East Fork Lewis River is an urbanizing watershed that has strong rural and agricultural character. In 2018, the watershed had 14,827 acres of agricultural zoning, which consists of numerous equestrian properties, small acreage farms with livestock, equestrian facilities orchards, vegetable farms, wineries, and rolling pastures. Between 2004 and 2018, zoning for agricultural lands decreased by 9 percent in the watershed, with a loss of 1,512 acres. Most of the remaining agricultural land uses are located in the middle and lower portion of the watershed. However, there are some private forest owners with active silviculture practices in the upper watershed.

Agriculture is one source of bacteria pollution in the East Fork Lewis River watershed. Agriculture can impact water quality through nonpoint source (NPS) runoff and stormwater, direct access of livestock to streams, or direct discharge of manure to surface water. Agriculture can also impact stream temperature if property owners have removed native trees and shrubs in stream buffer areas.

The extent of agricultural impacts in the East Fork Lewis River watershed is currently under evaluation. The Department of Ecology and local organizations are working to understand the extent and severity of agricultural issues. The lower and middle watershed, where known bacteria issues exist, are priority areas for investigation, site visits, conservation planning, technical and financial assistance. The *East Fork Lewis River Source Assessment* identified Brezee and McCormick Creeks as the top priority for bacteria reduction. Rock Creek North, Jenny, Riley, and Lockwood Creek are secondary priorities. Mason and Yacolt Creek are also priorities for bacteria reduction. In these priority subwatersheds, there are 257 tributary miles and 3,138 parcels within 100 feet of the river that could be potential sources of pollution. These properties need field investigation, windshield surveys, watershed evaluation, mapping, and additional water quality assessment to identify potential impacts to water quality from agriculture. Once source confirmation is complete, outreach to property owners to encourage implementation of agricultural best management practices is needed. Listed below is a summary of agriculture in the East Fork Lewis River.

Table 20. Agriculture facts in the East Fork Lewis River watershed,

Agriculture facts.
<ul style="list-style-type: none">• 14,827 acres of agricultural zoning.• Estimated 322 farms in watershed.• 1 Small dairy with potential manure application.• 1 Egg laying facility.• 0 Concentrated Animal Feeding Operations.• Mostly small acreage agriculture with livestock, horses, alpaca, and poultry; pasture, crops, and grassland.• 257 priority tributary miles for bacteria.• 3,138 parcels within 100 feet of water on priority tributaries.

Livestock facilities in the East Fork Lewis River

Currently, there is only one small permitted dairy in the East Fork Lewis River, which is regulated through the Washington State Department of Agriculture’s (WSDA) Dairy Nutrient Management Program. This dairy is located in the Middle East Fork Lewis River, in the headwaters of Mason Creek, with some potential manure application on fields in the Lockwood Creek drainage. In McCormick Creek, there is one active egg laying facility regulated by WSDA’s Food Safety program. In the McCormick Creek subwatershed, there is also an active irrigation district withdrawing water from the mainstem East Fork Lewis River for agricultural uses. There are no Concentrated Animal Feeding Operation (CAFO) permits or facilities. Most of the agricultural properties in the East Fork Lewis River watershed are small acreage farms on residential properties. Equestrian use and alpaca farms are common.

Historically, the watershed had significantly more agriculture and portions of the watershed have legacy impacts from agricultural activities. Some of these legacy areas are now being improved and restored. For example, the lower McCormick Creek watershed used to have a dairy operation where cattle would graze in floodplain areas near the mainstem East Fork Lewis River shoreline. This property is currently owned by the Clark County Legacy Lands program and is in the process of being restored to improve water quality and salmon habitat. Additionally, through NPS investigation and implementation, an abandoned manure lagoon from a historical dairy operation was identified and decommissioned in McCormick Creek, removing a large source of bacteria from the watershed.

Although agriculture has significantly decreased in Clark County, there are still significant livestock impacts in watersheds. According to the USDA Agricultural Census completed in 2017, Clark County has 1,978 farms that are an average of 46 acres each. Additionally, there are over 15,000 cattle and over 11,400 poultry, living on Clark County farms. Listed below is a summary of Clark County agriculture from the USDA Census.

Table 21. Livestock and agriculture in Clark County from USDA 2017 Agriculture Census.

Livestock in Clark County
<ul style="list-style-type: none">• 1,978 farms, ~46 acres each.• 15,065 cattle on 730 farms.• 3,371 milk cows on 21 farms.• 12,445 other cattle on 332 farms.• 2,016 sheep & lambs on 139 farms.• 412 hogs & pigs on 67 farms.• 1,939 goats on 198 farms.• 2,687 horses on 491 farms.• 11,470 poultry on 505 farms.• 530 acres of orchards on 178 farms.• 20-30 wineries.

Nonpoint source implementation by Department of Ecology

To support bacteria reduction efforts in the East Fork Lewis River, the Department of Ecology piloted a new, proactive nonpoint source effort in the East Fork Lewis River in 2018. The goal of proactive nonpoint source investigation is to use monitoring data, watershed evaluation, property inspections, and outreach as a mechanism to find and fix sources of bacteria.

Ecology started its nonpoint source efforts in the headwaters of McCormick Creek, where the highest bacteria concentrations were measured. Agricultural properties were prioritized for site visits based on their proximity to surface water. A postcard was mailed to property owners before site visits were completed. In addition to focusing on agricultural properties, Ecology worked with Clark County Public Health (CCPH) to evaluate septic system records, focusing on properties that have not had septic system inspections completed within the last three years. Any property owners with natural resource concerns or water quality challenges were referred to Clark Conservation District. The Conservation District works with landowners to provide technical and financial assistance to implement best management practices for water quality. Properties with septic concerns were referred to CCPH for technical and financial assistance. Future nonpoint source investigation will be targeted to Jenny, Riley, Brezee, Lockwood Creeks, and Rock Creek North.

In total, there are 257 priority tributary miles for water quality investigation and outreach. Along these river miles, there are 3,138 parcels within 100 feet of water. Surveying these areas and providing landowners with assistance will require coordination across multiple organizations. In 2019, Ecology visited 18 properties. Nonpoint source monitoring was one tool used to confirm, and further investigate bacteria sources. During site visits, Ecology documented any nonpoint source pollution issues observed using a site visit form. Early success stories include:

- Identification and decommissioning of a large manure lagoon from an old dairy.

- Communication with a landowner who was historically dumping manure into the creek. After attending a WSU extension workshop, the landowner has stopped dumping manure and has implemented manure management BMPs to correct the issues.
- Communication with an irrigation district in McCormick Creek.
- A site visit to a dog grooming facility that was directly discharging to the river was also completed. The owner was advised to eliminate the discharge.
- Sites with stormwater and erosion issues have also been visited.
- The identification of an industrial stormwater site operating without a permit.

Manure lagoon decommissioning in McCormick Creek

Ecology's nonpoint source investigation efforts in McCormick Creek resulted in the early identification and removal of a large manure lagoon at an old dairy in the City of Ridgefield. This manure lagoon was located on a property that was transitioning from agricultural land use, into residential land use. Liable parties were notified about their responsibility for manure lagoon decommissioning. Ecology worked with the City of Ridgefield, an engineering firm, and the construction contractor to provide technical assistance on how to decommission the lagoon appropriately using NRCS Manure Lagoon Decommissioning Guidelines (Code 360: Closure of Waste Impoundments). A map of properties with appropriate soils where the manure could be land applied was provided, as well as consultation on the appropriate agronomic rates for manure application.

The Construction Stormwater Permit was the primary tool used to manage the manure lagoon. Ecology required the liable party to develop a Stormwater Pollution Prevention Plan (SWPPP) specific for the lagoon to prevent bacteria discharge to McCormick Creek. Ecology also requested that a berm be constructed and the site be stabilized for the wet weather season. As of September 2019, the manure lagoon was fully decommissioned. Effectiveness monitoring in McCormick Creek will help determine if the major source causing bacteria exceedances in McCormick Creek since 2005 was removed, or if additional sources remain.

Future nonpoint source investigation and implementation

In 2020, Ecology implemented additional nonpoint source monitoring and investigation to further identify sources of bacteria. This monitoring data is being collected in collaboration with Clark County Clean Water, and will be used to target outreach and implementation efforts. Priority areas for additional investigation are Brezee, Jenny, and Bolen Creeks, and Rock creek North.

Traditionally, Ecology utilizes two pathways for nonpoint source implementation and compliance. One pathway is through environmental complaint response, and another pathway is through proactive investigation. Proactive investigation is the primary method being implemented in the East Fork Lewis River Watershed, however Ecology staff are also responding to complaints.

Environmental complaint response (ERTS)

Environmental agencies rely on residents and landowners in watersheds to be the “eyes and ears” for the environment. If the public observes pollution issues, they are encouraged to submit an ERTS complaint online at ecology.wa.gov/ReportAnIssue. Environmental complaints are one important mechanism for Ecology to address water quality concerns. Ecology has routinely responded to ERTS complaints in the watershed.

When a NPS pollution issue is identified, site visits and property investigations are completed. If the problem is related to agriculture, a letter may be sent to the property owner, referring them to the Conservation District for assistance. Follow-up site visits are completed to confirm BMP implementation. The ultimate goal is voluntary compliance and implementation of BMPs necessary for water quality.

Voluntary Clean Water Guidance for Agriculture

The Voluntary Clean Water Guidance for Agriculture is a technical resource that is currently being developed for the agricultural community, restoration practitioners, and technical assistance organizations to support implementation. Compared to other agricultural guidance documents, this guidance focuses on BMPs that protect water quality and help meet the Washington State Water Quality Standards. In the future, this guidance will support Ecology’s nonpoint source funding program, and will inform water cleanup planning, technical assistance, education, and outreach efforts. Ecology recommends that farmers and conservation districts use the guidance during the farm and conservation planning process to identify the best BMPs for water quality. Conservation Districts may also use the guidance to provide technical assistance to landowners, and when developing water quality protection plans or projects. It can also serve as a tool for developing education and outreach materials.

This guidance is voluntary because agricultural landowners are not required to use these specific BMPs. However to protect water quality and comply with water quality standards, Ecology recommends implementing BMPs from this guidance. If an agricultural landowner implements the recommended BMPs, Ecology will presume the operation is adequately protecting water quality.

Agricultural assistance

Clark County has agriculture and solid waste ordinances to protect water resources from the impacts of agriculture. Clark County Code Enforcement is responsible for implementing these ordinances. Most often, agricultural issues in Clark County are identified through environmental complaints submitted by the public. These complaints are usually responded to with a combination of letters, phone calls, site visits, or by providing agricultural landowners with technical assistance to address the issue. Clark County provides some limited funding to Washington State University Extension and Clark Conservation District to provide public education and outreach to landowners on agricultural best management practices.

Although there are some established programs to help agricultural landowners, there is often limited capacity and funding available to provide essential technical assistance, conservation planning, and financial assistance to landowners to help fix water quality issues. Additionally,

the County also has limited capacity and ability to issue corrective action or enforcement to agricultural landowners due to financial constraints, limited staffing capacity, and the current political environment in Clark County. Opportunities to update local agricultural codes, ordinances, and enforcement protocols should be pursued, as well as securing a local source of funding for essential Conservation District assistance.

Organizations providing agricultural assistance to landowners in Clark County and the East Fork Lewis River are outlined in the following table.

Table 22. Agricultural assistance organizations.

Organization	Description of Programs
Clark Conservation District	Clark Conservation District provides technical assistance to landowners with natural resource, livestock, soil, and water issues. The CD is a non-regulatory agency that works directly with landowners correct environmental issues, achieve voluntary compliance, and protect clean water.
Washington State University Extension – Clark County	The WSU Extension Small Acreage program provides educational workshops and other outreach to residents on mud and manure management, fencing and pasture management, and other water quality topics unique to rural properties.
USDA Natural Resource Conservation Service (NRCS)	NRCS has funding assistance programs available to assist agriculture producers, and private non-industrial forest landowners to implement conservation activities on their properties address natural resource concerns. One example is the Environmental Quality Incentives Program (EQIP)
USDA Farm Service Agency (FSA)	The Conservation Reserve Enhancement Program (CREP) is a voluntary program implemented by the USDA Farm Service Agency to benefit both farms and fish by helping restore natural vegetation along salmon streams, and provide rental payments to property owners for that part of their property for 10-15 years.
Washington State Department of Ecology Water Quality Program	Staff work with property owners to improve stream water quality by identifying pollution issues and connecting landowners to local agricultural assistance organizations. Ecology can also provide strategic planning support and provides competitive funding opportunities to organizations that can work with private landowners to implement conservation projects.

Clark Conservation District

Clark Conservation District is a non-regulatory organization that works with private landowners to provide solutions to natural resource and water quality concerns. Clark Conservation District can support landowners by providing technical assistance, education and outreach, conservation planning services, and by providing funding to implement water quality projects on private property. While Clark Conservation District provides an essential service to residents of Clark County, there is no sustainable funding source at the local level to support the District’s programs. The District is 100 percent grant funded. Securing a local source of funding is essential to supporting Clark County landowners with natural resource assistance.

Multiple regulatory programs rely on Conservation Districts to provide landowners with technical and financial assistance as a pathway to achieve voluntary compliance with local, state, and federal pollution programs. Over the last two years, Department of Ecology has worked closely with Clark Conservation District, the Washington State Conservation Commission, and the USDA Natural Resource Conservation Service (NRCS) to develop solutions to increase the District's capacity.

Washington State University Extension

The Washington State University (WSU) Extension Small Acreage Program provides outreach and education to rural property owners, and hosts multiple educational workshops focused on best practices for natural resources and water quality on farms. Workshop topics include mud and manure management, fencing and pasture management, and other water quality topics unique to rural and agricultural landowners. Other annual events include the Living on the Land Education Series, Small Acreage Expo, a Small Acreage Recognition Program, and Best Management Practices Workshops. From 2012 to 2018, approximately 316 Clark County residents attended WSU's BMP workshops, and 74 percent of individuals surveyed implemented 198 BMPs. Additionally, 470 people graduated from the Living on the Land series since 2003. These individuals have implemented 752 BMPs on at least 2,473 acres, benefitting 1,795 non-poultry livestock in Clark County. WSU Extension primarily relies on grant funding to implement agricultural programs, and has a small portion of funding from Clark County.

USDA Natural Resource Conservation Service (NRCS)

Currently, there is one NRCS staff person providing support to agricultural producers in Clark County. Priority resource concerns established by the NRCS Southwest Washington Local Working Group, are water quality issues from excess nutrients, sediments, and pesticides; inadequate fish and wildlife habitat, degraded plant and soil conditions, and challenges with water supply for irrigation. NRCS has grant opportunities available to help landowners implement agricultural BMPs. However, NRCS does not provide much funding support for essential technical assistance or conservation planning, which are normally the first steps necessary to help landowners.

Conservation planning and implementation process

The traditional process to support agricultural landowners with implementation involves multiple steps. Normally, properties with water quality challenges are identified and landowners are contacted through a letter, site visit, or phone call. Once an initial site visit is completed, landowners may be provided technical assistance verbally or in a letter. If there are more significant issues, a conservation plan (or farm plan) targeted towards water quality BMP implementation may be developed. Once conservation planning and BMP design is complete, on-the-ground BMP implementation can occur using various levels of financial assistance. Private landowners may also choose to fix the problem on their own. BMP maintenance and monitoring is used to ensure BMPs are working and to measure effectiveness. The conservation planning and implementation process is summarized in the following table.

Table 23. Process to support implementation on private properties

Steps	Activity
1	Identification of Properties
2	Landowner Outreach
3	Site Visit
4	Technical Assistance
5	Conservation Planning
6	BMP Design
7	BMP Implementation
8	BMP Maintenance and Monitoring

Poop Smart Clark – PIC Program

Clark Conservation District, Clark County Public Works, Clark County Public Health, Washington State University Extension, and Watershed Alliance of Southwest Washington are developing a new Pollution Identification and Correction (PIC) Program in Clark County called *Poop Smart Clark*. PIC programs provide one overarching framework for organizations to work across jurisdictions, organizational boundaries, and programmatic silos to comprehensively address bacteria and other pollution problems in watersheds. PIC programs can help achieve long-term water quality goals for agriculture, while also addressing septic system issues, and stormwater sources. Additional details related to this program were provided in the Septic System section of the *Water Cleanup Plan*.

In 2019, Clark County applied for an NRCS Regional Conservation Partnership Program (RCPP) grant to implement a new PIC program in Clark County, focusing its initial efforts on the East Fork Lewis River. In 2020, Clark County was awarded \$1.4 million dollars to launch the Poop Smart Clark PIC Program. This program will utilize expertise from local agencies and nonprofits to reduce sediment, nutrient, and bacteria runoff in Clark County. Through pollution source identification, targeted outreach, education, and implementation of on-the-ground practices, Poop Smart Clark connects landowners with the tools they need to correct pollution, drive social change, and spur adoption of improved management practices. The funding award primarily supports implementation of agricultural BMPs. Additional funding is needed to support other elements of a comprehensive PIC program. The new program may begin implementation as early as 2021.

PIC Partners issued a survey to find potential landowners who could benefit from water quality improvement projects in the East Fork Lewis River. Some landowners have already expressed interest, but more outreach to landowners is needed. In the following table, specific tasks and agencies involved with PIC program implementation are detailed. Additional detail is provided in the PIC Program figure.

Table 24. Pollution identification and correction (PIC) program tasks in Clark County.

Tasks	Agency
Source Identification	
Quality Assurance Project Plan	Clark County Public Works Clean Water
Water Quality Data Assessment	Clark County Public Works Clean Water
Land Use Assessment	Clark County Public Works Clean Water
Septic System Records Assessment	Clark County Public Health
Microbial Source Tracking	Clark County Public Works Clean Water
Outreach	
Poop Smart Clark Development	Clark Conservation District
Door-to-door Outreach	Clark Conservation District / Watershed Alliance of Southwest Washington
Septic	
Septic System Compliance Prioritization	Clark County Public Health
Financial Assistance Means Testing System	Clark County Public Health
Septic Inspection Fee Rebate Program	Watershed Alliance of Southwest Washington
Septic System Inspection & Maintenance Workshops	Washington State University Extension
Septic System Repair/Replacement	Clark Conservation District
Livestock	
Livestock Technical Assistance	Clark Conservation District
Livestock BMP Installation	Clark Conservation District
Livestock BMP Workshops	Washington State University Extension

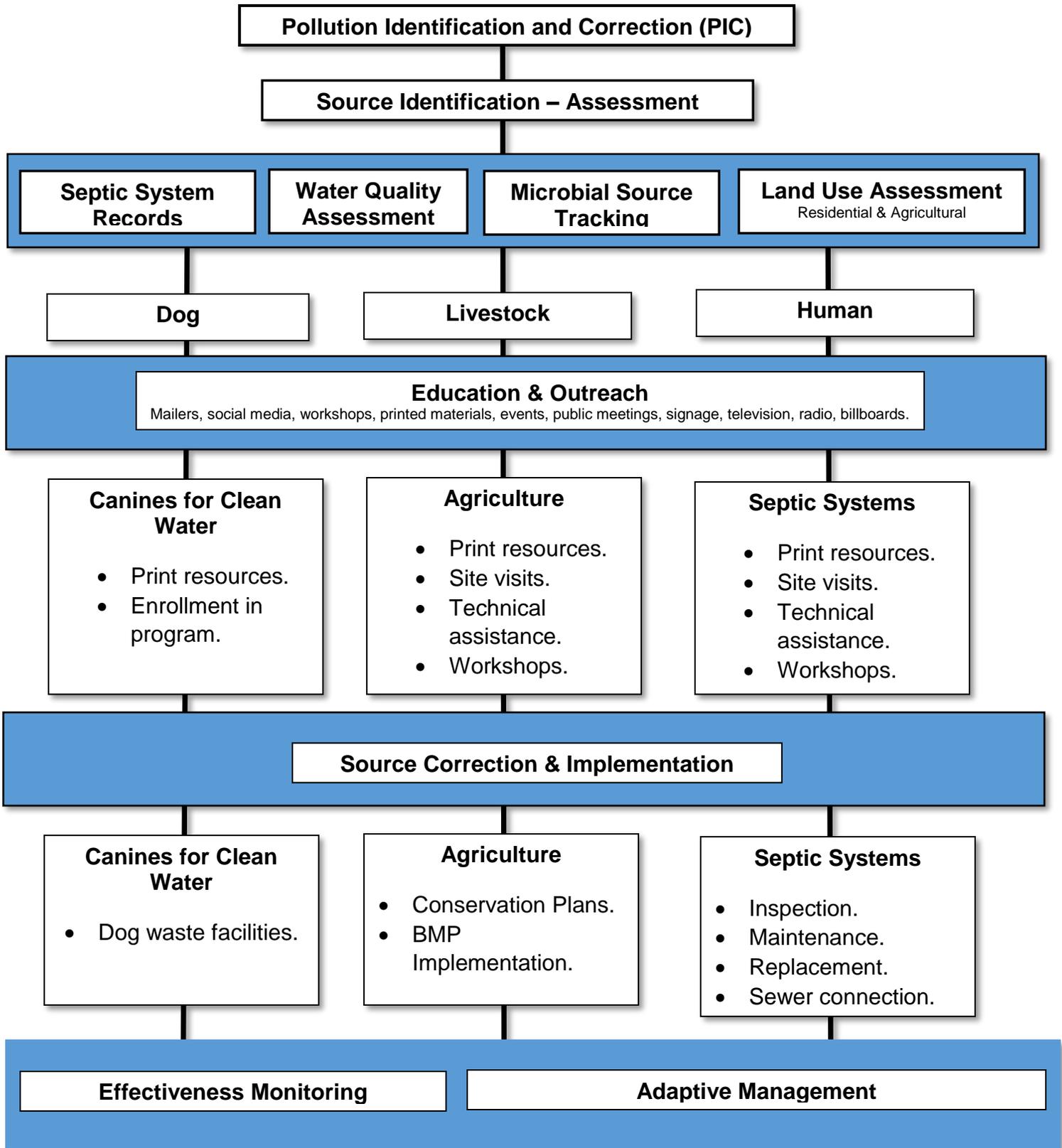


Figure 2. Poop Smart Clark Pollution Identification and Correction Program Framework.

Agriculture enforcement

Ecology's goal is to work with stakeholders to achieve voluntary compliance with state law and the water quality standards. Ecology invests heavily in technical and financial assistance and provides multiple opportunities and pathways for stakeholders to proactively address pollution problems before enforcement is pursued. Ecology uses regulatory authority as a backstop when technical assistance efforts fail to address identified pollution problems. Any person who violates or creates a substantial potential to violate any part of the Water Pollution Control Act, is subject to an enforcement order from Ecology pursuant to RCW 90.48.120.

The *Voluntary Clean Water Guidance for Agriculture* is a technical resource that is under development for the agricultural community, restoration practitioners, and agricultural assistance organizations to utilize for implementation. Ecology recommends implementing BMPs from this guidance to achieve water quality standards. If water quality standards are not achieved through implementation of best management practices for agriculture outlined in this *Water Cleanup Plan*, a traditional total maximum daily load (TMDL) study will be required in the East Fork Lewis River.

Implementation - agriculture

To achieve clean water in the East Fork Lewis River, meet water quality standards, and support recreational uses, it is necessary to address water quality impacts from agriculture. The extent of agricultural impacts in the watershed is currently unknown, but areas with known bacteria issues have been identified and proactive nonpoint source investigation is underway. Additional watershed evaluation, mapping, and assessment is needed to target and identify bacteria sources. Since the East Fork Lewis River Partnership was launched, significant progress has been made to build local capacity and form new partnerships to address agricultural issues and help landowners. However, more work, coordination, resources, and capacity are needed. The following implementation tables outline goals and actions for agricultural implementation in the East Fork Lewis River. The long-term vision is to eliminate agricultural impacts on water quality. To achieve this goal, local organizations should prioritize agricultural implementation efforts in the lower and middle watersheds where known bacteria problems exist.

Table 25. Agriculture implementation goals.

Agricultural goals
<ul style="list-style-type: none">• Eliminate impacts of agriculture on water quality in the East Fork Lewis River.• Implement agricultural BMPs necessary to protect water quality in the lower and middle watershed (river miles 0 to 20 – specifically McCormick, Brezee, Lockwood, Riley, Jenny, Mason, Yacolt, and Rock Creek North) where known bacteria problems exist. The <i>East Fork Lewis River Source Assessment</i> identified Brezee and McCormick Creeks as the top priority for bacteria reduction. Rock Creek North, Jenny, Riley, and Lockwood Creek are secondary priorities. Mason and Yacolt Creek are also priorities for bacteria reduction. In total, there are 257 priority tributary miles, with 3,138 parcels within 100 feet of the river.• Prioritize agricultural outreach and implementation in the lower and middle watershed (river miles 0 to 20 – specifically McCormick, Brezee, Lockwood, Riley, Jenny, Mason, Yacolt, and Rock Creek North) where known bacteria problems exist.• Develop and implement a Pollution Identification and Correction program that supports long-term identification and improvement of agricultural properties contributing to bacteria pollution in surface waters.

Table 26. Agriculture implementation actions.

AG1	Proactive Nonpoint Source Investigation
AG1.1	Proactively investigate and identify properties with nonpoint source water quality concerns in the lower and middle East Fork Lewis River watershed, where known bacteria issues exist. (River miles 0 to 20 – specifically McCormick, Brezee, Lockwood, Riley, Jenny, Mason, Yacolt, and Rock Creek North).
AG1.3	Complete watershed evaluation, windshield surveys and desktop analysis to develop a list of properties with nonpoint source water quality issues that would benefit from a site visit, technical assistance, conservation planning, or best management practice implementation. Refer properties to Clark Conservation District or local code enforcement to address bacteria pollution.
AG2	Site Visits
AG2.1	Complete site visits at all properties in the East Fork Lewis River watershed with nonpoint source water quality concerns to assess and document water quality issues, provide technical assistance, and identify opportunities for water quality BMP implementation. Prioritize agricultural landowners with livestock for initial outreach efforts.
AG2.2	Work with the Washington State Department of Agriculture Dairy Nutrient Management Program and the Food Safety Program to inspect the dairy and egg-laying facility in the East Fork Lewis River to identify potential sources of nonpoint source pollution. Ensure waste management and any land application of manure or biosolids is occurring appropriately.
AG2.3	Complete site visits and inspections at all wineries in the East Fork Lewis River to identify bacteria and temperature pollution problems. Identify opportunities to implement source control best practices for bacteria and temperature, including management of fruit waste (food kindred products / compost) and management of manure land applied as compost or fertilizer. Prioritize visiting wineries with large ponds attracting geese, which potentially contribute to bacteria pollution and thermal loading. If appropriate, encourage proper wastewater treatment practices and coverage by the Ecology winery general permit.
AG2.4	Complete site visits at all produce producers and orchards in the watershed to educate and encourage the implementation of source control measures.
AG3	Technical Assistance
AG3.1	Provide technical assistance for the planning, design, and implementation of eligible water quality BMPs and stream restoration activities to all property owners with nonpoint source water quality challenges in the East Fork Lewis River. Document technical assistance in a letter outlining necessary corrective action and implementation needed to address water quality concerns.
AG3.2	Identify water quality improvement projects that are eligible for Ecology (Centennial & 319 Funding), NRCS, Clark CD, or other funding.
AG3.3	Provide technical assistance to support manure lagoon decommissioning and management in the watershed.

Table 27. Agriculture implementation actions (cont.)

AG4	Conservation Planning
AG4.1	Complete site-specific conservation plans targeted to water quality BMP implementation on all properties in the East Fork Lewis River with nonpoint source pollution concerns. Prioritize agricultural landowners with livestock for initial planning efforts.
AG4.2	Identify opportunities for off-stream watering, livestock feeding, waste management BMPs, livestock exclusion fencing, heavy use area protection, pasture management, and riparian restoration and planting on farms.
AG5	Implementation – Agricultural Best Management Practices
AG5.1	Implement appropriate livestock BMPs on properties in the East Fork Lewis River with NPS water quality concerns. These include off-stream watering, livestock feeding, waste management BMPs, livestock exclusion fencing, and riparian restoration and planting. Utilize the <i>Voluntary Clean Water for Agriculture Guidance</i> for implementation support.
AG5.2	Where appropriate, utilize Ecology (Centennial and 319) funding, NRCS or Clark CD funding to implement to implement best management practices on private property.
AG6	Public Education and Outreach
AG6.1	Implement agricultural education and outreach efforts in the East Fork Lewis River. Focus on subwatersheds with known bacteria issues.
AG6.2	Connect NPS agricultural education to soil health, mud management, pasture health, erosion, flooding, protecting private property, restoring salmon habitat, and enhancing recreational opportunities in the East Fork Lewis River.
AG6.3	Host more agricultural workshops and events. Prioritize hosting workshops in the watershed boundaries and target advertisements to residents living in the watershed to increase attendance.
AG6.4	Develop and host new agricultural workshops for Clark County including best management practices for equestrian owners, horse boarding facilities, alpaca farms, and small farmers with livestock in urban areas. Workshops targeted towards small acreage landowners are a priority.
AG6.5	Provide landowners renting the Conservation District’s poultry processing unit, manure spreader equipment, and participating in the manure exchange program with education on water quality best management practices.
AG6.6	Update printed agricultural education materials. When appropriate, translate materials for other languages and make them accessible.
AG6.7	Provide education on best practices for water withdrawals, irrigation, water-use efficiency, off-stream watering facilities, and the negative impacts of constructed ponds for agriculture, focused on how these efforts benefit water temperatures and salmon recovery. Provide technical assistance to farmers with water resource challenges, including any irrigation districts in the watershed.
AG6.8	Develop new videos to educate the public on agricultural best management practices to improve water quality.
AG6.9	Create public private partnerships for agricultural education and outreach with local feed, agriculture supply stores, and real estate agencies specializing in agricultural properties.

Table 28. Agriculture implementation actions (cont.)

AG6	Public Education and Outreach
AG6.10	Form relationships with Clark County Executive Horse Council, the Alpaca Association of Western Washington, Clark-Cowlitz County Farm Bureau, Pacific Northwest Poultry Association, the Northwest Livestock Commission, Washington Cattel Feeders Association, Future Farmers of America, 4H programs, the Center for Agriculture, Science, and Environmental Education, and others to promote education and outreach on agricultural BMPs for water quality
AG6.11	Provide educational information on agricultural best management practices at Clark County Fair and the Washington State Horse Expo.
AG6.12	Increase outreach to Clark County residents to raise awareness and utilization of Ecology’s Environmental Incident Reporting system (ERTS) to report nonpoint source pollution complaints.
AG7	Pollution Identification and Correction
AG7.1	To support PIC program administration, establish a PIC Program Interposal Agreement or Memorandum of Understanding, PIC Program Coordinator, Advisory Group, Charter, or Governance Structure.
AG7.2	Establish a PIC Program Flowchart and Chain-of-Command, which describes an enforcement process and regulatory backstop.
AG7.3	Complete land use analysis and mapping. Establish geographic prioritization and project scope. Complete watershed evaluation and windshield surveys to support prioritization.
AG7.4	Develop protocols for site visits and property inspections and outline how technical and financial assistance will be provided. Establish clear criteria for how properties will be prioritized for investigation, outreach, and implementation.
AG7.5	Develop a Quality Assurance Project Plan (QAPP), which incorporates new E. coli standard. Select initial monitoring locations, and determine thresholds for confirming bacteria hotspots and a threshold for resampling. Additionally, develop an investigative sampling and source tracing process.
AG7.6	Develop protocols for site visits, nonpoint source surveys, illicit discharge detection and elimination, and property investigations.
AG7.7	Conduct outreach to agricultural landowners and stakeholders that have the potential to impact water quality. Provide technical assistance to agricultural landowners to site, design and construct BMPs necessary for water quality improvement. Develop and install livestock BMP projects necessary for water quality improvement. Administer funding for livestock BMP implementation. Conduct initial and follow-up site visits to ensure proper installation, use, and maintenance of water quality BMPs.
AG7.8	Develop a communication, education, and outreach strategy to support agricultural PIC efforts.
AG7.9	Develop an evaluation process to measure success. Develop implementation targets and criteria to measure progress, as well as a long-term effectiveness-monitoring plan.

Table 29. Agriculture implementation actions (cont.)

AG8	Other
AG8.1	Secure local funding from Clark County and municipalities to support Clark Conservation District and local agricultural assistance organizations.
AG8.2	Update mapping to identify where water quality improvement projects have been implemented and where landowners are spreading manure. Include soil suitability mapping for land application of bio solids (lagoon decommissioning drainage class soils).
AG8.2	Through the NRCS Southwest Local Working Group and Regional Conservation Partnership Program (RCP), prioritize the East Fork Lewis River for additional planning and implementation support. Work with the Washington State Conservation Commission to prioritize resources for Southwest Washington and Clark County, to implement Water Cleanup Plan activities.
AG8.3	Implement best practices from Ecology’s Voluntary Clean Water Guidance for Agriculture.
AG8.4	Calculate expected load reductions from implementation of livestock BMPs.
AG8.5	Track implementation and complete effectiveness monitoring to assess water quality improvement post-implementation.
AG8.6	Implement stormwater source control best management practices to reduce nonpoint source agricultural runoff.
AG8.7	Update local codes and ordinances to address agricultural discharges to water quality and manure management.

Milestones, targets, and timelines for agriculture

Table 30. Agriculture milestones, targets, and timelines.

Agriculture Milestones	Target Date
Proactive Nonpoint Source Investigation	
Complete proactive nonpoint source investigation of priority tributaries in the East Fork Lewis River by 2025.	2025
Site Visits	
Complete site visits to 100% priority properties the East Fork Lewis River by 2025, targeting properties in the Brezee, McCormick, Jenny, and Rock Creek North watersheds.	2025
Technical Assistance	
Provide technical assistance to 100% of livestock owners and agricultural landowners by 2030.	2030
Conservation Planning	
Complete conservation plans targeted towards water quality BMP implementation on 100% of agricultural properties with livestock by 2030.	2030.
Implementation – Livestock Best Management Practices	
Implement Agricultural BMPs on 100% of agricultural properties by 2035.	2035
Public Education and Outreach	
Utilize Community Based social marketing practices to reach 100 % of property owners in the East Fork Lewis River by 2025.	2025
Educate 100% of small acreage landowners in the East Fork Lewis River through WSU Extension’s small acreage program by 2030.	2030

Criteria to measure progress on agriculture

An annual survey will be sent to implementing partners to track and measure implementation progress. Information collected from the annual survey will be used to develop an annual report. Every five years, an East Fork Lewis River Progress Report will be published as a part of the adaptive management process. This report will be used to track implementation progress, and update implementation actions. Relevant metrics will also be tracked through any grant projects supporting implementation in the East Fork Lewis River. The following criteria should be utilized to measure progress on agricultural implementation in the East Fork Lewis River.

Table 31. Agricultural criteria to measure progress on implementation.

Agriculture Criteria to Measure Progress	
	Number of livestock removed from direct access.
	Number of willing landowners.
	Number of completed conservation plans geared towards water quality BMPs.
	Number of site visits completed.
	Number of technical assistance letters issued.
	Number of landowners completing voluntary implementation.
	Total amount of cost share dollars spent by private landowners in the East Fork Lewis River on voluntary conservation practices.
	Lineal feet or river miles of livestock exclusion fencing implemented.
	Number of homeowners implementing NRCS EQIP or CREP projects on their properties.
	Pounds of manure managed in the watershed.
	Acres of pasture improved.
	Number of agricultural BMPs implemented in the watershed.
	Manure lagoons decommissioned.
	Number of enforcement actions and compliance outcomes.
	Dollars spent on agricultural implementation.
	Bacteria and temperature monitoring.
	Number of landowners attending workshops.
	River miles of riparian restoration implemented.

Funding and partnerships for agriculture

The Department of Ecology provides funding for agricultural BMPs through the Water Quality Combined Funding Program. The following agricultural BMPs are currently eligible for Ecology funding. The full list of eligible BMPs may be updated annually when new information or technology becomes available. In addition to these BMPs, Ecology also funds implementation of riparian buffers that are beneficial for water quality. Additional guidance on agricultural BMPs should be referenced in the *Voluntary Clean Water Guidance for Agriculture*.

Table 32. Ecology funding for agriculture implementation.

Best Management Practice	Description
Livestock Exclusion Fencing	Livestock exclusion fencing protects riparian areas from impacts due to livestock activities in and around streams. In addition to fencing, recipients of this funding are required to plant the buffer between the stream and fencing setback with native trees and shrubs to provide a higher level of water quality improvement.
Livestock Off-stream Watering Facilities	A livestock owner uses off-stream watering to provide an alternative source of watering when fencing or other methods exclude livestock from streams in order to protect water quality. Recipients of this funding must also implement livestock exclusion fencing and riparian plantings in conjunction with off-stream watering facilities.
Livestock Feeding BMPs	Livestock feeding and waste management BMPs support the relocation of livestock activities that threaten water quality. Eligible livestock BMPs include heavy use area protection and associated fencing, waste storage facilities, and windbreaks. Grass filter strips are eligible as needed around heavy use areas, when located outside riparian areas. Livestock exclusion fencing and riparian restoration is a required prerequisite for projects that relocate livestock and must meet the minimum setback requirements.
Conservation-Based Tillage Systems	Conservation-based tillage systems that are consistent with Ecology’s Voluntary Clean Water Guidance for Agriculture guidance are eligible for financial assistance.
Pollution Identification and Correction	Pollution Identification and Correction (PIC) programs work to protect and restore water quality by finding and fixing sources of bacteria. Eligible PIC program activities often include pollution source identification surveys and sampling, mapping, water quality monitoring, outreach, and BMP implementation.
Technical Assistance and Conservation Plans for Water Quality	Ecology may reimburse the costs associated with project-specific planning and technical assistance for planning, design, and implementation of eligible water quality BMPs or riparian restoration. In-depth planning or engineered designs on private property may require a landowner agreement prior to significant investment.

Information on BMP costing can be obtained by contacting Ecology’s grant project managers and financial managers. The USDA Natural Resources Conservation Service also serves as a strong resource for BMP cost estimation. To achieve water quality standards in the East Fork Lewis River, significant financial investment is needed to address water quality impacts from agriculture.

Table 33. Agriculture implementing organizations and partners.

Implementation	Stakeholders
<p>Primary organizations</p>	<p>Clark Conservation District and Washington State University Extension.</p>
<p>Partners</p>	<p>Watershed Alliance of Southwest Washington, Washington State University Extension, Washington State Conservation Commission, United State Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), USDA Farm Service Agency, Clark County Public Works Code Enforcement, Clark County Public Health, Clark County Animal Control, Washington State Department of Agriculture, and Washington State Department of Ecology.</p>

Stormwater

Introduction

Stormwater is one source of bacteria pollution in the East Fork Lewis River watershed. In the *East Fork Lewis River Source Assessment*, some of the highest bacteria concentrations in the watershed were measured from a stormwater outfall in the City of La Center. This stormwater outfall drains La Center’s downtown and urban growth area, before discharging to Brezee Creek near river mile four of the East Fork Lewis River mainstem. Samples collected from this outfall have regularly exceeded water quality standards since 2005-2006. The highest bacteria concentrations measured at this outfall were almost six times higher than the applicable water quality standard, with 100 percent of samples exceeding water quality criteria year-round. Additionally, the highest bacteria levels in the watershed have been measured in McCormick Creek. This subwatershed is experiencing rapid urbanization and development due to population growth in the City of Ridgefield.

Priorities for stormwater management in the East Fork Lewis River include bacteria source tracing, illicit discharge detection and elimination (IDDE) programming, bacteria source control activities, and comprehensive stormwater management planning. Adoption of the Western Washington stormwater Manual for development standards and stormwater operations is also a priority. Focusing these efforts in the Brezee Creek and McCormick Creek subwatershed where the highest bacteria concentrations have been measured, and where there are significantly more impervious surfaces and stormwater infrastructure, is a priority. Addressing stormwater impacts in these subwatersheds will require close coordination with local jurisdictions, including the Cities of La Center and Ridgefield, which do not have Municipal Stormwater Permits or programs in place. Coordination with Clark County and the Washington department of Transportation is also necessary. The following list summarizes stormwater facts in the East Fork Lewis River.

Table 34. Stormwater facts in the East Fork Lewis River watershed.

Stormwater facts.
<ul style="list-style-type: none">• Clark County has as Phase I Stormwater Permit.• City of Battle Ground has Phase II Stormwater Permit.• WSDOT has stormwater permit to implement Highway Runoff Manual.• Cities of Ridgefield, La Center, and Yacolt do not have stormwater permit.• 8% impervious land cover in watershed.• 18,731 acres of developed land cover in watershed.• 12,585 acres with impervious surfaces greater than 10%• 96-acre increase in road surfaces outside of urban areas between 2001 and 2016.• 4.9% increase in impervious surfaces (non-road) between 2001 and 2016.• 9,956 building footprints, in 364 acres of critical areas.• 787 building footprints in 26 acres of shoreline management area.• 47% population increase in watershed since 2000.

- Between 2000 and 2018, population has increased by 124% in Battle Ground, 101% in La Center, 259% in Ridgefield, and 69% in Yacolt.
- Between 2004 and 2018 Urban Growth Boundaries have increased by 84% in Battle Ground, 83% in Ridgefield, 160% La Center, and 37% in Yacolt

Western Washington Municipal Stormwater Permit

The Western Washington Municipal Stormwater Permit requires local governments to manage and control stormwater runoff so that it does not pollute downstream waters. In the East Fork Lewis River watershed, there are three municipal stormwater permittees. Clark County has a Phase 1 stormwater permit, which regulates discharges in unincorporated counties with populations of more than 250,000 people. The City of Battle Ground has a Phase 2 permit, which is implemented in jurisdictions with over 10,000 residents. The Washington Department of Transportation (WSDOT) also implements the Highway Runoff Manual on state roads to achieve stormwater requirements.

Stormwater jurisdictions and permits

City of La Center

Two jurisdictions have stormwater infrastructure in the Brezee Creek subwatershed where the highest stormwater bacteria concentrations were measured. These jurisdictions include unincorporated Clark County and the City of La Center. Unincorporated Clark County has a Phase 1 Municipal Stormwater Permit requiring the implementation of stormwater best management practices, including Illicit Discharge Detection and Elimination (IDDE) programming, stormwater outfall screening and mapping, and source control activities.

The City of La Center does not have a stormwater permit; therefore, all stormwater activities and programs implemented by the city are voluntary and proactive. However, La Center has expressed interest in developing a comprehensive stormwater management plan to support capital improvement and asset management programs, and long-term investment in stormwater infrastructure. To achieve stormwater goals, La Center adopted a stormwater utility in 2019 to support future construction, operation, and maintenance needs. La Center is also interested in developing a private stormwater facility inspection and maintenance program, and an illicit discharge detection and elimination program. As of August 2020, the City of La Center has not adopted the Western Washington Stormwater Management Manual for stormwater standards or operations. The City is currently utilizing the 1992 Puget Sound stormwater manual for implementation.

Other jurisdictions with stormwater impacts in the East Fork Lewis River include the City of Battle Ground, the Washington Department of Transportation (WSDOT), and the City of Ridgefield. The City of Battle Ground is under the Western Washington Phase 2 Municipal Stormwater Permit, which is implemented in portions of the Middle East Fork Lewis River watershed. Since 2004, the urban growth boundary in the City of Battle Ground has increased by 84 percent. Priorities for long-term stormwater reimplementation in Battle Ground include

bacteria source control, illicit discharge detection and elimination, and implementation of low impact development.

Washington Department of Transportation

The Washington State Department of Transportation (WSDOT) implements its Municipal Stormwater Permit in all Phase I and II areas. WSDOT's permit implementation data include its features inventory, BMP type and location, outfalls, conveyance mapping, and IDDEs, is available upon request. WSDOT is also required to implement its Highway Runoff Manual statewide. In the Highway Runoff Manual, WSDOT has identified best management practices for waterbodies with TMDLs and category 5 listings. These best practices should be implemented in the East Fork Lewis River watershed. Highways and state routes under WSDOT jurisdiction include Interstate-5 (I-5), which crosses the East Fork Lewis River near Paradise Point State Park; state route 503 (SR-503) which bisects the middle watershed near Lewisville Park; and state route 502 (SR-502) which runs parallel to the river in the southern portion of the watershed. WSDOT's I-5 northbound East Fork Lewis River Bridge Replacement project, at river mile 0.75 is set to begin in 2022. The project will eliminate direct stormwater discharge to the East Fork Lewis River. WSDOT is exploring opportunities to implement water quality education in Paradise Point State park beneath the bridge. WSDOT has also established stormwater retrofit priorities in Clark County, including a location within the East Fork Lewis River watershed along state route 502 at Mill Creek. While not yet funded, the retrofit will be funded in one of three ways as outlined in WSDOT's Stormwater Retrofit Management Plan. WSDOT has also identified two fish passage barriers along state route 503, which are not prioritized because they are outside of the Puget Sound fish passage injunction area. However, these locations will be corrected as funding allows. WSDOT also has active wetland mitigation sites in the watershed that it monitors. These locations change overtime. WSDOT's TMDL Lead can be contacted to request data or to explore partnership opportunities.

City of Ridgefield

The City of Ridgefield also has stormwater impacts in the East Fork Lewis River, specifically in the McCormick Creek subwatershed. Ridgefield does not have a municipal stormwater permit, and has not adopted the Western Washington Stormwater Management Manual. The implementation of stormwater best management practices within Ridgefield's jurisdiction would be beneficial to water quality in rapidly developing and urbanizing portions of the East Fork Lewis River.

Clark County

The primary stormwater infrastructure owned by Clark County in the East Fork Lewis River watershed are roads and ditches. Between 2001 and 2016, impervious surfaces from road infrastructure have increased by 96 acres in the watershed. Clark County plans to update its mapping and inventory of roads and ditches in the watershed in the next few years. In the past, Clark County has implemented stormwater needs assessment studies, water quality monitoring, and stream health reporting in the watershed. Clark County also has a Canine for Clean Water program, which provides education to dog owners about proper management and

disposal of pet waste. According to the program, Clark County has over 110,000 dogs adding more than 13,000 tons of pet waste to Clark County watersheds each year through stormwater runoff. Pet waste is a major priority for stormwater source control activities in the East Fork Lewis River. Implementation of pet waste facilities is one best management practice to reduce bacteria from Clark County's pets.

Stormwater source control

The Phase 1 and Phase 2 Municipal Stormwater permit requires the development, implementation, and management of source control programs to prevent and reduce the discharge of nonpoint source pollutants to stormwater systems. Source Control programs often include the implementation of operational, structural, and treatment BMPs at pollution generating land use types, businesses, and activities. The Municipal Stormwater Permit requires implementation of source control BMPs. Structural and non-structural BMPs for bacteria and temperature source control are outlined in the Western Washington Stormwater Manual. Inspections of pollutant generating land uses are required to ensure source control ordinances and BMPs are implemented.

Priority businesses for stormwater source control in the East Fork Lewis River are businesses that have the potential to produce bacteria and increase water temperatures. These businesses include, but are not limited to, Animal Care Services, Food and Kindred Products, Commercial Composting, Marinas and Boat Clubs, and Water and Sewer Districts and Departments. Agricultural and residential land uses are a priority due to the potential for bacteria pollution from livestock and pets. The most important Source Control practices in the East Fork Lewis River watershed are listed below.

- Correcting Illicit Discharge to Storm Drains (IDDE).
- Addressing Pet Waste and Goose Waste.
- Preventing pollution from Commercial Animal Handling Areas, Nurseries and Greenhouses, Commercial Composting, and Fertilizer Applications.
- Implementing preventative maintenance and good housekeeping.
- Implementing source control best practices for pools, spas, hot tubs, and fountains; and building, repair, and maintenance of boats and ships.

Source Control implementation in the East Fork Lewis River should be targeted to watersheds where known bacteria pollution exists. Field staff completing monitoring, nonpoint source investigation, inspections, or pollution identification and correction activities should be trained to implement Stormwater Source Control programs. Some elements of source control programs relevant to the East Fork Lewis River are as follows.

- Update and make source control ordinances or enforcement programs effective.
- Identify and inventory publicly and privately owned institutional, commercial, and industrial sites, which have the potential to generate pollutants to stormwater systems.
- Require the application of source control BMPs for pollutant generating sources associated with existing land uses and activities.

- Implement operational, structural, or treatment BMPs, to manage pollutant-generating sources.
- Implement an inspection program for sites identified. Inspect businesses or sites identified in the source control inventory to assess BMP effectiveness and compliance with source control requirements. Sites should be prioritized for inspection based on their land use category, potential for pollution generation, and proximity to receiving waters, or to address an identified pollution problem within a specific geographic area or sub-basin. All sites identified through credible complaints should be inspected.
- Implement a progressive enforcement policy to require sites to come into compliance with stormwater requirements within a reasonable time.
- Enforce source control ordinance.
- Provide education and technical assistance on source control programs.
- Train staff who are responsible for implementing the Source Control Program to conduct source control activities.
- Prioritize agricultural and residential land uses, and businesses that generate bacteria and temperature pollution for source control activities

Illicit discharge detection and elimination (IDDE)

The Phase 1 and Phase 2 Municipal Stormwater Permit requires the development, implementation, and management of Illicit Discharge Detection and Elimination (IDDE) programs to prevent, detect, characterize, trace, and eliminate illicit connections and illicit discharges into stormwater. IDDE implementation in the East Fork Lewis River should be targeted to watersheds where known bacteria pollution exists. Field staff completing monitoring, nonpoint source investigation, inspections, or pollution identification and correction activities should be trained to implement IDDE programs. Training should include information on IDDE investigation methods such as dye testing, smoke testing, and stormwater televising. The development of survey protocols for shoreline and IDDE investigation is also needed. Some elements of IDDE programs are listed below.

- Implement an ordinance, appropriate policies or other regulatory mechanism to prohibit non-stormwater, illicit discharges into the stormwater system, and an enforcement plan to ensure compliance.
- Implement an ongoing program designed to detect and identify non-stormwater discharges and illicit connections into stormwater systems, which includes procedures for conducting investigations.
- Maintain a storm-sewer system map showing the locations of all known storm drain outfalls and discharge points.
- Develop procedures for reporting and correcting or removing illicit connections, spills and other illicit discharges when they are suspected or identified. Illicit connections and illicit discharges can be identified through techniques including field screening, inspections, complaints or reports, construction inspections, maintenance inspections, source control inspections, or monitoring information.
- Develop a publicly listed and publicized hotline or other telephone number for public reporting of spills and other illicit discharges.

- Develop an ongoing training program for all municipal field staff, who might come into contact with or observe an illicit discharge or connection to the stormwater system, on the identification and procedures for reporting and responding to the illicit discharge or connection.
- Implement an ongoing program designed to address illicit discharges and connections. The program shall include procedures for tracing the source of an illicit discharge; and procedures for eliminating the discharge, including notification of appropriate authorities
- Conduct screening for illicit connections using the Illicit Connection and Illicit Discharge Field Screening and Source Tracing Guidance Manual (Herrera Environmental Consultants, Inc.; May 2013).
- Conduct field inspections and visually inspect for illicit discharges at all known stormwater outfalls and discharge points.
- Implement procedures to identify and remove illicit discharges.
- Provide staff training or coordinate with existing training efforts to educate staff on proper BMPs for preventing illicit discharges.
- Eliminate any illicit connections identified.

Stormwater implementation in La Center, WA

In December of 2018, there were multiple illicit connections identified in the City of La Center, where sanitary sewer infrastructure was directly connected to the municipal stormwater system. These connections were identified through routine stormwater maintenance after detecting an odor from a manhole. La Center's Public Works team responded promptly to the issue, and submitted an Environmental Incident Report (ERTS). Clark County Public Health responded to the report, and worked with La Center to fix the problem. During the correction process, homeowners were required to immediately stop using household sanitary systems. Temporary portable sanitation facilities were provided to homeowners. Clark Regional Wastewater District provided the City with technical assistance to survey the stormwater system to identify potential illicit discharges and cross connections. Multiple cross connections were identified in a subdivision built in 2017. The contractor who built the subdivision was notified and worked quickly to correct the illicit connections.

Through this process, an opportunity to prevent illicit cross connections was identified for future implementation. In the past, the same color pipes were used to install sanitary sewer and stormwater infrastructure. La Center is planning to update its building code to require different colored pipes and unique stamping to distinguish sanitary and stormwater systems. Additionally, the City is now requiring a more thorough inspection process before new homes are occupied.

Although the cross connections were identified and corrected, the final discharge point for these connections has not been confirmed. Additional investigation is needed to ensure that all illicit cross connections and discharges in the City of La Center's jurisdiction are eliminated. Initial focus should be placed on the Brezee Creek drainage where bacteria issues have persisted since 2005 and 2006. Bacteria levels in Bolen Creek, which drains the northern portion of La Center, are currently unknown and need to be investigated. These two tributaries

are currently being investigated through Ecology's nonpoint source monitoring efforts. In 2020, high bacteria levels were confirmed at other locations in La Center's stormwater system through nonpoint source investigation and monitoring. To address these issues, the City of La Center should conduct more system-wide field investigations, screening, and surveying to identify and correct potential problems. Additional information to support the development of an Illicit Discharge Detection Program in the City of La Center and Brezee Creek is listed below.

- Map the stormwater and sewer infrastructure network, including ditches and vegetated best management practices.
- Identify and map contributing areas to stormwater outfalls in Brezee Creek; La Center and Clark County's stormwater infrastructure draining to stormwater outfalls in Brezee Creek; and the number of homes connected to municipal sewer versus septic systems.
- Understand septic system inspection, operation, and maintenance records, as well as information about septic system design, age, condition, and inspection frequencies.
- Utilize comprehensive stormwater planning to develop and implement IDDE and Source Control programs in La Center.

Opportunities for La Center to collaborate with Clark County and other jurisdictions to implement an IDDE program are encouraged due to shared jurisdiction in the Brezee Creek subwatershed. Opportunities for cross-jurisdictional training and resource sharing are also recommended to build local capacity and expertise. The following Clark County activities will support future IDDE work in the East Fork Lewis River watershed.

- Updating stormwater outfall and ditch mapping the East Fork Lewis River.
- Updating *Clark County's Stream Health Report* in the East Fork Lewis River.
- Revisiting *Stormwater Needs Assessment Program Reports* for Brezee Creek.
- Clark Conservation District's implementation of the new Poop Smart Clark Pollution Identification and Correction Program.

To increase stormwater resources, La Center should develop a comprehensive Stormwater Management Plan, which would enable the city to understand the location and condition of its stormwater system assets, and prioritize future infrastructure investments and maintenance needs. Stormwater Management Planning would also support IDDE work in Brezee Creek, and prioritize areas for implementation of source control best management practices to reduce bacteria pollution.

La Center should also adopt the Western Washington Stormwater Management Manual for its stormwater standards and operations. Proactively adopting and implementing the Manual could help the City prepare for future stormwater management needs and impending stormwater permit issuance. Between 2000 and 2018, population has increased by 101 percent in La Center, and between 2004 and 2018, the city's urban growth boundary has increased by 160 percent.

Participation in the new Poop Smart Clark, Pollution Identification and Correction (PIC) Program in partnership with Clark Conservation District, Clark County, Watershed Alliance, and Washington State University Extension is also recommended to address bacteria issues in the stormwater system. Engaging with the Stormwater Partners for Southwest Washington may

also help La Center leverage stormwater resources and experience from other municipalities in the region.

Impervious surfaces and development

The East Fork Lewis River watershed is experiencing significant urbanization, population growth, and development. The cities of Ridgefield and La Center are some of the fastest growing municipalities in Washington. According to the East Fork Lewis River Recovery Plan Review, the watershed has experienced a 47 percent increase in population since 2000.

Currently, eight percent of the watershed is impervious. Watersheds are considered threatened when impervious land cover exceeds 10 percent. In total, the watershed has 18,731 acres of developed land cover. Approximately 12,585 acres have impervious Landcover densities that are greater than the 10 percent target. In 2019, there were 9,956 building footprints in the watershed, on 364 acres of critical areas. Around 787 of these building footprints were in 26 acres of shoreline management areas.

In 2010, Clark County completed a *Stream Health Report*, which included a land cover assessment of subwatersheds. Subwatersheds with over 10 percent hard surfaces are priorities for stormwater management. These subwatersheds are located in the lower and middle watershed and include Brezee, McCormick, Jenny, Lockwood, Mason, Dean, Mill, and Rock Creek North. Subwatersheds entering the East Fork Lewis River mainstem at river miles 0, 3.19, and 7.25 are also priorities. Brezee and McCormick Creeks are top priorities for bacteria reduction efforts. Implementation of Low Impact Development (LID) practices, which maximize stormwater infiltration, can help achieve pollution reduction goals and help detain runoff from impervious surfaces.

Table 35. Impervious land cover in the East Fork Lewis River subwatersheds, 2010.

Subwatershed	Percent impervious surfaces
Lower Watershed	
Brezee Creek	16
Jenny Creek	12
McCormick Creek	19
EFLR RM 0.00	18
EFLR RM 3.19	15
Middle Watershed	
Dean Creek	13
Lockwood Creek	10
Mason Creek	11
Mill Creek	20
Rock Creek North	10
EFLR RM 7.25	19
EFLR RM 15.75	9
Upper Watershed	
Cedar Creek	5
Big Tree Creek	9
Rock Creek South (Lower)	5
Rock Creek South (Upper)	5
Yacolt Creek	8
EFLR RM 21.4	6
EFLR RM 26.3	5

Stormwater enforcement

Ecology’s goal is to work with stakeholders to achieve voluntary compliance with state law and the water quality standards. Ecology invests heavily in technical and financial assistance and provides multiple opportunities and pathways for stakeholders to proactively address pollution problems before enforcement is pursued. Ecology uses regulatory authority as a backstop when technical assistance efforts fail to address identified pollution problems. Any person who violates or creates a substantial potential to violate any part of the Water Pollution Control Act, is subject to an enforcement order from Ecology pursuant to RCW 90.48.120.

If water quality standards are not achieved through implementation of best management practices for stormwater outlined in this *Water Cleanup Plan*, a traditional total maximum daily load (TMDL) study will be required in the East Fork Lewis River.

Implementation - Stormwater

To achieve clean water in the East Fork Lewis River, meet water quality standards, and support recreational uses, it is necessary to address water quality impacts from stormwater. The following implementation tables outline goals and actions for stormwater implementation in the East Fork Lewis River. The long-term vision is to achieve a high level of stormwater management in the watershed, resulting in the implementation of illicit discharge, detection,

and elimination, and bacteria source control activities. To achieve this goal, local organizations should prioritize stormwater implementation efforts in the lower watersheds where known bacteria problems exist, and in subwatersheds where impervious land cover exceeds 10 percent. Technical and financial assistance should be provided to the City of La Center and Ridgefield to develop and implement stormwater best practices in the most critical water quality areas.

Table 36. Stormwater implementation goals.

Implementation goals
<ul style="list-style-type: none"> • Prioritize stormwater implementation in the lower and middle watershed, focusing on Brezee and McCormick Creeks, and subwatersheds with imperious surfaces over 10 percent. • Achieve a high level of stormwater management in the East Fork Lewis River by implementing structural and non-structural stormwater BMPs to manage runoff from impervious surfaces. Prioritize implementation of BMPs on effective impervious surfaces, directly discharging to the East fork Lewis River from pollutant generating land use types, businesses, and activities. • Develop and implement comprehensive stormwater management planning in the watershed, which prioritize the implementation of structural and non-structural stormwater BMPs, including Source Control and Illicit Discharge Detection and Elimination programs, resulting in the elimination of stormwater impacts on water in the East Fork Lewis River. • Permitted jurisdictions, Clark County (Phase 1) and the City of Battle Ground (Phase 2) prioritize the East Fork Lewis River for implementation of stormwater management practices, programs, and projects. • Non-permitted communities in the East Fork Lewis River watershed, including La Center, Ridgefield, and Yacolt; implement proactive and voluntary stormwater management measures to protect and improve water quality in the East Fork Lewis River.

Table 37. Stormwater implementation actions.

SWM1	Illicit Discharge Detection and Elimination Programs
SWM1.1	Implement Illicit Discharge Detection and Elimination (IDDE) programs in the East Fork Lewis River through Phase I and Phase 2 stormwater permit programs, and voluntary, proactive stormwater management activities. Prioritize implementation of IDDE in subwatersheds that have known bacteria and temperature impairments, focusing first on Brezee and McCormick Creek subwatersheds.
SWM1.2	Support the development of an Illicit Discharge Detection Program in the City of La Center and Brezee Creek by mapping the stormwater and sewer infrastructure network, including ditches and vegetated best management practices. Identify and map contributing areas to stormwater outfalls in Brezee Creek; La Center and Clark County’s stormwater infrastructure draining to stormwater outfalls in Brezee Creek; and the number of homes connected to municipal sewer versus septic systems. Understand septic system inspection, operation, and maintenance records, as well as information about septic system design, age, condition, and inspection frequencies. Utilize comprehensive stormwater planning to develop and implement IDDE and Source Control programs in La Center.
SWM1.3	Develop and implement local ordinances or other regulatory mechanism to prohibit non-stormwater, illicit discharges into the stormwater system. Implement appropriate policies prohibiting illicit discharges and an enforcement plan to ensure compliance. Establish an ongoing program designed to detect and identify non-stormwater discharges and illicit connections into stormwater systems, which includes procedures for conducting investigations.
SWM1.4	Maintain a storm-sewer system map showing the locations of all known storm drain outfalls and discharge points.
SWM1.5	Develop procedures for reporting and correcting or removing illicit connections, spills and other illicit discharges when they are suspected or identified. Establish procedures for addressing pollutants entering the stormwater system from an interconnected, adjoining system. Illicit connections and illicit discharges can be identified through techniques including field screening, inspections, complaints or reports, construction inspections, maintenance inspections, source control inspections, or monitoring information.
SWM1.6	Implement an ongoing program designed to address illicit discharges and connections. The program shall include procedures for tracing the source of an illicit discharge; and procedures for eliminating the discharge, including notification of appropriate authorities
SWM1.6	Develop a publicly listed and publicized hotline or other telephone number for public reporting of spills and other illicit discharges.
SWM1.7	Develop an ongoing training program for all municipal field staff, who might come into contact with or observe an illicit discharge or connection to the stormwater system, on the identification and procedures for reporting and responding to the illicit discharge or connection. Provide staff training or coordinate with existing training efforts to educate staff on proper BMPs for preventing illicit discharges.

Table 38. Stormwater implementation actions (cont.)

SWM1	Illicit Discharge Detection and Elimination Programs
SWM 1.8	Conduct screening for illicit connections using the Illicit Connection and Illicit Discharge Field Screening and Source Tracing Guidance Manual (Herrera Environmental Consultants, Inc.; May 2013). Conduct field inspections and visually inspect for illicit discharges at all known stormwater outfalls and discharge points. Eliminate any illicit connections identified.
SWM2	Source Control
SWM2.1	Implement source control programs in the East Fork Lewis River through Phase I and Phase 2 stormwater permit programs, and voluntary stormwater management activities.
SWM2.2	Prioritize implementation in subwatersheds that have known bacteria and temperature impairments. Target land uses that have the potential to generate bacteria and temperature pollution (residential, agricultural, etc.) for implementation of operational and structural best management practices for source control.
SWM2.3	Implement operational and structural Source Control Best Management Practices from the Western Washington Stormwater Manual that address bacteria and temperature.
SWM2.4	Implement source control best management practices for pet waste; goose waste; commercial animal handling areas; preventative maintenance and good housekeeping; building repair and maintenance of boats and ships; nurseries and greenhouses; commercial composting, pools, spas, hot tubs, and fountains; and fertilizer application..
SWM2.5	Prioritize the following business types for source control activities: food and kindred products, animal care services, commercial composting, marinas and boat clubs, and water and sewer districts and departments.
SWM2.6	Focus implementation of pet and goose waste best management practices at parks, public recreation areas, and campgrounds and day use areas in the East Fork Lewis River watershed.
SWM3	Stormwater Management Planning
SWM3.1	Develop and implement a comprehensive stormwater management plan for watersheds in the City of La Center and Ridgefield’s jurisdictions. Minimally, stormwater management plan should include strategies for public education and outreach, public involvement and participation, illicit discharge detection and elimination, construction stormwater, post-construction stormwater management and pollution prevention and good housekeeping for municipal operations.

Table 39. Stormwater implementation actions (cont.)

SWM3	Stormwater Management Planning
SWM3.2	<p>Complete comprehensive stormwater management planning to support capital improvements and asset management programs. Planning efforts may include:</p> <ul style="list-style-type: none"> • Inventorying and mapping all facilities and assets including effective imperviousness, drainage areas, outfalls, conveyance structures, ditches, and roads. • Assessing the condition of all assets and facilities to inform capital improvement and asset management programs. • Prioritizing facility upgrades, based on the condition and criticality of infrastructure • Prioritizing investments where the largest water quality benefits will be achieved. • Requiring LID principles and BMPs are implemented when updating, revising, and developing new development-related codes, rules, standards, or other enforceable documents. • Designing development-related codes, rules, standards, or other enforceable documents to minimize impervious surfaces, native vegetation loss, and stormwater runoff. • Utilizing the Low Impact Development Code Update and Integration Toolkit to incorporate stormwater management into local planning efforts.
SWM4	Education and Outreach
SWM4.1	<p>Implement stormwater education which generate public awareness, inspires stewardship and effects behavior change to improve water quality. Utilize community based social marketing practices to identify and target priority populations for stormwater education with culturally specific and appropriate messaging.</p>
SWM4.2	<p>Increase stormwater education and outreach on pet waste management and disposal, how to prevent illicit discharges, source control actions, and how stormwater management effects water quality. Utilize Clark County’s Canines for Clean water program to amplify education on how pet waste impacts water quality. Consider opportunities to collaborate with animal service providers including groomers, boarders, and veterinarians to increase public awareness. Increase pet waste facilities in the watershed and access to dog waste bags. When possible, partner with local solid waste authority, such as Clark County Green Neighbors, to develop an ordinance that requires pet owners pick up waste at least once weekly, or more often as necessary using a bag, and disposing in a sealed trash container.</p>
SWM4.3	<p>Provide education on yard care and yard waste management techniques that are protective of water quality.</p>
SWM4.4	<p>Educate homeowner associations on best practices for maintenance and management of private stormwater facilities and how proper management and investment in facilities benefits local water quality.</p>

Table 40. Stormwater implementation actions (cont.)

SWM4	Education and Outreach
SWM4.5	Educate the development community on low impact development and opportunities to co-locate vegetation and stormwater management requirements in development projects.
SWM4.6	Educate local governments on the benefits of proactive stormwater management and best practices for incorporating stormwater management and low impact development into municipal programs
SWM4.7	Utilize the Stormwater Messaging Toolkit and Resource Reservoir for stormwater education and outreach.
SWM4.8	Implement a stormwater drain-stenciling program as a public education and outreach tool in the East Fork Lewis River.
SWM5	Other Stormwater Best Management Practices
SWM5.1	Implement stormwater BMP setback requirements for BMPs located near septic systems to prevent impacts to sanitary infrastructure, or bacteria loading to surface waters.
SWM5.2	Implement best management practices and source control activities to prevent bacteria from entering Underground Injection Control (UIC) wells.
SWM5.3	Achieve minimum stormwater management and design requirements for new development and redevelopment in the East Fork Lewis River, as prescribed by the Western Washington Stormwater Manual.
SWM5.4	Implement private facilities inspections and maintenance programs in the East Fork Lewis River to ensure stormwater infrastructure in residential areas are functioning optimally.
SWM5.5	Implement recommended flow control, runoff treatment, LID, Source Control, and Construction BMPs as outlined by the Western Washington Stormwater Management Manual.
SWM5.6	Implement Low Impact Development (LID) to maximize infiltration in the East Fork Lewis River watershed.
SWM5.7	Implement stormwater best management practices that promote infiltration. Avoid detention and ponding BMPs that can contribute to warm water temperatures. Best management practices most appropriate for bacteria and temperature impairments are outlined in the Western Washington Stormwater Manual and the Department of Transportation’s Highway Runoff Manual.
SWM5.8	Prioritize subwatersheds with over 10 percent impervious cover for stormwater management activities. From the <i>2010 Clark County Stream Health Report</i> , Brezee, Jenny, McCormick, Dean, Lockwood, Mason, Mill, Rock Creek North, and EFLR RM’s 0, 3.19, and 7.25 are priorities for stormwater management.
SWM5.9	Calculate expected load reductions from implementation of stormwater management activities.
SWM5.10	Implement best practices for local yard waste disposal programs to prevent bacteria loading to surface waters.
SWM5.11	Implement source control practices for dumpsters to prevent pollution to surface waters.
SWM5.12	Ensure proposal disposal of decant from street sweeping and street waste vehicles.

Table 41. Stormwater implementation actions (cont.)

SWM	Other Stormwater Best Management Practices
SWM5.13	Implement best practices from the Highway Runoff Manual for stormwater management on roads. Where possible, eliminate direct stormwater discharges from effective impervious surfaces and direct discharges from road infrastructure
SWM5.14	Update roads, ditches, and outfall mapping in the East Fork Lewis River.
SWM5.15	Preserve natural areas to promote infiltration, restore streamflow, and increase groundwater recharge, to help provide sources of cool groundwater inputs to the East Fork Lewis River.
SWM5.16	Retrofit existing impervious surfaces and bring old stormwater facilities up to modern design standards.
SWM5.17	Pursue Stormwater Financial Assistance Program funding to implement stormwater facilities and activities in the East Fork Lewis River watershed.

Milestones, targets, and timelines for stormwater

Table 42. Stormwater milestones, targets, and timelines.

Stormwater Milestones	Target Date
Illicit Discharge Detection and Elimination	
Identify and correct 100% of illicit discharges and cross connections in the City of La Center’s urban drainage by 2025.	2025
Complete IDDE screening of all stormwater outfalls in the East Fork Lewis River by 2025.	2025
Source Control	
Complete a source control inventory of the East Fork Lewis River watershed by 2025.	2025
Implement source control best practices in the East Fork Lewis River by 2025.	2030
Stormwater Management Planning	
Develop stormwater management plan for City of La Center by 2025.	2025
Voluntarily adopt Western Washington Stormwater Management Standards in the City of La Center and Ridgefield by 2025.	2025
Other Stormwater Best Management Practices	
Complete updated mapping of Clark County road, ditch, and stormwater infrastructure by 2025.	2025
Implement priority stormwater facilities and activities, including illicit discharge detection and elimination, and source control activities by 2030.	2030.
Other	
Implement dog waste facilities at all public parks in the watershed by 2025.	2025
Enroll 100% of dog owners in the East Fork Lewis River in the Canine for Clean Water Program.	2025

Criteria to measure stormwater implementation progress.

An annual survey will be sent to implementing partners to track and measure implementation progress. Information collected from the annual survey will be used to develop an annual report. Every five years, an East Fork Lewis River Progress Report will be published as a part of the adaptive management process, to track implementation progress, and update implementation actions. The following criteria should be utilized to measure progress on stormwater management implementation in the East Fork Lewis River.

Table 43. Stormwater criteria to measure progress on implementation.

Stormwater Management Criteria to Measure Progress
Total acres of impervious surfaces with stormwater treatment and detention.
Number of illicit discharges or cross connections identified corrected.
Number of stormwater facilities implemented in the watershed.
Development of stormwater management plans, stormwater capital improvements and asset management plans in the watershed. Implementation of priorities identified in stormwater plans.
Number of source control inspections and technical assistance meetings completed.
Number of residents implementing stormwater best management practices on private property.
Number of dogs entered into the Canines for Clean Water Program. Number of new dog waste facilities implemented.
Acres of natural shoreline implemented for goose waste source control.
Miles of stormwater infrastructure mapped, surveyed, and tested.
Number of new stormwater plans, policies, procedures, and protocols developed in non-permitted areas.
Number of homes with IDDE activities implemented
Acres of land managed under stormwater management plan or program.
Total acres or percent impervious surfaces.
Dollars spent on stormwater management activities (capital investment, asset management, maintenance).
Dollars generated by new stormwater utility.
Bacteria monitoring and water temperature.

Funding and partnerships for stormwater

The Department of Ecology provides funding for stormwater activities and facilities through the Water Quality Combined Funding Program. The full list of eligible BMPs may be updated annually when new information or technology becomes available

Table 44. Ecology funding for stormwater implementation.

Best Management Practice	Description
Stormwater Facility Projects	Stormwater facility projects provide water quality benefits by treating and providing flow control for water generated from impervious surfaces associated with urban development, such as roads and buildings. Planning, prioritization, design, and construction of stormwater facility projects are eligible for funding.
Stormwater Activity Projects	Stormwater activity projects provide water quality benefits by creating behavior change, preventing future impacts to water bodies, and protecting and restoring natural systems. Grant funding for stormwater activity projects should enhance, not replace, current local water quality efforts and stormwater management program requirements.

Information on BMP costing can be obtained by contacting Ecology’s grant project managers and financial managers. To achieve water quality standards in the East Fork Lewis River, significant financial investment is needed to address water quality impacts from stormwater.

Table 45. Stormwater implementation organizations and partners.

Implementation	Stakeholders
Primary organizations	Clark Conservation District and Washington State University Extension.
Partners	Watershed Alliance of Southwest Washington, Washington State University Extension, Washington State Conservation Commission, United State Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), USDA Farm Service Agency, Clark County Public Works Code Enforcement, Clark County Public Health, Clark County Animal Control, Washington State Department of Agriculture, and Washington State Department of Ecology..

Riparian Restoration

Introduction

No monitoring locations in the East Fork Lewis River watershed met temperature water quality standards in 2005 and 2006. Efforts to lower warm water temperatures are important to protect aquatic life and support salmon recovery. Riparian forest restoration is one of the primary strategies needed to increase shade and lower warm water temperatures in the East Fork Lewis River.

Today, there are around 2,000 acres of Clark County owned property that have been preserved for conservation purposes. Much of this public land is located in riparian areas along the East Fork Lewis River mainstem, providing significant opportunities for restoration. An additional 9,000 acres have been identified for future acquisition and preservation. Multiple restoration projects have been implemented in the watershed to increase tree canopy and enhance natural resources, however more work is needed. These projects have been funded through the Department of Ecology’s Water Quality Combined Funding program, the Recreation Conservation Office’s Salmon Recovery program, Clark County, Clark Public Utilities, local conservation programs, and by private landowners. Most of these projects are located in the middle and lower watershed.

The upper East Fork Lewis River watershed has significant forested landcover. In 2016, the East Fork Lewis River had around 74,505 acres of private and public forestlands. From 2004 to 2018, around 27,472 acres were permitted for harvest by the Department of Natural Resources. The watershed has an estimated 11,135 acres of wetlands, and 132,266 acres of non-impervious surfaces. In addition to riparian restoration, other cold-water enhancement projects such as wetland restoration, floodplain reconnection, streamflow restoration, and cold-water refugia enhancement are also important for long-term water quality and salmon recovery.

A summary of riparian restoration facts in the East Fork Lewis River is listed below.

Table 46. Riparian restoration facts in the East Fork Lewis River.

Riparian restoration facts.
<ul style="list-style-type: none">• 85 percent system potential riparian vegetation.• 27 percent shade deficit in lower watershed.• 35 percent average shade deficit in middle watershed.• 26 percent average shade deficit in upper watershed.• River miles 9 to 13 have shade deficits over 40 percent.• 2,000+ acres of conservation land in watershed through Clark County Legacy Lands program.• 9,000+ acres planned for acquisition.• 74,505 acres of forestland in 2016• 27,472 acres of forestland permitted for harvest from 2004-2018.

System Potential Vegetation

According to the *East Fork Lewis River Source Assessment*, the system potential riparian vegetation that can be achieved in the East Fork Lewis River is 85 percent tree canopy cover. System potential riparian vegetation is defined as the vegetation that can be achieved without human disturbance, based on climate, elevation, soil properties, plant biology and hydrologic processes. This target can be achieved by planting trees on all land that is not already paved or developed.

From the river mile 0 to 7, the primary tree species present are deciduous trees. The average 100-year tree height potential is around 75 feet, with an estimated overhang potential of approximately 7.5 feet. From river mile seven to the headwaters, the primary tree species are conifers. The average 100-year tree height potential is around 150 feet, with an estimated overhang potential of approximately 15 feet. To maximize tree canopy and shade in the East Fork Lewis River, it is important to consider how channel orientation and site conditions can effect restoration success and maximize shade. Current resources available to identify appropriate buffer widths for riparian restoration are Ecology's [Riparian Buffer Width Map](#), the Department of Natural Resources [Forest Practices Application Mapping Tool](#), and the Washington Department of Fish and Wildlife's [SalmonScape mapping application](#). More guidance on riparian restoration and best practices for buffer implementation will be published in the future *Voluntary Clean Water Guidance for Agriculture*. The long-term goal is to achieve system potential riparian vegetation, maximum tree height and maximum overhang potential in the watershed.

Shade Deficit Analysis

In the *East Fork Lewis River Watershed Source Assessment*, a shade deficit analysis was completed on the river's mainstem to identify priority locations where riparian forest restoration and tree planting projects are needed to increase shade and help lower water temperatures. Shade deficits were calculated by subtracting effective shade, which is the total amount of solar radiation that is prevented from reaching the surface water, from potential shade. The priority area for tree planting projects is the middle watershed (RM 5.7-20.3), which has an average shade deficit of 35 percent.

Since this analysis was completed in 2005 and 2006, multiple restoration projects have been implemented in the East Fork Lewis River watershed. How these projects have effected shade and water temperatures is currently unknown. Future effectiveness monitoring and repeated shade deficit analysis is needed to measure how restoration activities are impacting water temperature and shade levels.

In the remainder of this section, results from the shade deficit analysis are described for the lower, middle, and upper East Fork Lewis River watershed. These results help prioritize where future riparian restoration efforts should be targeted on the mainstem East Fork Lewis River.

Lower Watershed Shade Deficit Results

The lower East Fork Lewis River watershed (RM0-5.7) has the least effective shade, and the lowest potential shade. The potential shade that can be achieved is 35 percent and the average effective shade is 8 percent. The average shade deficit in the lower watershed is 27 percent. River miles 4-5 and 5-6 are priorities for riparian restoration and enhancement, with shade deficits exceeding 30 percent.

Table 47. Shade deficit results in the lower watershed.

River Mile	Average Potential Shade (%)	Average Effective Shade (%)	Average Shade Deficit (%)
1-2	24	13	9
2-3	32	7	25
3-4	39	9	28
4-5	37	3	34
5-6	42	8	36
TOTAL	35%	8%	27%

Most of the riparian land in the lower watershed is part of the East Fork Lewis River Greenway, which is owned by Clark County and managed by the Legacy Lands program. Most of the properties on the south side of the river are in public ownership, and many of the parcels on the north side of the river are privately owned. Riparian restoration projects on public property should be prioritized on the south side of the river. Outreach to private landowners to encourage planting projects should be focused to the north side of the river.

Lower Columbia Estuary Partnership and Clark Public Utilities have completed multiple riparian restoration projects on public property in the lower watershed. Trees planted during these projects are still maturing, and will likely have positive impacts on shade levels in the lower watersheds. Once the trees have matured, effectiveness monitoring should be completed to measure how restoration activities have effected water quality.

Middle Watershed Shade Deficit Analysis Results

The middle watershed has the highest shade deficit in the East Fork Lewis River. In the middle watershed, the potential shade that can be achieved is 63 percent and the average effective shade is 28 percent. This results in an average shade deficit of 35 percent in the middle watershed

Shade deficits exceeding 40 percent are located between river miles 9-10, 10-11, 11-12 and 12-13. River miles with shade deficits over 30 percent are located between river miles 6-7, 7-8, 13-14, and 16-17, and 19-20.

Table 48. Shade deficit results in the middle watershed.

River Mile	Average Potential Shade (%)	Average Effective Shade (%)	Average Shade Deficit (%)
6-7	47	15	31
7-8	42	5	36
8-9	42	12	30
9-10	54	15	40
10-11	65	21	40
11-12	55	13	45
12-13	67	16	49
13-14	72	39	37
14-15	70	43	29
15-16	69	40	25
16-17	71	36	38
17-18	71	41	28
18-19	74	46	27
19-20	80	47	34
TOTAL	63%	28%	35%

The middle watershed has less publicly owned property compared to the lower watershed. Most public property is located between river miles 6 to 14, and most privately owned property is located between river miles 14 to 20. Many organizations have focused restoration activities on the middle watershed, including Clark Public Utilities and the Lower Columbia Estuary Partnership’s Ridgefield Pits Technical Advisory Committee. Through this committee, LCEP is developing restoration alternatives for river miles 8 to 10 to restore abandoned sand and gravel mining facilities. Additionally, Watershed Alliance and Clark County are implementing environmental and recreational improvements at Lower Daybreak Park, located between rivers miles 9 and 10. While restoration efforts on public properties are occurring in the middle watershed, additional restoration activities in the middle watershed should still be pursued. Outreach to private landowners is also important to enhance riparian connectivity between public and privately owned land.

Upper Watershed Shade Deficit Analysis Results

The Upper East Fork Lewis River is the most forested portion of the watershed with significant state, federal, and private forestlands. The potential shade that can be achieved in the upper watershed is 82 percent. The average effective shade is 56 percent, resulting in a shade deficit of 26 percent in the upper watershed.

While the upper watershed has the lowest average shade deficit, there are still opportunities to increase effective shade. Priority river miles for riparian forest restoration activities include river miles 20-21, 21-22, 27-28, 29-30, and 30-31, which have average shade deficits over 30 percent.

Table 49. Shade deficit results in the lower watershed.

River Mile	Average Potential Shade (%)	Average Effective Shade (%)	Average Shade Deficit (%)
20-21	73	40	32
21-22	69	36	34
22-23	73	50	25
23-24	82	59	22
24-25	78	54	25
25-26	82	62	21
26-27	82	52	27
27-28	87	55	34
28-29	85	59	26
29-30	87	57	30
30-31	89	61	30
31-32	91	72	21
32-33	94	80	13
TOTAL	82%	56%	26%

Clark County has some public property in the upper watershed, including Lucia Falls and Moulton Falls Regional Parks. The US Forest Service also manages Sunset Falls campground near the watershed boundary. Most of the public land in the upper watershed is located between river miles 21 and 25. While there is significantly more private property in the upper watershed, there are significant state and federally owned forestlands, which are subject to management by Forest Practices regulations. Forest practices can help ensure riparian management zones and buffer remain intact for fish and wildlife, and that harvested lands are replanted. Efforts to educate private forest owners and provide conservation-planning services are a priority. Clark Conservation District employs a Stewardship Forester to help private landowners manage and conserve private timberlands. Private landowner outreach should be prioritized between river miles 25 and 33.

Forested land cover in the East Fork Lewis River tributaries

The *East Fork Lewis River Source Assessment* completed a shade deficit analysis for the mainstem, but did not complete a shade analysis for tributaries. Additional information and assessment is needed to understand riparian restoration needs on East Fork Lewis River tributaries, as no monitoring sites on East Fork Lewis River tributaries met temperature water quality standards in 2005 to 2006. Currently, there are an estimated 20 to 30 miles of tributaries, which need riparian buffers planted. In addition to low shade, many of these tributaries have manmade ponds that have been constructed near private residences. There are an estimated 350 acres of manmade ponds needing decommissioning and restoration on East Fork Lewis River tributaries. Restoration to enhance cold-water on tributaries is critical to achieving temperature water quality standards in the mainstem East fork Lewis River.

In 2010, Clark County completed a *Stream Health Report*, which included a land cover assessment of subwatersheds. This assessment provides a starting point for prioritizing

tributaries for riparian restoration. Subwatersheds with less than 40 percent forest cover are a priority for forest restoration. These subwatersheds are located in the lower and middle watersheds and include Brezee, McCormick, Dean Creek, and Mill Creeks; and subwatersheds entering the East Fork Lewis River mainstem at river miles 0, 3.19, and 7.25. Outreach to private landowners to promote tree-planting projects are a priority in these subwatersheds.

Table 50. Forested landcover in the East Fork Lewis River subwatersheds.

Subwatershed	Percent Forested
Lower Watershed	
Breezee Creek	38
Jenny Creek	40
McCormick Creek	20
EFLR RM 0.00	28
EFLR RM 3.19	23
Middle Watershed	
Dean Creek	37
Lockwood Creek	45
Mason Creek	41
Mill Creek	29
Rock Creek North	54
EFLR RM 7.25	36
EFLR RM 15.75	89
Upper Watershed	
Cedar Creek	88
Big Tree Creek	51
Rock Creek South (Lower)	85
Rock Creek South (Upper)	85
Yacolt Creek	52
EFLR RM 21.4	76
EFLR RM 26.3	84

Riparian forest implementation efforts

Clark County Legacy Lands Program

Clark County’s Legacy Lands Program has worked for 30 years to acquire, protect, and restore natural resources and critical areas in Clark County. Since its inception, the program has purchased over 2,000 acres of conservation areas in the East Fork Lewis River. The East Fork Lewis River has been a long-term focus area for the Legacy Lands program, due to the significant role this watershed plays in long-term salmon recovery in the Lower Columbia River Basin. Through the Legacy Lands program, there are multiple regional parks and trail systems providing recreational use and enjoyment for residents and visitors in Clark County. Clark County works with Columbia Land Trust on conservation and acquisition projects.

Properties under Legacy Lands’ ownership in the East Fork Lewis River include:

- Lower East Fork Lewis River Greenway.

- Lower East Fork Lewis Wildlife Area.
- La Center Bottoms, Mimsi Marsh.
- Becker-Lower Dean Creek.
- Lower Daybreak Park.
- Lewis River Ranch.
- Camp Lewisville (Camp Hope).
- Lucia Falls North and South.
- Moulton Falls.
- Lewis and Clark Regional Trail Corridor.
- Rock Creek Natural Area.
- Habersetzer – Upper East Fork Lewis River.

Some of these areas are open for passive recreation such as hiking, fishing, birding, and boating; and others are conservation areas that are closed to public access to protect critical natural resource areas. While these conservation areas are closed for recreation, they provide opportunities for restoration and volunteer stewardship activities. Efforts to enhance riparian restoration on these properties should be pursued.

In 2017, Clark County Board of Councilors authorized the issuance of \$7 million dollars in bonds to purchase 10 more properties for the Legacy Lands program. Six of these properties are in the East Fork Lewis River. Acquisition of these properties will add over 9,000 acres of publicly owned conservation lands to the watershed.

Table 51. Future acquisitions in the East Fork Lewis River.

Properties	Sponsor	Acres	Description
East Fork Lewis River – Mason Creek	Clark County	65	Implementing sixth highest rated salmon recovery project of 55 identified in the Lower East Fork Lewis River Aquatic Habitat Restoration Plan.
La Center – Bolen Creek	La Center	5.48	Acquiring a key link in the City’s Trails and Pathway Plan, connecting northern portions of La Center to the river.
Lewis River Ranch – Phase 2	Clark County	160	Expanding an 89-acre legacy land between Daybreak and Lewisville Park to serve unmet recreational demands.
Yacolt Burn Forest – Phase 1	Columbia Land Trust	8,445	Acquiring a conservation easement to ensure high quality forest lands are committed to timber production and open to public access.
East Fork Lewis River Optimists	Columbia Land Trust	43	Protect significant resources along East Fork Lewis river and enable continued use of property for a youth camp.
Rock Creek Forest	Columbia Land Trust	362	Acquire a conservation easement to ensure high quality forestlands, and critical steelhead habitat, are committed to long-term timber production.
TOTAL		9080.48	

Lower Daybreak Master Plan – Manley Creek Restoration

Lower Daybreak Park is a 112-acre Clark County Regional Park located on the mainstem East Fork Lewis River. This park is located in the middle watershed between river miles 9 and 11. There is a 40 percent shade deficit on the East Fork Lewis River mainstem near this park. In 2010, Clark County developed a Masterplan for Lower Daybreak, which includes riparian restoration, streambank stabilization, and environmental education activities. At this park, there is significant erosion of the streambank and lack of riparian vegetation. To achieve clean water and increase effective shade in the East Fork Lewis River, resources are needed to restore riparian forest at Lower Daybreak Park. In total, 20.2 acres of this site have been prioritized for reforestation and quarter mile of streambank has been prioritized for stabilization. The total tree canopy coverage that can be achieved at this site is approximately 68 acres, or 40 percent of the park's total area. In addition to reforesting the mainstem East Fork Lewis River, riparian restoration on Manley Creek, which bisects the park, is also a priority. Watershed Alliance of Southwest Washington and Clark County are implementing a riparian restoration project on Manley Creek starting in 2020.

Mason Creek Acquisition & Restoration

Clark County acquired 48.5 acres of floodplain, wetland, and riverbank habitat adjacent Mason Creek and the East Fork Lewis River. The County has purchased a conservation easement, on 7.4 acres of habitat. The Lower Columbia Estuary Partnership will develop designs to restore more than 75 acres of floodplain and stream habitat at this site.

East Fork Lewis River Schriber Reforestation

The East Fork Lewis River Schriber Reforestation project proposes to plant native trees and shrubs on 8 to 9 acres of county-owned property stretching 4000 feet along the south bank of the East Fork Lewis River. Portions of the southern bank in this area have a mature Oregon ash component, but the understory is dominated by reed canary grass. The project site is located in the lower watershed between approximately RM 3.8 and RM 4.8. Clark County will begin restoration at this site in 2020. Currently, there is a shade deficit of 28 percent between river miles 3 and 4 and 34 percent between river miles 4 and 5.

Columbia Land Trust

The Columbia Land Trust works to, “Conserve and care for the vital lands, waters, and wildlife of the Columbia River region through sound science and strong relationships.” The Land Trust was founded in 1990, and has conserved over 43,000 acres through purchasing land and conservation easements, accepting donation of land and easements, and supporting partners in conservation.

The East Fork Lewis River is a top priority for the Columbia Land Trust. The Land Trust is currently working on 10 projects totaling 972 acres in the watershed. The Columbia Land Trust is working with Clark County Legacy Lands program as the lead sponsor to acquire the Yacont

Burn Forest – Phase 1, the East Fork Lewis River Optimists, and Rock Creek Forest projects. The Land Trust is also working to acquire the land near Horseshoe Falls for conservation purposes.

Additionally, the Land Trust has also collaborated with the Portland Audubon Society and Watershed Alliance of Southwest Washington to develop and implement a Backyard Habitat Certification Program. This program works with landowners to implement natural backyard habitats on private property. This program expanded to Clark County in 2019 and should be utilized in the East Fork Lewis River watershed to promote private lands conservation.

Lower Columbia Estuary Partnership

The Lower Columbia Estuary Partnership has implemented multiple projects in the East Fork Lewis River, benefitting over 600 acres on 10 miles of river. The La Center Wetlands Restoration Side and East Fork Mainstem and Side Channel project are completed. Mason Creek, Ridgefield Pits, and McCormick Creek are current projects, and the Phase II La Center Wetlands project is proposed for future work. Most of LCEP's projects have been completed on Clark County Legacy Land's property and have helped enhance riparian connectivity in the lower and middle watershed.

Ridgefield Pits Restoration

The Lower Columbia Estuary Partnership is leading the Ridgefield Pits Technical Advisory Committee to restore the Ridgefield Pits area of the East Fork Lewis River, located between river miles 8 and 10. A large flood in 1996 pushed the East Fork Lewis River mainstem into abandoned gravel pits in the floodplain, lowered the riverbed upstream, and altered almost a mile of high quality spawning habitat. LCEP is developing restoration designs that address these problems. Funding to support implementation of the preferred restoration alternative for Ridgefield Pits has not been secured. It is projected that if restoration intervention is not implemented, it will take over 75 years for these gravel pits to return to their original, natural state.

Significant information about land use change, geomorphology, surface gravel mining, and temperature in the East Fork Lewis River are available through this project. Some of the pits are adding cool water, and others are very warm. This project aims to restore cold-water areas to this section of the watershed. The target for selecting the preferred restoration alternative is 2020.

East Fork Lewis River Thermal Assessment

This project aims to identify cold-water refugia and develop conceptual designs to enhance thermal refuges along 15 miles of the East Fork Lewis River (EFLR) to benefit Endangered Species Act (ESA) listed Pacific salmon, steelhead, and lamprey in the face of climate change. LCEP plans to map the locations, size, and habitat conditions of cold-water refuges along the mainstem, tributaries, and off-channel areas that are temperature-limited for juvenile and adult Coho, Chinook, steelhead, and chum salmon. With a Technical Oversight Committee, LCEP will prioritize locations, assess restoration and enhancement alternatives, and develop conceptual designs for three sites. This project will start in 2020.

Clark Public Utilities District

McCormick Creek Restoration

Clark Public Utilities District received a non-point source grant from Ecology for the McCormick Creek Restoration project, which will implement extensive tree and shrubs plantings for over a half mile of McCormick Creek. Non-native, invasive plants will be removed from 20 acre project site 1,400 lineal feet of eroding bank along McCormick Creek will be stabilized, over 200 pieces of large woody debris (LWD) will be added to provide shade, increase stream complexity, improve floodplain connectivity, and lower temperatures in the stream. Approximately 28,000 native trees and shrubs will be planted along 2,600 feet of McCormick Creek. Beaver dam analogues will also be added to the project area. This project is located downstream from La Center between river miles 2 and 3, and is expected to be complete by 2022.

East Fork Lewis River Knotweed Control Project

The East Fork Lewis Knotweed Control Project is addressing water quality impairments through removal of invasive Japanese knotweed and planting native vegetation to increase riparian plant diversity and floodplain functions. The upper watershed has been targeted for surveys and invasive species treatment. The project is educating landowners and the community on invasive knotweed and how it affects water quality.

Clark Public Utilities District has attended outreach events, conducted landowner site visits, and initiated direct communication to around 1,000 landowners to increase public awareness. The project increased public participation by coordinating volunteers and staff to survey 50 stream miles and treat 150 acres of invasive species while monitoring and re-treating all previous sites, over three growing seasons.

Lockwood Creek

The Lockwood Creek Centennial grant began in 2007 and finished in June of 2011. The project included private landowners in Lockwood Creek, downstream of Lockwood Creek Road, about a mile east of La Center. This project planted more than 47,131 trees and shrubs along 4,150 feet of stream on 23 acres. More than 1,500 feet of eroding streambanks were stabilized and at least 3,800 students learned the basics of the water cycle. Over 24 landowners participated in trainings.

Zimmerly Restoration Project

The East Fork Lewis Zimmerly Restoration Project addressed multiple water quality impairments through re-establishing vegetation in riparian corridors. Prior to planting, Clark PUD removed non-native invasive species with particular focus on Japanese knotweed to increase riparian plant diversity, restore floodplain function, and stabilize streambanks to decrease turbidity.

This project focused on river mile 5.8 in the East Fork Lewis watershed. Activities included removing invasive non-native vegetation, and planting native species along the streambank. This will help prevent erosion of the streambanks and will result in less turbidity and contamination in the water from runoff and erosion. In some areas, bank stabilization efforts were implemented to restore damage from bank erosion, and to reconnect lands that historically functioned as floodplains extending from the stream corridor. As trees grow and

mature they will provide shading to help lower the temperature of the water. A well-vegetated buffer will help prevent, reduce and filter bacteria, from both animal and human sources, from entering into the system.

Clark Conservation District small forest land stewardship

The Regional Conservation Partnership Program (RCPP) is a USDA Natural Resources Conservation Service (NRCS) Farm Bill program that packages funding from multiple NRCS programs to provide landscape scale conservation benefits through partnerships with conservation organizations, and agriculture and forestry producers. The Southwest Washington Small Forest Lands Conservation Partnership provides RCPP funding to achieve conservation of forests in southwest Washington in a way that engages forest landowners voluntarily, increases financial and regulatory security for forest landowners and improves forest and watershed health to benefit people, fish and wildlife. The partnership is planned to run through September 2022. Currently, Clark Conservation District has a Stewardship Forester covering Clark, Wahkiakum, and Cowlitz counties. Since April 2019, significant conservation work has been implemented on private forestlands. The following implementation has been achieved on private forestlands in between 2019 and 2020 through this new program.

- 20 people currently seeking conservation planning on 1392 acres.
- 5 plans completed on 79 acres.
- 28 technical assistance site visits completed on 860 acres.
- 56 clients served on 2330 acres.

Surface water and groundwater exchange

Temperature projects that go beyond tree planting and shade to help lower warm water temperatures are needed in the East Fork Lewis River watershed. The *Surface Water/Groundwater Exchange Along the East Fork Lewis River* study was published in 2009 to identify locations of groundwater inflow in the river and estimate the temperature of groundwater inputs. This information helps prioritize locations for streamflow restoration projects to promote infiltration, augment cold-water baseflow, and establish cold-water refugia.

The total streamflow gain to the East Fork Lewis River from groundwater was 64 cubic feet per second (cfs) in 2005. The average temperature of groundwater inputs were 10.6 to 12.5 degrees Celsius, indicating that groundwater entering the East Fork Lewis River is much cooler than surface water temperatures. Priority gaining reaches, where cold groundwater inputs enter the East Fork Lewis River are summarized in the following table. River miles 4.6 to 7.3 have the largest streamflow gains in the watershed, followed by river miles 7.3 to 8. The lower and middle watershed are priorities for future streamflow restoration efforts.

Table 52. Priority river miles for groundwater inflow.

River miles	Location	CFS of groundwater inflow per mile (cfs/mile)
4.6 to 7.3 Lower and middle watershed	Lower and middle watershed	13.3
7.3 to 8 Middle watershed	Middle watershed	6.3
26.9 to 29 Upper watershed	Upper watershed	6.1
10.1 to 13.2 Middle watershed	Middle watershed	2.0

Currently, there are two projects underway by the Lower Columbia Estuary Partnership to identify opportunities to restore streamflow and enhance cold-water areas. These projects include the implementation of a thermal refuge assessment, to identify cold-water refugia and restoration opportunities in the watershed, and the Ridgefield Pits Technical Advisory Committee, which is developing restoration alternatives for river miles 8 to 10 to restore abandoned surface gravel mining pits that the river historically avulsed. This area has cold-water inputs that can be enhanced for water quality and salmon recovery.

In addition to augmenting streamflow at priority river miles, the following recommendations were provided in the *Surface Water/Groundwater Exchange Along the East Fork Lewis River* report.

- Track and analyze water levels over time in the Sand and Gravel Aquifer, which is the main water source for the East Fork Lewis River.
- Determine where the river is directly connected with the Sand and Gravel Aquifer to help clarify where the river is gaining groundwater.
- Utilize information about the effects of current and future water withdrawals when making water rights decisions in the basin.

Local water use

An instream flow rule was established for WRIA 27 through WAC 173-527. Based on historical and current low flows and the water withdrawals by existing water right holders, Ecology has determined that no waters are reliably available for new consumptive uses in the East Fork Lewis River from Interstate 5 to the headwaters.

In 2006, the Lower Columbia Fish Recovery Board published the *Salmon-Washougal and Lewis Watershed Management Plan*. This report recommends management actions and strategies to ensure public and private water users have access to water resources, while avoiding and minimizing effects on streamflow and aquatic habitat. Recommended streamflow management techniques from the *Salmon-Washougal and Lewis Watershed Management Plan* include:

- Restricting issuance of new water rights.
- Water conservation.

- Curtailment or changed operations in drought conditions.
- Source substitution.
- Transfers to State Trust water rights.
- Enforcement actions against unauthorized water uses.
- Implementation of the Forest Practices Act.
- Stormwater management.
- Floodplain management.
- Wetland management.

Other opportunities to lower water temperatures, improve streamflow, and enhance cold-water are listed below.

- Decommission and restore the numerous manmade ponds throughout the watershed that are contributing to warm water temperatures.
- Implement restoration projects to decrease the width to depth ratio of the river.
- Protect and restore headwater areas in tributaries.
- Identify opportunities to install large wood, and implement beaver dam analogs to restore natural watershed processes.
- Acquire, preserve, and restore critical aquifer recharge areas.
- Work with private landowners to implement water conservation and wellhead protection BMPs.
- Work with local jurisdictions in the East Fork Lewis River to establish strong planning and enforcement programs that prioritize protection of critical areas that benefit water quality, streamflow, and salmon recovery through Critical Areas Ordinances, Shoreline Masterplans, and the Comprehensive Plan.

Lower Columbia Fish Recovery Board and salmon recovery

The Lower Columbia Fish Recovery Board (LCFRB) is the Lead Entity and Regional Recovery Organization for salmon recovery in the East Fork Lewis River watershed. LCFRB develops Salmon Recovery Plans and coordinates funding for implementation of salmon recovery projects.

The East Fork Lewis River watershed is home to five Engaged Species Act (ESA) listed populations of salmonids. These include Fall Chinook, Chum, Winter Steelhead, Summer Steelhead, and Coho. Restoring the watershed is a top priority for salmon recovery in the Lower Columbia region.

According to *LCFRB's East Fork Lewis Subbasin Plan*, the lower mainstem East Fork Lewis contains important spawning and rearing habitats for fall Chinook, chum, and Coho. The middle mainstem East Fork Lewis and Rock Creek South are most important for winter steelhead, although summer steelhead also utilize these reaches. The upper East Fork Lewis tributaries are mostly utilized by summer steelhead, and sometimes winter steelhead. A Limiting Factors Analysis (LFA) determined that over 50 percent of the off-channel habitat and wetlands in floodplain areas have been disconnected from the river as a result of diking, ditching, and draining to protect agricultural, residential and mining activities. Additionally, there are

concerns with the availability of suitable pool habitat, low large woody debris concentrations, high road densities, sediment, turbidity, and temperature. Other limiting factors in the watershed include:

- Habitat connectivity.
- Habitat diversity.
- Channel stability.
- Riparian function.
- Floodplain function.
- Streamflow.
- Water quality.
- Substrate and sediment.
- Agriculture and grazing,
- Rural and suburban development.
- Forest practices.
- Channel manipulations.

More information can be referenced in the *East Fork Lewis Subbasin Plan*. LCFRB has published the following strategic plans for the East Fork Lewis River watershed.

- *Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan, 2010.*
- *Lower East Fork Lewis River Habitat Restoration Plan, 2009.*
- *Salmon-Washougal and Lewis Watershed Management Plan WRIAs 27-28, 2006.*

Currently LCFRB is working with PC Trask and Associates to complete the *East Fork Lewis River Recovery Plan Review*. This report is scheduled for completion by 2021, and will serve as a tool to evaluate how salmon recovery programs are being implemented on the ground, while highlighting success stories and challenges, and identifying emerging risks to water quality and salmon recovery.

To link water quality priorities to salmon recovery, it is important to understand how water quality and habitat impacts salmonids at critical life stages. The following table was adapted from the *Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan* to summarize how water and habitat quality are limiting factors for fish in the East Fork Lewis River watershed at critical life stages

Table 53. Water quality affects salmon recovery in the East Fork Lewis River at critical salmonid life stages.

Species and criticality	Life stage	Primary Limiting Factors	Secondary Limiting Factors
East Fork Lewis River Fall Chinook			
Most Critical	Egg Incubation	Sediment	Temperature, Channel stability, key habitat
Second	Spawning	Temperature	Key habitat, habitat diversity
Third	Pre spawning holding	Temperature, habitat diversity	Flow
East Fork Lewis River Chum			
Most Critical	Egg incubation	Sediment	Channel stability, key habitat
East Fork Lewis River Coho			
Most Critical	Egg incubation	Sediment	Channel stability
Second	0-age winter rearing	Habitat diversity	Key habitat, flow
Third	0-age summer rearing	Temperature, habitat diversity, key habitat, food	Channel stability, flow
East Fork Lewis River Summer Steelhead			
Most Critical	Egg incubation	Channel stability, sediment, key habitat	temperature
Second	0-1 age winter rearing	Channel stability, habitat diversity, flow	
Third	0-age summer rearing	Habitat diversity	Temperature, channel stability, flow
East Fork Lewis River Winter Steelhead			
Most Critical	Egg incubation	Temperature, sediment	Key habitat, channel stability
Second	0-age summer rearing	Temperature, habitat diversity, pathogens	Flow, food
Third	0,1-age winter rearing	Habitat diversity	Channel stability, flow

Tier 1 Streams for Salmon Recovery

To establish implementation priorities, LCFRB has developed a tiered prioritization system for restoring and preserving streams in the East Fork Lewis River. Tier 1 streams are high priority reaches for preservation and restoration, to recover one or more primary populations of salmonids. Listed below are the Tier 1 reaches for salmon recovery in the East Fork Lewis River watershed. Each stream has been assigned a value for preservation and restoration using a

scale from 0 to 100 percent, with the higher percentage indicating a higher value for salmon recovery. Restoration or preservation in these locations benefit may benefit Chum, Coho, Fall Chinook, Summer Steelhead, or Winter Steelhead. Restoration priorities may include restoring floodplain function and channel migration processes, instream flows, off channel and side channel habitat, riparian conditions and functions, stream channel habitat structure and bank stability, watershed conditions and hillslope processes, water quality, access to blocked habitats, and regulated stream management for habitat functions.

Table 54. Priority locations to restore and preserve for salmon recovery.

Subwatershed	LCFRB Unique Identifier	Restoration Value	Preservation Value	Starting River Mile	Ending River Mile	Length (mi)
Brezee	B1_Brezee Cr 2	53%	47%	0.43	0.48	0.05
McCormick	McCormick Cr 1 D	29%	71%	2.25	2.28	0.03
McCormick	McCormick Cr 1 G (pond)	76%	24%	2.82	2.93	0.11
McCormick	McCormick Cr 1 H (pond)	85%	15%	2.93	3.03	0.1
Jenny	Jenny Cr	44%	56%	0	0.13	0.13
Mason	M1_Mason Cr RB Trib 1 A	37%	63%	0	0.04	0.04
Mainstem	EF Lewis 4 A	58%	42%	4.49	4.86	0.37
Mainstem	EF Lewis 4 B	50%	50%	4.86	5.39	0.53
Mainstem	EF Lewis 4 C	53%	47%	5.39	5.74	0.35
Mainstem	EF Lewis 5 A	44%	56%	5.74	7.03	1.29
Mainstem	EF Lewis 5 B	57%	43%	7.03	7.39	0.36
Mainstem	EF Lewis 6 A	55%	45%	7.39	7.66	0.27
Mainstem	EF Lewis 6 B	54%	46%	7.66	8.17	0.51
Mainstem	EF Lewis 6 C	57%	43%	8.17	9.36	1.19
Mainstem	EF Lewis 7	46%	54%	9.36	9.45	0.09
Mainstem	EF Lewis 8 A	52%	48%	9.45	10.7	1.25
Mainstem	EF Lewis 8 B	56%	44%	10.7	16.17	5.47
Mainstem	EF Lewis 9 A	56%	44%	16.17	17.86	1.69
Mainstem	EF Lewis 13	34%	66%	24.49	26.15	1.66
Mainstem	EF Lewis 15 B	42%	58%	29.12	29.54	0.42
Mainstem	EF Lewis 16	38%	62%	29.54	31.45	1.91
Mainstem	EF Lewis 17 A	28%	72%	31.45	31.52	0.07
Mainstem	EF Lewis 17 B	38%	62%	31.52	32.51	0.99
Mainstem	EF Lewis 18	39%	61%	32.51	33.96	1.45
Mainstem	EF Lewis 19 A	51%	49%	33.96	35.41	1.45
Mainstem	EF Lewis 20 B	35%	65%	39.14	39.22	0.08
Dean	Dean Cr 1 A	64%	36%	0	0.87	0.87
Mill Creek	Mill Cr 1 C	42%	58%	1.06	1.34	0.28
Manley	Manley Cr 1 A	68%	32%	0	0.15	0.15
Manley	Manley Cr 1 D	72%	28%	1.01	1.14	0.13
Manley	Manley Cr 1 E	73%	27%	1.14	1.38	0.24
Manley	Manley Cr 1 F	74%	26%	1.38	1.49	0.11
Manley	Manley Cr 1 G	65%	35%	1.49	1.52	0.03
Rock Creek South	Rock Cr 1	35%	65%	0	1.24	1.24

Rock Creek South	Rock Cr 2 A	26%	74%	1.24	1.43	0.19
Rock Creek South	Rock Cr 2 B	31%	69%	1.43	2.37	0.94
Rock Creek South	Rock Cr 3	32%	68%	2.37	3.12	0.75
Rock Creek South	Rock Cr 4	39%	61%	3.12	5.23	2.11

Additional information on priority projects for salmon recovery are outlined in Chapter 6 of the *Lower East Fork Lewis River Habitat Strategy*. LCFRB plans to update this *Habitat Strategy* using information from the Lower Columbia Estuary Partnership’s Thermal Refuge Assessment in the East Fork Lewis River, which will start in fall of 2020. LCFRB has an online SalmonPORT mapping tool that displays the locations of projects that have been implemented in the watershed and Tier 1 streams for salmon recovery.

The publication of this *East Fork Lewis River Water Cleanup Plan* implements the following actions from the *Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan*.

- Address water quality issues through the development and implementation of water quality cleanup plans (TMDLs).
- Assist in the development and promote the implementation of Best Agricultural Practices for the protection and restoration of watershed functions, riparian conditions, habitat, and water quality
- Implement stormwater best management practices in cities and towns.

Temperature enforcement

Ecology’s goal is to work with stakeholders to achieve voluntary compliance with state law and the water quality standards. Ecology invests heavily in technical and financial assistance and provides multiple opportunities and pathways for stakeholders to proactively address pollution problems before enforcement is pursued. Ecology uses regulatory authority as a backstop when technical assistance efforts fail to address identified pollution problems.

Any person who violates or creates a substantial potential to violate any part of the Water Pollution Control Act, is subject to an enforcement order from Ecology pursuant to RCW 90.48.120. Ecology also has regulatory authority through the Forest Practices Act RCW 76.09, and WAC 222 to implement and enforce Forest Practices Rules and the Timber, Fish, and Wildlife agreement. Instream flow rules established through WAC 173-527 provide regulatory authority for enforcement related to water consumption and streamflow in the watershed. Authority through the Shorelands and Environmental Assistance program, which oversees critical areas ordinances, shoreline management, and wetlands regulations, is also enforceable.

If water quality standards are not achieved through implementation of best management practices outlined in this *Water Cleanup Plan*, a traditional total maximum daily load (TMDL) study will be required in the East Fork Lewis River.

Implementation – Riparian Restoration

To achieve clean water in the East Fork Lewis River, meet water quality standards, and support aquatic life uses, it is necessary to restore riparian forest areas and implement restoration projects that benefit streamflow and stream temperatures. The following implementation tables outline goals and actions for riparian forest implementation and streamflow restoration in the East Fork Lewis River watershed. The long-term vision is to achieve system potential riparian vegetation of 85 percent tree canopy cover in the East Fork Lewis River, and to protect and restore streamflow. To achieve this goal, riparian forest restoration projects should be targeted to areas with the highest shade deficits, starting with the middle and lower watershed. Other projects that support streamflow restoration should be focused to critical aquifer recharge areas and priority river miles where groundwater flows enters the watershed.

Table 55. Riparian restoration implementation goals.

Implementation Goals
<ul style="list-style-type: none"> • Achieve system potential riparian vegetation of 85 percent canopy cover in the East Fork Lewis River watershed. • Achieve maximum tree height and overhang potential in the watershed. • Restore and enhance riparian forest in the East Fork Lewis River, prioritizing the river miles with the highest shade deficits in the lower and middle watershed. The segments of the river with the highest shade deficits are located in the middle watershed from river miles 9 to 13. • Preserve existing riparian forest, and stabilize eroding streambanks with existing riparian forest in the East Fork Lewis River watershed. • Identify, acquire, preserve, and restore critical conservation lands in the East Fork Lewis River Watershed.

Table 56. Riparian restoration implementation actions.

RR1	Riparian Forest Restoration
RR1.1	Implement riparian forest restoration projects on river miles, with shade deficits over 30-40 percent.
RR1.2	In the lower watershed (RM 0-5.7), prioritize private landowner outreach for riparian forest implementation on the north side of the river. Focus implementation on public lands on the south side of the river within the East Fork Lewis River greenway.
RR1.3	In the middle watershed (RM 5.7-20.3), prioritize riparian forest implementation on public properties between river miles 6 and 14. Focus private landowner riparian restoration and conservation efforts between river miles 14 and 20.
RR1.4	In the upper watershed (RM 20.3 – 32.3), focus riparian restoration efforts on public lands between river miles 21 and 25. Prioritize riparian restoration on private properties between river miles 25 and 32.
RR1.5	Utilize the Ecology Riparian Buffer Width Map and other fish use identification tools to identify the appropriate buffer widths to implement at project sites.
RR1.6	Complete a shade deficit analysis on the East Fork Lewis River tributaries, to identify tree-planting opportunities.
RR1.7	When possible, utilize volunteer groups, AmeriCorps members, Washington Conservation Crews, and Correctional Crews to implement tree-planting projects. Engage members of the public in restoration and stewardship activities.
RR1.8	Maintain riparian planting projects implemented in the East Fork Lewis River watershed.
RR1.9	Conduct effectiveness monitoring on riparian restoration projects to understand how restoration efforts have effected water temperatures.
RR1.10	Calculate expected heat load reductions from riparian forest restoration projects.
RR1.11	Complete shade deficit analysis in 10-20 years post implementation to measure progress on increasing effective shade in the watershed.
RR2	Private Lands
RR2.1	Prioritize private landowner outreach for riparian forest restoration in the middle watershed (RM 5.7-20.3), where there is the most privately owned land. Prioritize outreach to private landowners with property on East Fork Lewis River tributaries.
RR2.2	Increase the capacity of local organizations to develop, implement, and complete tree-planting projects; including outreach, planning, funding, maintenance, and implementation on private land.
RR2.3	Where appropriate, utilize Ecology, NRCS, and Clark CD funding to implement tree-planting projects on agricultural properties. If Ecology funding is supporting implementation, adhere to buffer width guidelines.
RR2.4	Complete forest stewardship conservation plans on properties with private forestlands.
RR2.5	Complete riparian planting plans for streamside properties with shade deficits.
RR2.6	Implement the Backyard Habitat Program in the East Fork Lewis River.
RR2.7	Replicate the Watershed Alliance of Southwest Washington’s Project Restore program in the East Fork Lewis River.
RR2.8	Target land acquisition efforts to the middle and upper watershed, which has the least public ownership. Prioritize properties on the north side of the river in the lower watershed for continued acquisition efforts, and to support riparian connectivity in the East Fork Lewis River greenway.

Table 57. Riparian restoration implementation actions (cont.)

RR2		Private Lands
RR2.9	Prioritize subwatersheds with less than 40 percent forest cover for forest restoration activities. From the 2010 Clark County Stream Health Report, Brezee, Jenny, McCormick, Dean, Lockwood, Mason, Mill, Rock Creek North, and EFLR RM's 0, 3.19, and 7.25 are priorities for forest restoration. The LCFRB's East Fork Lewis River Recovery Plan Review and the 2020 Clark County Stream Health Report will provide a more accurate depiction of forested land cover in the watershed to further target implementation efforts.	
RR3		Public Lands
RR3.1	Implement riparian forest restoration projects on public lands in the East Fork Lewis River including the Schriber project, La Center wetlands Phase 2, Mason Creek, McCormick Creek, Lower Daybreak, and Man ley creek projects.	
RR3.2	Focus riparian restoration efforts on public properties in the middle watershed, where there are the largest shade deficits.	
RR3.3	Continue implementing riparian forest restoration project in the lower watershed.	
RR3.4	Implement the proposed land acquisitions in the watershed to add 9,000 plus acres to the watershed.	
RR3.5	Stabilize the eroding streambank and restore riparian forest vegetation at lower Daybreak Park, located between river miles 9 and 11.	
RR3.6	Acquire priority properties through the Clark County Legacy Lands program, in partnership with Columbia Land Trust, for conservation, preservation, and restoration. Focus acquisition efforts in the middle and upper watershed.	
RR3.7	Implement Washington state Forest Practices Act and associated rules on private and public forestlands Ensure forest practices activities are implemented on timberlands to preserve appropriate buffer widths for water quality and fish habitat. Forest practices activities are most prevalent in the upper watershed on timberlands.	
RR3.8	Continue implementing Clark County's Conservation Areas Acquisition Plan in the East Fork Lewis River through the Legacy Lands Program, and Columbia Land Trust programs.	
RR3.9	Preserve forested areas in the upper watershed.	
RR4		Public Education and Outreach
RR4.1	Educate private landowners on the benefits of retaining trees, planting native landscape, and adding backyard habitat to the East Fork Lewis River.	
RR4.2	Educate new landowners, homebuilders, developers, construction companies, and the real estate community, and building industry on the benefits of retaining riparian vegetation and forest on private property.	
RR4.3	Conduct outreach to private landowners to educate, incentivize, and encourage riparian tree planting projects on private property.	
RR4.4	Build the capacity of local organizations to conduct more private landowner outreach to increase tree planting and riparian forest restoration. If appropriate, develop a new private landowner tree planting partnership for outreach, branding, and marketing purposes.	

Table 58. Riparian restoration implementation actions (cont.)

RR5	Other
RR5.1	Complete a thermal refuge assessment to identify critical cold-water refuge areas, off-channel habitat, and side channels for restoration.
RR5.2	Restore the Ridgefield Pits area between river miles 8-10 to enhance cold-water inputs, and increase riparian vegetation and forested areas in the middle watershed.
RR5.3	Incorporate cold-water restoration elements into the Habitat Conservation Plan for the Daybreak Mine.
RR5.4	Supplement riparian restoration activities with wetland enhancement, floodplain reconnection, streambank stabilization, addition of large woody debris and beaver dam analogues, and the enhancement of cold-water refugia.
RR5.5	Retire old water rights to restore streamflow to the watershed.
RR5.6	Remove culverts and improve bridges causing restrictions to stream flow and fish passage in the watershed. Major upcoming culvert projects include the Brezee Creek culvert replacement and the I-5 Bridge.
RR5.7	Complete the development of the Paradise Point water supply, and retire water supply uses in the middle watershed to restore vital streamflow to the watershed. Where appropriate and feasible, connect private well owners to public water supply.
RR5.8	Implement streamflow restoration projects to promote groundwater recharge.
RR5.9	Identify and inventory any illegal impoundments, dams, or manmade ponds. Work with local jurisdictions and watershed groups to assess and complete removal and restoration opportunities.
RR5.10	Implement erosion control measures to prevent and reduce sediment loading to the watershed.

Milestones, targets, and timelines for riparian restoration

Table 59. Riparian restoration milestones, targets, and timelines.

Riparian Forest Restoration	Target Date
Restore riparian forest to 100% of mainstem river miles needing shade enhancement by 2030.	2030
Achieve 85% system potential riparian vegetation on the East Fork Lewis River mainstem by 2060.	2060
Complete a shade deficit analysis on East Fork Lewis River tributaries by 2025.	2025
Acquire and conserve priority conservation properties and complete private landowner outreach to foster riparian restoration projects on tributaries by 2030.	2030
Complete implementation of tributary riparian restoration projects by 2030.	2030
Achieve system potential riparian vegetation on the East Fork Lewis River tributaries by 2060.	2060
Other Temperature Strategies	
Identify cold-water refugia restoration opportunities by 2025.	2025
Implement restoration projects at 100% of cold-water refugia areas by 2035.	2035
Acquire and conserve priority conservation lands outlined by the Clark County Legacy Lands Program and Columbia Land Trust by 2030.	2030
Restore riparian forest vegetation on Clark County Legacy Lands Program and Columbia Land Trust's acquisition properties by 2040.	2040
Achieve system potential riparian vegetation on these properties by 2060.	2060
Remove 100% of fish barriers in the East Fork Lewis River to improve flow by 2030.	2030
Complete restoration of historical sand and gravel mining sites to benefit cold-water by 2030.	2030
Implement other wetland enhancement, off-channel habitat, bank stabilization, and floodplain reconnection projects by 2035.	2035

Criteria to measure riparian restoration implementation progress.

An annual survey will be sent to implementing partners to track and measure implementation progress. Information collected from the annual survey will be used to develop an annual report. Every five years, an East Fork Lewis River Progress Report will be published as a part of the adaptive management process, to track implementation progress, and update implementation actions. The following criteria should be utilized to measure progress on riparian forest restoration in the East Fork Lewis River.

Table 60. Riparian restoration criteria to measure progress on implementation.

Riparian Restoration Criteria to Measure Progress
River miles restored
Shade deficit analysis
Number of pools created
Number of beaver dam analogs added
Number of pieces of large woody debris added.
Lineal feet or miles of streambank stabilization or improvement.
River miles of riparian forest restored.
Number of private forest landowners implementing conservation stewardship practices on their property and protecting buffer widths.
Acres restored (floodplains, wetlands, etc.)
Acres acquired and preserved.
River miles in under conservation easement or protection.
CFS of streamflow restored to river.
Water temperature
Number of trees added to watershed, acres of habitat restored.
Acres of invasive species treated and removed.

Funding and partnerships for riparian restoration

The Department of Ecology provides funding for riparian restoration and other natural resource enhancement projects through the Water Quality Combined Funding Program. The full list of eligible BMPs may be updated annually when new information or technology becomes available.

Table 61. Ecology funding for riparian restoration implementation.

Best Management Practice	Description
Land Acquisition	The purchase of real property and conservation easements is eligible for financial assistance for the following purposes: wetland habitat preservation and protection, riparian area and watershed preservation and protection, and drinking water source protection.
Restoration Planning and Implementation – Riparian Area, Wetland, and Floodplain Restoration	Planning and implementing riparian and wetland habitat restoration projects are eligible for loans or grants. Maintenance is eligible for up to 5 years of funding following planting. Applicants can include installation of livestock exclusion fencing as part of a riparian protection/restoration project.
Stream Restoration and Bank Stabilization	Stream restoration includes all in-stream work, such as daylighting, culvert removal, channel modification or re-establishment, large woody debris and engineered logjams, and bank stabilization using any materials beyond plants.
Water Quality Monitoring	Water quality monitoring before and during implementation and after project completion is critical for tracking environmental and project results. Ecology may provide loans or grants for water quality monitoring projects. Typically, a recipient undertakes monitoring to characterize the existing conditions of ground waters and surface waters, to identify or quantify pollutant sources or loads, or to establish the effectiveness of BMPs. Monitoring may be the entire project or a component of a larger project.

Information on BMP costing can be obtained by contacting Ecology’s grant project managers and financial managers. The USDA Natural Resources Conservation Service also serves as a strong resource for BMP cost estimation. The Lower Columbia Fish Recovery Board and the Washington State Recreation and Conservation Organization also have resources available to support implementation cost estimation. To achieve water quality standards in the East Fork Lewis River, significant financial investment is needed to achieve riparian restoration and salmon recovery goals.

Table 62. Riparian restoration implementation organizations and partners.

Implementation	Stakeholders
Primary organizations.	Clark County Public Works, Lower Columbia Estuary Partnership, Clark Public Utilities District, Columbia Land Trust, Watershed Alliance of Southwest Washington, Clark Conservation District, and Lower Columbia Fish Enhancement Group.
Partners	Washington State University Extension, Clark Skamania Fly Fishers, Washington State Conservation Commission, United State Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), USDA Farm Service Agency, Washington State Department of Agriculture, Friends of Trees, Friends of the East Fork, and Washington State Department of Ecology.

Chapter 4 – Public Education and Outreach

Introduction

Public education and outreach efforts are a fundamental component of the *East Fork Lewis River Water Cleanup Plan*. These efforts help raise general awareness, create stewardship opportunities, and effect behavior change to improve water quality. It is important to educate residents and visitors in the East Fork Lewis River watershed, on how their individual and collective actions can help improve water quality. Targeted education and outreach efforts are needed to promote voluntary implementation of water quality BMPs. Community Based Social Marketing practices, which utilize demographic analysis and social sciences, can help support targeted education and culturally specific outreach for water quality.

The primary public education and outreach need in the East Fork Lewis River is to increase outreach to private landowners to encourage voluntary implementation of water quality BMPs on streamside properties. These outreach efforts should be targeted towards three different audiences.

1. **Agricultural landowners with properties adjacent to the East Fork Lewis River** and its tributaries. Agricultural landowners in subwatersheds where there are known bacteria issues are priorities for outreach.
2. **Homeowners with septic systems adjacent to the East Fork Lewis River** and its tributaries that are past due for inspection and maintenance, or need repair.
3. **Public and private landowners with riparian properties** adjacent to the highest shade deficits on the East Fork Lewis River mainstem and tributaries. Outreach to these landowners to promote tree planting and riparian restoration to increase shade is needed.

For bacteria related outreach, there are three priority areas to target education efforts. Brezee and McCormick Creeks are the top priority for bacteria reduction. Rock Creek North, Jenny, Riley, and Lockwood Creek are secondary priorities. Mason and Yacolt Creeks are the third priority for bacteria reduction. In total, there are 257 priority tributary miles for bacteria reduction. Along these tributaries, there are 3,138 parcels within 100 feet of the river. Outreach to these properties is needed.

For riparian restoration and tree planting, there are different priorities in the lower, middle, and upper watershed. In the lower watershed (RM 0-5.7), private landowner outreach for tree planting and riparian restoration should be targeted to the north side of the river, as most of the land on the south side is publicly owned. In the middle watershed (RM 5.7-20.3), outreach to private landowners should be focused between river miles 14 and 20. In the upper watershed (RM 20.3 – 32.3), outreach for riparian restoration should be targeted between river miles 25 and 32. Additionally, there are an estimated 20 to 30 miles of riparian restoration needed on East Fork Lewis River tributaries.

Public education and outreach goals

The long-term goal for public education and outreach efforts in the East Fork Lewis River is to inspire behavior change and voluntary adoption of best management practices for water quality. Additionally, it is important to achieve a mutual understanding and shared responsibility of how individual and collective actions, and investments can lead to better water quality and a better quality of life for people, plants, fish, and wildlife. Public education and outreach efforts that promote behavior change will ultimately help reduce bacteria, lower water temperatures, meet water quality standards, and support all beneficial uses in the East Fork Lewis River watershed.

This public education and outreach strategy highlights existing programs that help raise public awareness about water quality issues in Clark County watersheds. Some organizations have already made commitments to increase public education and outreach in the East Fork Lewis River. Efforts to coordinate messaging across different outreach programs can help amplify clean water messaging and lead to greater outcomes for water quality. Additional goals and actions for public education and outreach are recommended at the end of this chapter and throughout the *Water Cleanup Plan*.

Implementing Organizations

Clark County Clean Water

Clark County has a Phase I Municipal Stormwater Permit, which requires the County to develop and implement an educational program for water quality. The goals of this program are to raise general awareness, inspire stewardship, and effect behavior change to reduce or eliminate stormwater pollution.

To achieve these goals, Clark County has developed a Stormwater Management Plan, which includes strategies for Public Involvement, Education, and Outreach. Through this plan, Clark County is implementing the following public education and outreach programs, which support Water Cleanup efforts in the East Fork Lewis River.

Canines for Clean Water

Clark County's Canines for Clean Water program provides information to dog owners about proper management and disposal of pet waste. According to the program, Clark County has over 110,000 dogs adding more than 13,000 tons of pet waste to Clark County watersheds each year. The program's webpage provides educational information, directions for properly managing and disposing of pet waste, and a pledge for dog owners to pick up after their dogs. The webpage (www.cleanwaterdogs.com) also provides information for community members to work in their neighborhood to support pet waste pick-up. Signs are available to place in yards and common pet walking areas. Canines for Clean Water educational material will be used in the East Fork Lewis River during outreach events, and shared with the City of La Center. This program will also be used in future Pollution Identification and Correction (PIC) Program efforts. Relationships with business that provide pet waste removal services should also be formed, to foster new programs to remove dog waste from watersheds. Partnerships with local

veterinarians, groomers, pet boarding, and dog licensing agencies should also be explored to educate dog owners on what they can do to protect watershed health.

Social media and online engagement

Public Works utilizes several forms of social media to increase outreach including Facebook, Twitter, Instagram, and NextDoor. Clark County also has a comprehensive, “What you can do for clean water” website with many educational materials for public use. Targeted, short messages for bacteria reduction, septic systems, pet waste, agriculture, and tree planting and backyard habitat should be developed for social media use. Information about local programs for private landowners should also be shared on social media. Opportunities to coordinate and share social media messaging should be explored by local partners to amplify and streamline social media messaging, as well as coordination on social media campaigns or short videos. Social media messages should be targeted to East Fork Lewis River watershed residents through Facebook, NextDoor, and other social media platforms. When appropriate, webinar opportunities should be used for education and outreach

Mass Media

Clark County implemented a mass media buy from a local television station, KPTV (Fox12). Meteorologists delivered stormwater public service announcements on various topics including pet waste and native plants. Messages from the East Fork Lewis River Water Cleanup Plan and the Small Acreage Program should be incorporated into future mass media outreach plans, to educate Clark County residents on the importance of reducing bacteria and cooling warm water temperatures. Opportunities to use radio and billboards should also be explored to educate Clark County residents on clean water.

Stormwater Partners for Southwest Washington

Stormwater Partners of Southwest Washington is a collaborative group of local jurisdictions and watershed groups which implement stormwater education and outreach focused on raising public awareness, providing stewardship opportunities, engaging communities, and effecting behavior change. The county coordinates and facilitates quarterly meetings focused on maximizing education and outreach effectiveness through the sharing of resources, collaboration on projects, and the development of consistent messaging. Together, Stormwater Partners has developed an interactive and educational online map to, “Explore Your Watershed” in Clark County, which includes the East Fork Lewis River. Stormwater Partners have also updated road stream crossing signs throughout the county to raise the public’s awareness about local rivers and streams. Messages from the East Fork Lewis River Water Cleanup Plan should be incorporated into the Stormwater Partners Map. Individual actions that the public and landowners can take to improve water quality should be one of the focus areas. Road stream crossing signs in the East Fork Lewis River should also be updated to raise public awareness.

Student Watershed Monitoring Network

In partnership with City of Vancouver’s Vancouver Water Resources Education Center, Clark County engages students in grades K-12 in water quality monitoring at sites near their schools. Teachers and students receive mentoring in water quality and macroinvertebrate monitoring,

and conduct stream studies. Students share their findings with peers and the community at an annual Student Watershed Congress. About 3,500 students participate each year. In 2019, the Student Watershed Congress included discussions on the East Fork Lewis River watershed. School districts within the East Fork Lewis River should continue to engage in student monitoring and the annual watershed congress.

Clean water stories

In an effort to support schools that want to provide water quality education to large groups, the Clean Water Division has contracted with a regional storytelling expert who is available to large school groups, school assemblies, and student focused events. Clean Water Storytelling should occur at public education and outreach events in the East Fork Lewis River, especially when working with K-12 audiences.

Enviroscape

The Clean Water Division has an Enviroscape watershed model available for schools to use for watershed and stream health studies. The Enviroscape watershed model should be used at education and outreach activities in the East Fork Lewis River, especially when working with K-12 audiences.

Green Neighbors Program

Clark County launched the Green Neighbors program in 2012 to promote sustainable practices to homeowners. The program also hosts workshops and other educational events related to sustainability. The program is administered within Clark County Public Health, in partnership with Public Works, to provide timely messaging of upcoming events and activities, including a community event calendar. Workshops and outreach events in the East Fork Lewis River watershed should be publicized on the Clark County Green Neighbors website and community event calendar.

Clark County Green Business

Clark County's Green Business Program recognizes and promotes local businesses that have implemented "green" practices, including practices that are good for water quality. The program currently celebrates over 50 local businesses that have completed sustainability assessments and have met the requirements to be a local Green Business. This program is now managed through Clark County Public Health. Outreach to businesses in the East Fork Lewis River should occur through the Clark County Green Business program. This outreach will focus on businesses that are priorities for temperature and bacteria source control activities.

Publications and displays

Clean Water Division staff produce interpretive displays and publications on various topics including pet waste management, natural gardening, pollution prevention techniques, watershed education, and others. Typical messaging includes information on watersheds, the value of the stormwater project, the value of protecting water quality, and contact information for Green Neighbors. A sign to educate residents and visitors on water quality in the East Fork Lewis River watershed should be developed.

Outreach events

Public Works Clean Water Division staff host informational booths at a variety of community events. Outreach includes information about water quality, the effects of stormwater pollution, pollution prevention, and other targeted environmental protection messages. Clark County Public works should attend East Fork Lewis River specific community events to conduct clean water outreach. Clark County should be willing to share East Fork Lewis River specific messaging and outreach materials at any informational booths they have in Clark County.

Community presentations

As requested, Clean Water Division staff will provide information on the program's activities to community, neighborhood and civic groups. Clark County has presented at multiple East Fork Lewis River Partnership meetings since August 2018. Clark County Clean Water Division should continue presenting on their Clean Water programs at East Fork Lewis River community events.

Washington State University Extension – Small Acreage Program

Washington State University (WSU) Extension works in partnership with Clark County Public Works and Public Health to provide educational workshops and other outreach to rural property owners through the Small Acreage Program. Through this program, WSU provides workshops and other outreach to residents on water quality topics unique to rural properties. Topics include mud and manure management, pasture management, well and septic maintenance, and best practices for livestock management. To support the East Fork Lewis River Water Cleanup Plan, Clark County made the commitment to target Small Acreage program implementation in the East Fork Lewis River starting in 2019. The following education commitments were achieved in 2019.

- **Private Landowner Outreach through Direct Mailings** - A direct mailing to at least 1,000 property owners in the East Fork Lewis River Watershed occurred in 2019. The properties targeted for outreach were determined in partnership with Washington State University Extension and the Department of Ecology, in alignment with water quality priorities.
- **Well and Septic System Maintenance Workshop** – One Well and Septic workshop was held in the East Fork Lewis River watershed in 2019 in the City of La Center, which is a priority area for bacteria reduction. This workshop was hosted in partnership with Clark County Public Health.
- **Best Management Practices Workshop** - At least one workshop focused on best management practices for manure management and composting was hosted in the East Fork Lewis River in 2019

Department of Ecology will continue to collaborate with Clark County and WSU Extension to support Small Acreage outreach and promotion efforts in the East Fork Lewis River Watershed for 2020 to 2030. Implementation of additional WSU Small Acreage workshops is one element of Poop Smart Clark, which is a new Pollution Identification and Correction program in Clark County.

Other Small Acreage outreach events include the Living on the Land Education Series, Small Acreage Expo, the Small Acreage Recognition Program, Well and Septic Workshops, and Best Management Practices Workshops. In 2018, approximately 936 members of the public participated in Washington State University Extension's public education and outreach events in Clark County. These participants owned approximately 1,068 acres of land in Clark County watersheds. WSU's Small Acreage Program has been working in Clark County since 2003.

Listed below, are details regarding WSU's public education and outreach through the Small Acreage programs. The Small Acreage program is partially funded by Clark County Clean Water Division.

Small Acreage Expo

The Small Acreage Expo is held annually in Clark County. This expo includes a series of workshops, which cover grazing and sustainable pasture management, native landscaping, weed identification and control, sustainable timber harvest, goat management, septic inspection certification, composting, pond care, keeping well water healthy, drainage solutions, and sustainable living for small farms. In 2018, 106 people attended the Small Acreage Expo. In 2019, Ecology attended the Expo and was invited to talk about Partnerships for Clean Water and share educational resources for water quality at an information booth. The Small Acreage Expo should be advertised to landowners in the East Fork Lewis River through WSU's direct mailings and social media in starting in 2020. Ecology should be invited to participate in this Expo annually to educate residents about water quality studies, priorities, and efforts in Clark County.

Living on the Land Program

The Living on the Land Program is a 12-week educational series for small acreage landowners to learn best practices to help steward and take care of their land. Topics covered during the series include soil, water, plants, and animals; pasture management, controlling weeds, wildlife, soil health, well and septic maintenance, and much more. Between 2003 and 2018, 83 people from the City of La Center graduated from the Living on the Land Series and 76 from Yacolt. Residents from Ridgefield and Battleground also participated in the education series. Around 81 percent of participants felt that they learned something from the program. All of the learning modules, activity sheets, and supplemental resources are available on WSU's Small Acreage website. The Living on the Land Program should be advertised to landowners in the East Fork Lewis River through WSU's direct mailings in 2020 to 2030. When appropriate, consider opportunities to include Ecology in the Living on the Land Program curriculum. Since the East Fork Lewis River Partnership started, more residents in the watershed registered for this course in 2019 compared to past years.

Best Management Practices Workshop

WSU hosts Best Management Practices Workshops, which cover manure composting and management, pasture management, and streamside planting with native plants. In 2018, 40 people signed up for Best Management Practices workshops. These participants owned 291 acres in Clark County watersheds. At least 46 percent of attendees learned how best management practices could affect clean water after attending workshop. WSU should commit

to hosting at least one, annual Best Management Practices Workshop in the East Fork Lewis River watershed from 2020 to 2030. The Best Management Practices Workshop should be advertised to landowners in the East Fork Lewis River through WSU's direct mailings and social media. When appropriate, consider opportunities to include Ecology in the BMP Workshop curriculum.

Well and Septic Workshop

Well and Septic Workshops are hosted by WSU and Clark County Public Health every year. At these workshops, homeowners learn tips for maintaining their septic systems and protecting their water supply. By attending this workshop, Clark County homeowners with owner-occupied, gravity fed septic systems can be certified to perform their own septic system inspection. These systems are required to be inspected every three years, with every other inspection needing to be completed by a certified professional. Participation in the workshop, followed by a short exam, enables homeowners to perform their own inspection.

In 2018, 126 residents attended a Well and Septic Workshop. These residents owned about 525 acres in Clark County watersheds. From a survey, around 87 percent of attendees indicated that they had increased their knowledge on well and septic system maintenance and health after attending a workshop. On average, 75 percent indicated that they had learned something about how septic management practices effects clean water.

One workshop was held in the East Fork Lewis River watershed in 2019, in partnership with Clark County Public Health. This workshop was held in the City of La Center, which is a priority for bacteria reduction. All Well and septic classes held in 2019 were at full capacity. More septic workshops in Clark County would be beneficial to meet public demand for septic system technical assistance.

WSU and Clark County Public Health should commit to hosting at least one, and ideally multiple, Well and Septic workshops in the East Fork Lewis River watershed from 2020 to 2030. The Well and Septic workshop should be advertised to landowners in the East Fork Lewis River through WSU's direct mailings and social media. Increasing local capacity to host more of these workshops is one goal of the East Fork Lewis River Pollution Identification and Correction Program, Poop Smart Clark. Offering courses online may help increase public attendance.

Small Acreage Recognition Program

The Small Acreage Recognition program recognizes Clark County residents that are implementing water quality best management practices on their properties. This program evaluates the property's drainage, vegetation features, soil health and erosion, septic systems, wellheads, safe chemical and fuel storage, pasture and manure management, and livestock practices. Property owners that complete an "Assessment Guide" for Small Acreage and can apply to receive a Clean Water Recognition Sign.

In 2018, two properties were assessed in the East Fork Lewis River and one property was recognized for its land management practices. This Small Acreage Recognition Program should be advertised to landowners in the East Fork Lewis River through WSU's direct mailings and social media from 2020 to 2030. Local partners should be encouraged to identify properties

that are eligible for this certification while conducting site visits and share information with landowners to contact WSU.

Other events and resources

WSU hosts other educational events including Small Farm Tours, workshops on Farm Business Planning, an annual Harvest Celebration, and a Women in Agriculture event. WSU also has a series of publications available on their website that can be used for public education and outreach. These publications cover a wide variety of topics relevant to rural landowners. In 2018, around 3,221 people accessed WSU's Small Acreage webpages and 4,531 people accessed their video clips. Local partners should use WSU Small acreage Program's educational materials during outreach events and local partners should have copies of WSU's educational materials to share with landowners when conducting site visits. A thorough review of these materials should be completed to potentially update, shorten, or modernize the materials as appropriate. Efforts to develop an educational packet for different organizations working with private landowners should be pursued.

Program Evaluation

Washington State University Extension has a robust evaluation process to keep track and how many acres of land, number of livestock, and people its program has impacted. The outcomes and impacts of WSU programs are summarized annually by WSU. Multiple people, who participate in the Small Acreage program, often implement best management practices after attending workshops.

Clark Conservation District

Clark Conservation District is a non-regulatory agency that was established in 1942 to help bridge the gap between landowners with natural resource needs, and state and federal government. Clark Conservation District works with landowners to provide education, and technical and financial assistance to landowners that have natural resources needs. Clark Conservation District provides direct support through site visits, technical assistance, and conservation planning services. The Conservation District offers a manure exchange program, and has a manure spreader and poultry processor available for rent. Additionally, the Conservation District offers different programs, classes, and workshops, which include free Watershed Stewardship Classes, Amphibian and Stormwater Classes, and an annual plant sale. Most recently, Clark Conservation District is the lead organization developing the new "Poop Smart Clark," Pollution Identification and Correction program in Clark County. This program includes resources to educate the public on best practices to reduce bacteria and protect water quality. The Conservation District also has a Stewardship Forester that assists private forest owners with conservation planning and implementation.

Watershed Alliance of Southwest Washington

The Watershed Alliance of Southwest Washington works to educate and engage community members in Southwest Washington to be active stewards of natural resources. The Watershed

Alliance has multiple programs that educate the public through workshops, events, hands on stewardship opportunities, and working with private landowners to implement best management practices on their properties.

The Watershed Alliance has a successful history working with private landowners in the Burnt Bridge Creek and Washougal watersheds. Currently, the Watershed Alliance is expanding its programs to the East Fork Lewis River Watershed, through a grant to implement riparian restoration in Lower Daybreak Park, and conduct outreach to private landowners in Manley Creek. The Watershed Alliance is also a partner in Poop Smart Clark, and will help conduct door-to-door outreach to promote implementation of water quality BMPs on private property. This includes the development of a septic system inspection and maintenance rebate program to address septic systems in Clark County.

Lower Columbia Estuary Partnership

The Lower Columbia Estuary Partnership engages students in education programs and stewardship opportunities, which includes science lessons and field trip programs. LCEP also provides teachers with curriculum and methods to self-implement their own environmental education units. Teachers can request LCEP to visit their classrooms to cover many Columbia River topics. In the East Fork Lewis River, LCEP has engaged student groups in restoration and stewardship activities, including tree planting at restoration sites.

Clark Public Utilities District

Clark Public Utilities (CPU) implements countywide educational opportunities through the Stream Stewards and Stream Team programs. The Stream Stewards program helps increase public awareness of geology, hydrology, riparian and wetland habitat, wildlife, water quality, and stream restoration. Tuition for this program is free of charge, and participants complete 45 hours of volunteer time with local environmental organizations. Clark County also hires AmeriCorps interns, to provide career advancement and education opportunities to college-aged students to support environmental workforce development. Clark Public Utilities has used multiple members of its Stream Team, Stream Stewards, and AmeriCorps program to implement projects in the East Fork Lewis River. CPU also works with inmate crews to implement restoration projects.

La Center Schools

La Center's High School is a certified, platinum Washington Green School with a strong environmental curriculum and dedicated environmental leadership. Students benefit from the Salmon in the Classroom program, and by participating in the Vancouver Water Resources Center's student watershed-monitoring network. Students in Environmental Studies classes complete water quality monitoring, macroinvertebrate identification, and vegetation assessments. Each year, the students raise and release salmon into Brezee Creek in the East Fork Lewis River.

Clark County Public Health - Swim Beach Program

Clark County Public Health (CCPH) is the primary jurisdiction responsible for protecting public health risks at designated swim beaches. Currently, Clark County Public Health monitors three designated swim beaches at Vancouver Lake, Kline Pond, and Battle Ground Lake. A designated swim beach has characteristics to prevent drowning and illness, such as physical barriers around the swimming area, restrooms, a gradually sloped bank, and vegetation management in the swimming area to increase visibility. CCPH monitors these three locations bi-weekly from Memorial Day to Labor Day for *E.coli* bacteria, following the Environmental Protection Agency (EPA) testing guidelines. They also respond to and investigate potential public health hazards at any water body within Clark County, which may include algae blooms, recreational waterborne illness outbreaks, or an untreated sewage release.

To educate the public on healthy swimming activities, Clark Public Health issued a “Healthy Swimming is Safe Swimming,” press release in 2019 highlighting best practices for reducing bacteria at swimming areas. Clark County Public Health recommends parents keep children who are not toilet-trained out of the water at swim beaches. Swim diapers and plastic covers are not effective and may give parents a false sense of security. While swim diapers may contain solid feces, they are not leak proof. Bacteria and parasites that can cause illness may still leak into the water. Swimmers can keep themselves and others healthy by following these simple steps.

- Rinse off before and after swimming.
- Do not swim if you have had diarrhea or vomiting in the last two weeks.
- Keep children who are not toilet trained and require swim diapers out of unchlorinated water.
- Know where the bathrooms and changing stations are located.
- Take frequent bathroom breaks. Young children should be taken to the bathroom every hour.

In 2019, CCPH was awarded a grant from the National Environmental Health Association (NEHA) to fund an intern for 10 weeks to conduct a swim beach survey to assess risk of drowning or injury and bacterial contamination at 12 public parks within Clark County. The data from the survey will be used to provide recommendations to local park agencies.

Ecology also has a swim beach program, which primarily focuses on monitoring marine waters. However, Ecology has some recommendations for how to keep swim beaches clean. These recommendations include picking up after pets, picking up trash, swimming only when well, helping children to keep water clean, not discharging from boats, throwing fish guts into trash, and not feeding wildlife. Individuals can do their part to keep beaches clean by scooping and bagging pet poop and throwing it in the trash, inspecting and maintaining home septic systems, pumping recreational boat holding tanks in authorized pump stations, and picking up trash at the beach, especially diapers.

In 2019, community members living in the East Fork Lewis River watershed became concerned about high levels of bacteria in non-designated swimming areas. Developing educational information on healthy swimming behaviors to reduce bacteria in surface water has become a

priority in the East Fork Lewis River. Considering opportunities to disseminate this information at Paradise Point State Park and campground, Sunset Falls campground, Daybreak, Lewisville and Moulton Falls, would be beneficial to educate the public on public health risks associated with human bacteria, and what individuals can do to help improve water quality. Providing this information at other popular swimming areas, such as the informal swimming area near La Center Bridge, would also be beneficial.

Water quality public town hall

Ecology and East Fork Lewis River partners hosted the East Fork Lewis River Water Quality Public Town Hall in June 2019. Fifty-four people attended the public meeting in La Center, including forty members of the public, and fourteen people from environmental organizations. The goals of the Town Hall were to raise awareness about water quality in the East Fork Lewis River; share information about local environmental programs, projects, and priorities; provide landowners with resources to improve water quality on private property; and answer questions. Clark County newspapers highlighted the Town Hall to raise public awareness. This town hall was a new strategy to engage and educate members of the public on local water quality concerns and implementation opportunities. A similar community coffee was also hosted in La Center. Efforts to increase public awareness through town halls, community coffees, open houses, and relationships with local newspapers are needed in the East Fork Lewis River.

Community organizations

Multiple community organizations in Clark County are concerned about the environment. These organizations include Friends of Clark County, Friends of the East Fork, Fish First, East Fork Community Coalition, Trout Unlimited, Ducks Unlimited, Salmon Creek Fly Fishers, and Clark-Skamania Fly Fishers. Establishing partnerships with these grassroots, community-based organizations is essential to reach landowners in the East Fork Lewis River watershed that can implement BMPs for water quality. Additionally, these organizations often have volunteer networks that can support water quality and salmon recovery efforts.

Public outreach for culturally specific communities

The Environmental Protection Agency's (EPA) Environmental Justice Screening and Mapping Tool (EJ Screen) was developed to support culturally specific community outreach, while increasing accessibility, diversity, equity, and inclusion. This tool summarizes data from the United States Census American Community Survey Report from 2013-2017. Understanding demographic data can help support Community Based Social Marketing efforts to target culturally specific communities for outreach and engagement. Priority demographics to target are communities where more than 5 percent do not speak English. For these audiences, outreach materials should be translated and language interpreters should be provided.

In Clark County, the Hispanic population is the most common minority community making up nine percent of the County population. Building environmental outreach resources to engage the Hispanic community is necessary. Establishing relationships with Fourth Plain Forward, the Hispanic Metropolitan Chamber of Commerce, and the League of United Latin American

Citizens (LULAC) are recommended first steps. Recruiting volunteers that speak Hispanic languages and translating outreach materials are also priorities. Additionally, building resources to engage the Asian community in Clark County, which makes up 5 percent of the County’s total population, is also important. Specifically, developing resources to engage Chinese, Vietnamese, Korean, Filipino, and other Asian communities is needed. Resources to engage the growing Chuukese population is also a priority.

As of 2018, around 63,944 people in Clark County lived in a non-English speaking home. Approximately 6 percent of the County’s population, or around 25,024 people, speak English “less than very well.” Specifically, there are 4,868 linguistically isolated households in Clark County, where no one over the age of 14 speaks English. Approximately 35 percent of these linguistically isolated households speak Spanish, 34 percent speak Indo-European Languages, and 25 percent speak Asian-Pacific Island languages. Developing outreach and language resources to support these linguistically isolated households is essential.

To understand demographics at the tributary and subwatershed level, demographic analysis should be repeated at a more localized level. This information should also be updated when new demographic data from the 2020 census becomes available.

Implementation – public education and outreach

To achieve clean water in the East Fork Lewis River, meet water quality standards, and support recreational uses, it is important to increase general awareness, provide stewardship opportunities, and effect behavior change to improve water quality. The following implementation tables outline goals and actions for public education and outreach in the East Fork Lewis River. The long-term goal is to achieving a mutual understanding and shared responsibility of how individual and collective actions can lead to better water quality in the East Fork Lewis River. Additional public education and outreach actions are listed in the septic system, small acreage agriculture, riparian forest restoration, and stormwater management implementation sections.

Table 63. Public education and outreach implementation goals.

Implementation Goals
Inspire behavior change, while achieving a mutual understanding and shared responsibility of how individual and collective actions can lead to better water quality in the East Fork Lewis River. Raise general awareness, create stewardship opportunities, and effect behavior change to improve water quality.

Table 64. Public education and outreach Implementation actions.

Implementation Actions	
ED1	Target Audiences
ED1.1	Prioritize outreach and education to agricultural landowners with properties adjacent to the East Fork Lewis River and its tributaries. Agricultural landowners in subwatersheds where there are known bacteria issues are priorities for outreach.
ED1.2	Prioritize outreach and education to homeowners with septic systems that are past due for inspection and maintenance on properties adjacent to the East Fork Lewis River and its tributaries. Septic system owners in subwatersheds where there are known bacteria issues are a priority for outreach.
ED1.3	Prioritize outreach and education to public and private landowners with riparian properties adjacent to the highest shade deficits on the East Fork Lewis River mainstem and tributaries. Outreach to these landowners to promote tree planting and riparian restoration is a priority.
ED2 Clark County Public Works – Clean Water Division	
ED2.1	Clark County and Washington State University Extension will collaborate with Department of Ecology to conduct ongoing outreach and education to private landowners through the Small Acreage Program starting in 2019. Close coordination and planning for 2021 and future years should start in 2020. Specifically on sending targeted mailings to private property owners, and hosting educational workshops.
ED2.2	Canines for Clean Water educational material will be used by Department of Ecology in the East Fork Lewis River during outreach events and shared with the City of La Center. This program will also be used in future Pollution Identification and Correction efforts. Relationships with business that provide pet waste removal services should also be formed, to foster new programs to remove dog waste from watersheds. Partnerships with local veterinarians, groomers, pet boarding, and dog licensing should also be explored to educate on water quality.
ED2.3	Targeted, short messages for bacteria reduction, septic systems, pet waste, and agriculture, tree planting and backyard habitat should be developed for social media use. Information about local programs for private landowners should also be shared on social media. Opportunities to coordinate and share social media messaging should be explored by local partners, and when possible. Opportunities to develop social media campaigns or short videos should be coordinated between education and outreach partners. Target social media messages to East Fork Lewis River watershed residents through Facebook and NextDoor.
ED2.4	Incorporate messages from the East Fork Lewis River Water Cleanup Plan and the Small Acreage Program into Clark County’s mass media outreach plan for television and radio, to educate Clark County residents on the importance of reducing bacteria and lowering warm water temperatures.
ED2.5	Incorporate messages from the East Fork Lewis River Water Cleanup Plan into the Stormwater Partners Online Watershed Map, focusing on individual actions that the public and private landowners can take to improve water quality.
ED2.6	Update road stream crossing signs in the East Fork Lewis River to raise public awareness.

Table 65. Public education and outreach implementation actions (cont.)

Implementation Actions	Implementation Actions
ED2.7	Continue the student monitoring network and annual student watershed congress facilitated by the Vancouver Water Resources Center. Continue inviting school districts within the East Fork Lewis River to engage in the annual watershed congress and water quality activities.
ED2.8	Clean Water Storytelling should occur at public education and outreach events in the East Fork Lewis River, especially when working with K-12 audiences.
ED2.9	The Enviroscape watershed model should be used at education and outreach activities in the East Fork Lewis River, especially when working with K-12 audiences.
ED2.10	Workshops and outreach events in the East Fork Lewis River watershed should be publicized on the Clark County Green Neighbors website and community event calendar.
ED2.11	Outreach to businesses in the East Fork Lewis River will occur through the Clark County Green Business program. This outreach will focus on businesses that are priorities for temperature and bacteria source control activities.
ED2.12	Develop new signage to educate residents and visitors on the East Fork Lewis River watershed. Include individual actions people can take to improve water quality. Prioritize implementation of signage at Clark County Regional Parks, and other local parks on the East Fork Lewis River, including Sternwheeler Park in the City of La Center.
ED2.13	Clark County Public works should attend East Fork Lewis River specific community events to conduct clean water outreach. Clark County should be willing to share East Fork Lewis River specific messaging and outreach materials at any informational booths they have in Clark County.
ED2.14	Clark County Clean Water Division should attend and present their Clean Water programs at East Fork Lewis River Community events.
ED3	Washington State University Extension Small Acreage Program
ED3.1	Continue advertising Small Acreage events to residents in the East Fork Lewis River through direct mailings and social media in 2020-2025. Consider collaborating with other organizations to include additional water quality information and resources in mailings.
ED3.2	Continue advertising Small Acreage events to residents in the East Fork Lewis River through direct mailings and social media in 2020-2025. Consider collaborating with other organizations to include additional water quality information and resources in mailings.
ED3.3	Advertise the Small Acreage Expo to landowners in the East Fork Lewis River through WSU's direct mailings and social media in 2020-2025. Ecology should be invited to participate in this Expo annually to educate residents about water quality studies, priorities, and efforts in Clark County.

Table 66. Public education and outreach implementation actions (cont.)

Implementation Actions	Implementation Actions
ED3.4	Advertise the Living on the Land Program to landowners in the East Fork Lewis River through WSU’s direct mailings and social media in 2020-2025. When appropriate, consider opportunities to include Ecology into the Living on the Land Program curriculum.
ED3.5	Commit to hosting at least one, annual Best Management Practices Workshop in the East Fork Lewis River watershed in 2020-2025. Advertise the Best Management Practices Workshop to landowners in the East Fork Lewis River through WSU’s direct mailings and social media in 2020-2025. When appropriate, consider opportunities to include Ecology in the BMP Workshop curriculum.
ED3.6	Commit to hosting at least one, and ideally multiple, annual Well and Septic workshop in the East Fork Lewis River watershed in 2020-2025. Advertise the Well and Septic workshop to landowners in the East Fork Lewis River through WSU’s direct mailings and social media in 2020-2025.
ED3.7	Advertise the Small Acreage Recognition Program to landowners in the East Fork Lewis River through WSU’s direct mailings and social media in 2020-2025. Encourage local partners to identify properties that are eligible for this certification while conducting site visits and share information with landowners to contact WSU.
ED3.8	Utilize WSU Small Acreage Programs educational materials during outreach events. Local partners should have copies of WSU’s educational materials to share with landowners when conducting site visits. A thorough review of these materials to potentially update, shorten, or modernize educational materials and handouts should be considered. Efforts to develop an educational packet for different organizations working with private landowners should be pursued.
ED4.1	Continue engaging the East Fork Lewis River Partnership through regular email updates, by maintaining and updating the East Fork Lewis River website, continuing to host Partnership meetings, and engaging partners in the implementation, monitoring and adaptive management of the East Fork Lewis River Water Cleanup Plan.
ED4.2	Develop and implement a new healthy swim behavior campaign and messaging toolkit. Consider opportunities to disseminate this information at Paradise Point State Park, or the popular Clark County Regional Parks - Daybreak, Lewisville and Moulton Falls to educate the public on what they can do to help improve water quality.
ED4.3	Efforts to increase public education through town halls, community coffees, and open houses are needed in the East Fork Lewis River.
ED4.4	Incorporate Agriculture in the Classroom and Salmon in the Classroom programs into schools in the East Fork Lewis River.
ED4.5	Host Clark Conservation District’s Watershed Stewardship workshops program in the East Fork Lewis River watershed.

Table 67. Public education and outreach and implementation actions (cont.)

Implementation Actions	Implementation Actions
ED4.7	Review and update all agricultural and septic system outreach materials from various organizations to develop a common educational packet or toolkit for different organizations working with private landowners.
ED4.8	Continue educating K-12 aged children in volunteer stewardship activities and classroom programs.
ED4.9	Implement Skagit County’s Poop Smart campaign in Clark County, as Poop Smart Clark.
ED4.10	When appropriate, collaborate with the media, utilize press releases and news articles as a public education, and outreach tool to raise public awareness and encourage public involvement.
ED4.11	Develop and implement a new healthy swimming behavior campaign in the East Fork Lewis River by 2023. Provide educational signage and information on what swimmers can do to protect clean water.

Funding and partnerships for public education and outreach

Table 68. Ecology funding for public education and outreach.

Best Management Practice	Description
Public education and outreach	Projects with public outreach and education components are eligible for loan or grant funding.

Table 69. Public education and outreach implementing organizations and partners

Implementing Organizations	Clark County Public Health, Clark County Public Works, Watershed Alliance of Southwest Washington, Washington State University Extension, Clark Public Utilities, Clark Conservation District, Lower Columbia Estuary Partnership, La Center Schools
Implementing Partners	City of La Center, City of Battleground, Natural Resource Conservation Service, Washington State Conservation Commission, Washington Department of Agriculture, Lower Columbia Fish Enhancement Group, Lower Columbia Fish Recovery Board, Friends of Clark County, Friends of the East Fork, Fish First, East Fork Community Coalition, Trout Unlimited, Ducks Unlimited, Salmon Creek Fly Fishers, and Clark-Skamanian Fly Fishers..

Chapter 5 – Effectiveness Monitoring and Adaptive Management

Monitoring in East Fork Lewis River Watershed

The Department of Ecology, Clark County Clean Water Division, and other organizations have completed monitoring in the East Fork Lewis River watershed for many years. Monitoring efforts have been completed to assess watershed health, water and habitat quality, and the status of fish populations. The following information summarizes past monitoring efforts completed in the East Fork Lewis River watershed. For additional information, the *East Fork Lewis River Source Assessment* should be referenced as the primary technical reference for this *Water Cleanup Plan*. Future monitoring is necessary to support nonpoint source investigation, pollution identification and correction efforts, targeted implementation, and effectiveness monitoring.

Department of Ecology monitoring

To assess bacteria and temperature impairments in the watershed, the Department of Ecology completed its first water quality monitoring assessment in 2005-2006. In 2017, additional bacteria monitoring was completed for the *East Fork Lewis River Watershed Bacteria and Temperature Source Assessment*. Both of the Quality Assurance Project Plans (QAPPs) for monitoring efforts are available online. Additionally, a *Surface Water / Groundwater Exchange Report* was published in 2009.

From 2018 to 2020, Ecology completed additional investigative monitoring to support nonpoint source implementation efforts. Monitoring efforts were completed in the wet and dry seasons, and prioritized to the McCormick Creek subwatershed, where the highest bacteria concentrations were measured in *the East Fork Lewis River Source Assessment*. Investigation efforts resulted in the identification and decommissioning of a large manure lagoon associated with a historical dairy operation. Additional nonpoint source bacteria monitoring will be completed in the watershed starting in 2020. Priority areas for investigative monitoring include Brezee, Jenny, McCormick and Rock Creek North. Investigative monitoring in Bolen Creek, located in the City of La Center is also important to support stormwater implementation. This investigative monitoring information will support targeted outreach and implementation to landowners with septic systems or agriculture. Monitoring results will also be used to support pollution identification and correction program implementation. Investigative monitoring is being completed through the *Western Washington Nonpoint Source Quality Assurance Project Plan*.

In addition to TMDL and nonpoint source monitoring, Ecology has maintained a long-term ambient monitoring station in the middle watershed, near river mile ten at Daybreak Park.

Clark County Clean Water

Clark County Clean Water Division completes water quality monitoring in watersheds throughout Clark County, on a five-year rotating basis. In 2010, Clark County published a Stream Health Report, which summarized watershed health in the East Fork Lewis River. Clark County

Stream Health reports are generally published every 10 years. To prepare for the 2020 Stream Health Report, Clark County completed a full water year of monitoring in the watershed from 2018 to 2019, which included multiple sampling sites. In addition to collecting fecal coliform bacteria data, Clark County also collected *E. coli* data throughout the watershed, to support implementation of the new water quality standard for recreational uses. A new watershed story map (clarkwatersheds.org) will interactively publish Stream Health results and educate the public on water quality. In addition to stream health reporting, Clark County assists restoration partners with monitoring near restoration sites. The County also has a long-term index-monitoring site on Rock Creek North. This site was strategically selected to monitor watershed health in the transitional portion of the watershed, where urbanized land uses meet rural landscapes. Clark County intends to collaborate with other organizations to completed pollution identification and correction monitoring in the watershed starting in 2020. The plan is to use microbial source tracking to understand and target different sources of bacteria, including bacteria from humans, livestock, and dogs. Monitoring will be paired with land use mapping and assessment, to support targeted source correction and implementation efforts in the watershed.

Washington Department of Fish and Wildlife

Washington Department of Fish and Wildlife (WDFW) completed temperature monitoring in the East Fork Lewis River watershed in 2015, 2016, and 2018, as drought conditions and low streamflow raised concerns for fish. As of 2018, WDFW closed summer fishing in the East Fork Lewis River from July 16 to September 15 due to warm water temperatures and low streamflow conditions causing stress to fish.

Clark Public Utilities District

To assess how past restoration projects have effected stream temperatures, Clark Public Utilities District (CPU) has completed some temperature effectiveness monitoring in the watershed. Preliminary monitoring results show that stream temperatures have decreased significantly in Lockwood Creek, where CPU has implemented significant restoration efforts.

Lower Columbia Estuary Partnership

The Lower Columbia Estuary Partnership (LCEP) has also completed temperature monitoring and modeling on the mainstem East Fork Lewis River, focusing specifically between river miles 8 to 10 in the middle watershed. These temperature assessment efforts are supporting the development of restoration alternatives for the Ridgefield Pits, which are abandoned sand and gravel mining pits that were historically avulsed into by the Mainstem River. The long-term goal is to restore and enhance cold-water areas in this section of the watershed to benefit fish. Additionally, LCEP will complete a full thermal refuge assessment of river miles 0 to 15 beginning in 2020. The thermal assessment information will be used to update the *Lower East Fork Lewis River Habitat Restoration Plan*, which is one of the Lower Columbia Fish Recovery Board's (LCFRB) tools to guide salmon recovery in the watershed.

Lower Columbia Fish Recovery Board

LCFRB is developing the *East Fork Lewis River Recovery Plan Review* to assess land use and land

cover change in the watershed since 2004. This effort also evaluated implementation progress and restoration success in the watershed, and made recommendations for future management. To support additional evaluation, LCFRB plans to collaborate with WDFW to complete landscape-scale habitat status and trends monitoring, using 1-meter scale land cover information. This effort will help answer questions regarding changes in watershed and riparian land cover, and will be used to further prioritize and target critical areas for preservation, restoration, and implementation.

Effectiveness monitoring

Formal effectiveness monitoring to assess bacteria and temperature conditions in the watershed should be implemented as early as 2027; ten years after Ecology completed monitoring for the East Fork Lewis River Source Assessment. Samples should be collected at monitoring locations included in both the 2005-2006 and 2017 monitoring efforts.

Additional sampling sites, associated with nonpoint source investigation and pollution identification and correction program sampling, should also be considered for effectiveness monitoring. Completing monitoring near sites where water quality projects have been implemented, will also help measure implementation effectiveness.

Calculating the load reductions achieved from implementation will also support implementation tracking and reporting in the watershed. The ultimate goal is to implement water quality improvement projects that will cumulatively achieve the recommended load reductions for bacteria, and meet the effective shade targets established in the *East Fork Lewis River Source Assessment*. Completing a new shade deficit analysis as early as 2040-2060, will be necessary to measure progress towards meeting riparian forest restoration goals in the East Fork Lewis River watershed. The system potential riparian vegetation for the watershed is 85 percent canopy cover.

Effectiveness monitoring is the primary tool that will be used to assess if implementation actions are resulting in water quality improvement. Effectiveness monitoring should be completed every 10 years starting in 2027 until water quality standards are attained. Other efforts that can support effectiveness monitoring include desktop land use and land cover assessments, qualitatively viewing aerial photography, and implementing regular implementation tracking in the watershed through the East Fork Lewis River watershed.

When water quality standards are met, the Department of Ecology will delist category 5 waters in accordance with Policy 1-11.

Table 70. Monitoring schedule in the East Fork Lewis River.

Monitoring Project	Organization	Year
Initial Sampling for Source Assessment	Department of Ecology	2005-2006 & 2017
Surface / Groundwater Exchange and Ambient Monitoring	Department of Ecology	2009 and Ongoing
Streamflow Gauge	United States Geological Survey	Ongoing
Temperature Monitoring	Department of Fish and Wildlife	2015, 2016 , 2018
NPS Investigative Monitoring	Department of Ecology	Ongoing
Temperature Monitoring and Modeling	Lower Columbia Estuary Partnership	2019-2020 -Ongoing
Clark County Stream Health Report	Clark County Clean Water	2010, 2020, 2030, 2040, 2050, 2060
Pollution Identification and Correction Monitoring	Clark County Clean Water	2020-2027
Effectiveness Monitoring	Undetermined	2027, 2037, 2047, 2057
Shade Deficit Analysis	Undetermined	2017, 2040, 2060
Recovery Plan Review & Habitat Status and Trends Monitoring	Lower Columbia Fish Recovery Board	2020, 2025

Adaptive management, implementation tracking, and reporting

The East Fork Lewis River Partnership was launched in 2018. The Partnership has met regularly through 2020, and will continue to meet biannually to share information, provide project and program updates, and revisit water quality implementation goals. East Fork Lewis River Partnership meetings are a forum to share lessons learned, and suggest new projects and programs to be included in the *East Fork Lewis River Water Cleanup Plan*.

To document implementation progress, the Department of Ecology will publish a concise annual report highlighting implementation efforts and successes in the watershed. To develop this report, a survey will be sent to East Fork Lewis River partners each year, to gather information on project and program implementation status, metrics, and outcomes. Implementation tracking will also be completed through Ecology’s Water Quality Combined Funding Program. A mechanism for private landowners to report implementation will also be developed. Every five years, an East Fork Lewis River Progress Report will be published to update or amend the East Fork Lewis River Water Cleanup Plan. These reports will be published on the East Fork Lewis River Partnership website. A StoryMap is one tool that could support implementation tracking in the watershed.

Project tracking, annual reporting, and the 5-year progress report will occur until effectiveness monitoring is completed in 2020. Results from the 2027 effectiveness monitoring will be published in a report. Effectiveness monitoring results will determine how the Partnership will move forward with implementation.

In addition to Ecology’s planning and adaptive management, the Lower Columbia Fish Recovery Board has also implemented extensive program evaluation in the watershed, to measure and monitoring implementation of the *East Fork Lewis River Salmon Recovery Plan* and the *Lower East Fork Habitat Restoration Plan*. Recommendations from LCFRB’s planning efforts should continually be incorporated into Water Cleanup Planning and adaptive management process.

When category 5 waters are delisted, the East Fork Lewis River Partnership focus will shift its focus from water quality improvement to antidegradation.

Table 71. Adaptive management, implementation tracking, and reporting schedule.

Project	Agency	Year
East Fork Lewis River Subbasin Plan	LCFRB	2004
Quality Assurance Project Plan East Fork Lewis River Temperature and Fecal Coliform Bacteria Total Maximum Daily Load Study	Ecology	2005
Streamflow Summary for Gaging Stations on the East Fork Lewis River, 2005-06	Ecology	2005
Surface Water/Groundwater Exchange Along the East Fork Lewis River	Ecology	2009
Lower East Fork Lewis River Habitat Restoration Plan	LCFRB	2009
East Fork Lewis River Recovery Plan	LCFRB	2010
East Fork Lewis River Stormwater Needs Assessment Reports	Clark County	2010
2010 Stream Health Report	Clark County	2010
Quality Assurance Project Plan East Fork Lewis River Fecal Coliform Bacteria and Temperature Source Assessment	Ecology	2017
East Fork Lewis River Watershed Bacteria and Temperature Source Assessment	Ecology	2018
Quality Assurance Project Plan Monitoring Fecal Coliform Bacteria in Western Washington Water Bodies	Ecology	2020
East Fork Lewis River Water Cleanup Plan	Ecology	2020
East Fork Lewis River Recovery Plan Review	LCFRB	2021
2020 Stream Health Report	Clark County	2020
East Fork Lewis River Annual Reports	Ecology	2021, 2022, 2023, 2024, 2026
Lower East Fork Lewis River Habitat Restoration Plan Update	LCFRB	~2024
East Fork Lewis River Water Cleanup Plan - 5 year Progress Report	Ecology	~2025
East Fork Lewis River Effectiveness Monitoring Report	Ecology	~2027