



METRO

## Metro Nature in Neighborhoods Capital Grants Program

### REPORT FORM

X Final Report

**Name of organization reporting:** Clackamas Community College

**Project Name:** John Inskeep Environmental Learning Center, Newell Creek Headwaters

**Contact person & title:** Renee Harber, ELC Program Director

**Phone and email address:** [rharber@clackamas.edu](mailto:rharber@clackamas.edu), 503-594-3015

**Amount of Grant Award:** \$ 868,342

**Amount of Grant spent to date:** \$ 868,342

**Amount of matching funds or in-kind services to date:** \$ 1,959,051

The match was met from a combination of volunteer time, donated materials, and donated money from individuals, along with capital funds from the college and from other granting agencies. Details can be found in the files: *In Kind thru June 2018* and *Master Worksheet*.

**Percentage of project completed:** 100%

**Progress Report Period: from:** November 2016 to June 2018

**Background:** In 2014 Clackamas Community College applied for and received a Metro Nature in Neighborhoods grant for the Newell Creek Headwaters Restoration and Education project. The project is located on the College's Oregon City Campus at the John Inskeep Environmental Learning Center (ELC).

The ELC has a rich history as an educational resource for the College, regional schools, industry, and the community. Located on the former site of a Smucker's processing plant, the ELC was created to demonstrate what people could do to reclaim industrial sites, address stormwater issues, and restore wildlife habitat in urban areas. Each year thousands of people visit the ELC to explore the site and learn about watershed health. The site serves as an important stormwater facility for the College campus and provides critical wetland habitat for resident and migratory birds, such as great blue heron, wood duck, and merganser.

The ELC site is a conduit for stormwater for nearly half of the College's 165-acre campus, plus stormwater from Oregon City High School, and other areas along Beaver Creek Road. The original ELC ponds were once considered state-of-the-art, but they no longer functioned effectively for stormwater management. The need for a larger-scale stormwater management system, coupled with the spread of invasive plants left the

site physically degraded, and impaired the quality of water flowing from the ELC downstream into the Newell Creek Canyon. Because it is the headwaters of Newell Creek, the ELC plays a vital role in the overall health of the watershed. Newell Creek will not be adequately protected until the water that flows through the ELC site can be effectively cooled and filtered.

**Project Status:**

The primary goal of this project was to redevelop the ELC into an outdoor learning laboratory, demonstration project, and natural area that showcases innovations in stormwater management, landscape design, and sustainable living practices. In doing so, it was essential that the quality of stormwater leaving the ELC be improved. The construction of the site began in June 2017, was completed in May 2018, and a public grand opening was held June 7, 2018.

**Before Restoration (January 2011)**



**After Restoration (May 2018)**





**Modifications to the site included:**

- Redesign of the original ponds into a meandering riverine wetland,
- Addition of a sedimentation forebay,
- Creation of east-west oriented berms that were planted to allow for shading and cooling of water,
- Improvement of existing weirs to direct the flow of water through the system,
- Addition of an outdoor amphitheater,
- Addition of a play area for children,
- Addition of 7 new bridges,
- Addition of approximately 25,000 native plants
- Addition of 12 new interpretive signs,
- Addition of new entry signage that improves visibility of the site for the public.



## Project Changes:

A few adjustments were made along the way to keep the project in line with the budget, and to accommodate new opportunities. This included elimination of the covered breezeway at the entrance to the site, and access points for sampling water in the Water Quality Improvement Channel. In addition, financial support from the Clackamas River Water Providers, allowed us to add a rain garden to the site.

## Progress on Performance Measures

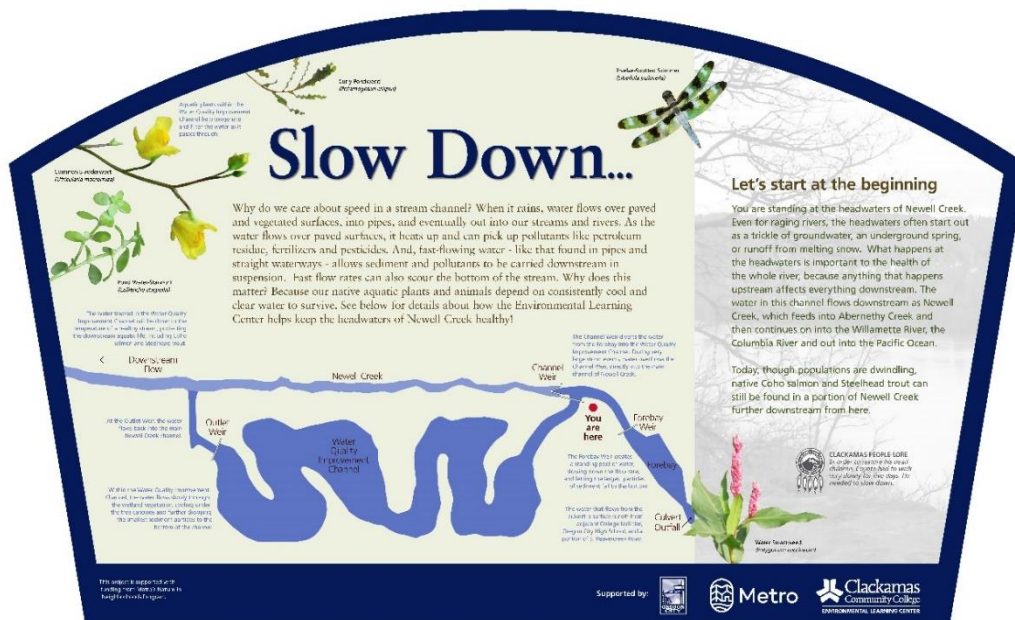
The restoration of the Environmental Learning Center into a regional outdoor laboratory and demonstration site has four long term objectives:

### 1. Enhance water quality within the Newell Creek watershed.

- *Site restoration will lead to lower water quality temperatures, increased dissolved oxygen, and decreased turbidity.*

**Progress:** The hydrologic control system seems to be functioning as intended – diverting the majority of stormwater into the slow-moving Water Quality Improvement Channel (WQIC). The WQIC has much greater water-holding capacity than did the ponds that were here prior to the restoration. As a result, stormwater moves across the site more slowly and the system doesn't have the overflows that it used to have. Even without numerical data, water turbidity is clearly reduced from the point where it enters the site, to where it exits the WQIC.

As for data collection, CCC's Environmental Science and Water & Environmental Technology students began collecting baseline water quality data prior to the restoration, and will continue to collect data after the restoration. Students collected some post-restoration data during Spring 2018, and it is expected that a deeper evaluation of water quality will begin in Fall of 2018.





Additionally, ELC program staff have developed field trip curriculum for middle school students which focuses on post-restoration site assessment (vegetation and water quality). These students will be contributing their data to a shared water quality database.

**2. Increase the capacity of the ELC to serve as a valuable educational resource for college students, schools and teachers, industry and families.**

- *The site is utilized by faculty and students in horticulture, water and environmental technology, renewable energy technology, environmental studies and education.*
- *College students are delivering field trip and community education programs on the ELC site as part of Cooperative Work Experience (CWE).*
- *Increase the number of K-6 schools using the site as a field trip destination.*
- *Collaborate with community partners to offer industry trainings.*

**Progress:** One of the beautiful things about this project is the involvement of CCC students during the actual restoration, which provided valuable, real-world learning opportunities for each of them. Specifically:

- Horticulture students propagated in excess of 5,000 native plants used for the project.
- Landscape classes gained experience in reading design plans, laying out plants and planting trees and shrubs.
- Arboriculture students practiced tree care activities for newly planted trees, such as staking and training.
- Two Horticulture students fulfilled their program's internship requirements (CWE) through restoration work at the ELC.
- Welding students helped to construct the seven new bridges: assembling and welding the steel girders and hand rails that support the wooden floors of the bridges.
- Environmental Science and Water & Environmental Technology students are involved in collecting water quality data.
- Art and welding students designed and built the Giving Tree – a gift from the CCC Foundation.



The restoration brought with it a greater presence for the ELC on campus, and with that, an increased awareness of its potential educational uses. Expectations are that more faculty will incorporate the site into their curriculum (Native Plant ID, Environmental Geography, Writing, etc.).

Additionally,

- 27 classes (grades K-12) visited the ELC on a field trip in the very first term after the restoration (spring 2018). The total number of students was about 670.
- High school students are receiving college credit (Service Learning Experience) for volunteering as Camp Counselors at our summer camps.
- See Appendices for lists of field trips (#1), summer camps (#2) & workshops (#3) offered in the spring and summer of 2018.
- Efforts are underway to begin offering industry trainings in the 2018/19 academic year. An excellent advisory committee comprised of environmental professionals is providing guidance for this program (Appendix 4-b).
- A second program advisory committee guides us in the development of educational programming and activities. This group is comprised of educators from CCC as well as from K-12 educators, water quality industry representatives and OSU Extension (Appendix 4-a).

### **3. Provide passive recreation for the local community.**

- *Increase the number of visitors using the ELC site.*

**Progress:** The number of people visiting the ELC has clearly increased since the restoration was completed, however, we have not yet developed a way to collect numbers to quantify this increase. But, here's what we can say:

- CCC staff are visiting more frequently, and using the buildings for various meetings.
- Walkers and joggers are very complimentary of the work completed.
- The interpretive signage provides a meaningful way for visitors to engage with the site.
- Benches and the outdoor amphitheater encourage people to sit and relax.
- The play area attracts young and old alike.
- The openness of the site feels more inviting and makes it easier to see the wildlife.



### **4. Leverage the on-going support of a network of community partners committed to protecting the health and sustainability of the Newell Creek watershed.**

- *Increase the number of community partners utilizing the ELC site for program delivery.*

**Progress:** The ELC offered the following programs which involved partners from April-June 2018:

- *Wildlife-Friendly Gardening: Creating Habitat at Home*; workshop partners were National Wildlife Federation, Association of Northwest Steelheaders, Clackamas River Basin Council, Clackamas Soil & Water Conservation District, Audubon Society of Portland, Columbia Land Trust
- *ELC Nature Spy summer camp* presenters: Clackamas River Water Providers, Clackamas County Garbage & Recycling
- Clackamas County Water Education Team (comprised of a dozen or so organizations) held the annual *Celebrating Water* event at CCC again this year.

Upcoming programs with partners include:

- Star-gazing Party with Rose City Astronomers on July 27.
- Clackamas County Water Education Team is likely to offer its water quality workshop for teachers at the ELC next year.

### **Many Partners Contributed to the Success**

This project has truly been a community effort!

- *Greater Oregon City Watershed Council*: helped with the harvest of aquatic animals and native plants prior to the restoration; members assisted with plantings during the restoration; sponsored the Wetland interpretive sign; and, posted a sign on Beaver Creek Rd. that shows Newell Creek beginning at the ELC.
- *Clackamas Water Environment Services*: sponsored the design of five of our new interpretive signs.
- *Oregon City Public Works*: sponsored our Hydrology sign.
- *Clackamas River Water Providers*: sponsored the construction of our rain-garden (Summer 2018) and its signage.
- *Confederated Tribes of the Grand Ronde*: assisted with writing the script and providing images for our Clackamas People sign; participated in both our Kick-off event in May 2017, and the Grand Opening in June 2018.
- *National Wildlife Federation*: the ELC is Wildlife Habitat Certified through this organization.
- *CCC Foundation*: raised \$128,035 for the ELC Sustainability Endowment, which will provide ongoing support for the maintenance of the newly refurbished site; and, they funded the creation of the Giving Tree sculpture.
- Our *two advisory committees* (see Appendix 4-a & 4-b) provided critical guidance in the development of our educational program.
- *Several companies* that we contracted with for the design and construction of this project ended up also donating some of their time. These include Pacific Habitat Services, YGH Architects, Lango Hansen Landscape Architects, KPFF, Lease Crutcher Lewis, Catena Engineers, Stantec Electrical Engineers and Rivers of Life.

- *Many volunteers* from the college and the wider community helped to plant the site, including: Oregon City High School students, Oregon City Service Learning Academy students, CCC's wrestling and basketball teams, CCC administrative staff, Horticulture students, Bartlett Tree Experts, and many individuals from the community who wanted to be a part of the resurrection of this treasured place.

CCC is meeting its promise to assemble a wide range of public agencies, conservation groups, and community residents to engage in a collaborative initiative that will have a lasting impact for generations to come.

### **Recognition of Metro**

We are extremely grateful to the Metro Nature in Neighborhoods grant for making this project possible, and deeply value our relationships with the Metro staff. Following are some of the ways that we have acknowledged Metro throughout this project:

- Large & Medium interpretive signs display the Metro logo and the following statement: *This project is supported with funding from Metro's Nature in Neighborhoods Program* (See Appendix 5-a thru 5-e).
- 2 Small interpretive signs display the Metro logo (See Appendix 5-f).
- Support from Metro has been mentioned in numerous materials, including: website, press releases and flyers. Sample language: *In 2014, CCC received an \$868,342 Metro grant to help fund redevelopment of the site into a regionally significant outdoor learning laboratory that showcases innovations in stormwater management, an outdoor amphitheater, a natural play area and more.*
- Frequent mentions in personal conversations and public events.

### **Having a Positive Impact**

There are many examples of how this restoration project has positively impacted the community, from college students and staff using it for meetings, class activities and restorative breaks in the day, to the wider community taking leisurely strolls, to all ages benefitting from the workshops, field trips and events. One of the most exciting impacts thus far has been through the delivery of much needed opportunities for nature-based education.

The numbers alone are impressive. 670 students from local elementary and high schools visited the site in the first two months after the restoration was essentially complete. Many of these students participated in an ELC-led field trip, but some explored the site independently with their teachers. Either way, it provides a marvelous learning opportunity for students to connect with the Next Generation Science Standards in K-12 education.

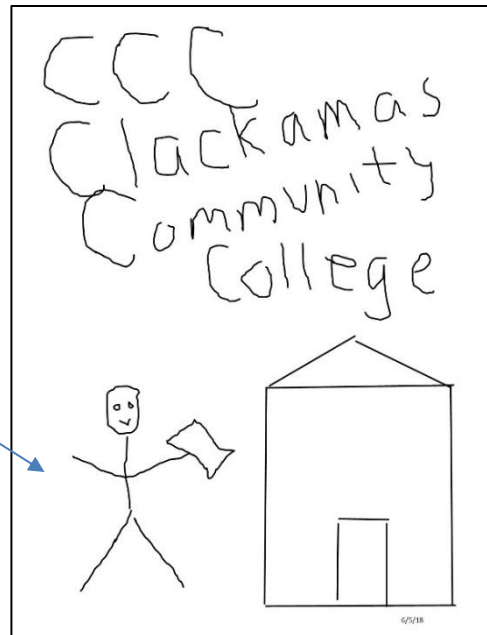


We have the opportunity to positively influence the longer term future of these youth. Visiting a college campus, even at a young age, makes it more likely that a child will pursue post-secondary education when the time comes. In this still mostly rural county, potential barriers to furthering one's education likely include cultural misunderstanding, lack of role models they can strongly identify with, and culture shock in the college environment. We believe bringing students face to face with potential role models and introducing them to the college campus will inspire them to pursue post-secondary education and training.

In early June of 2018, 64 2<sup>nd</sup> graders visited the ELC to explore our wetland via the *Prepare to Get Ducky* field trip. They spent 2 ½ hours learning about the value of wetlands, exploring the plants and animals (even a decomposing opossum), and playing games like the Migration Experience which helped to bring the lessons home... but, let's face it, it was fun too! They wrapped up the morning by receiving their first stamp in the ELC Nature Spy passport book, and headed for the buses to take them back to school.

Unfortunately, one of the buses was not there! And, it ended up being an hour late! In order to help the kids pass the time, we brought out a bin of clipboards, paper and colored pencils. The kids descended on these simple art supplies like a pack of wolves, and commenced to drawing or coloring whatever they were inspired to do! Shortly thereafter, one of the boys brought his artwork over to show me (this is my best effort to reproduce his drawing).

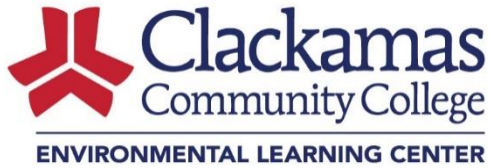
He explained to me that this was him going to college in the future!



**I hereby certify that the above and attached statements are true and accurate.**

\_\_\_\_\_  
**Signature of Executive Director or Authorized Person:**

\_\_\_\_\_  
**Date:**



Oregon City Campus  
19600 Molalla Avenue | Oregon City, OR | 97045-7998  
503-594-3015 | [www.clackamas.edu/elc](http://www.clackamas.edu/elc)  
**Education That Works**

## ***Field Trip Offerings***

### **Do coyotes eat salad?** *A journey into the forest ecosystem*

Grades: K-3            2.5 hours            Cost: \$7/student (minimum \$140/group)

The forest ecosystem is a complex web of plants and animals interacting with each other every day to find food, shelter and mates. This field excursion will give your students a better understanding of forest ecology through hands on learning, interactive role playing and participation in fun education based games!

### **Prepare to get ducky!** *Exploring wetland habitats*

Grades: K-3            2.5 hours            Cost: \$7/student (minimum \$140/group)

Wetlands make up only about 5% of the earth's surface, yet they are crucial habitat for a wide array of plants and animals. During their visit, students will learn about wetland plant and animal identification, animal migration and the important role wetlands play in water quality.

### **Why is My Skin Green?** *Adaptations for survival*

Grades: 4            2.5 hours            Cost: \$7/student (minimum \$140/group)

Frogs, birds, bears and even plants have adapted to improve their chances of survival in nature. Students will explore several types of adaptation in the forest/wetland ecosystem, and determine the purpose for each adaptation (growth, survival, behavior or reproduction), then join in a variety of fun, interactive games to reinforce their discoveries.

### **Web of Life:** *Food chains in the ecosystem*

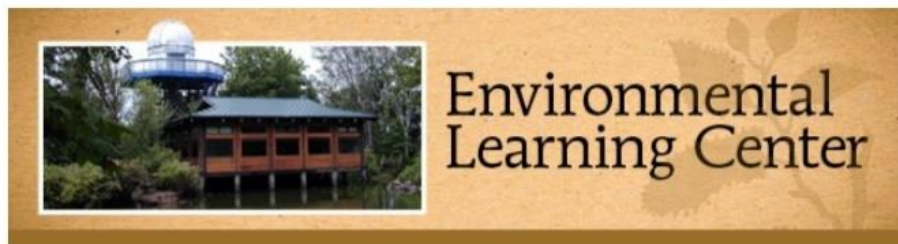
Grades: 5            2.5 hours            Cost: \$7/student (minimum \$140/group)

It may not be obvious, but all food ultimately comes from the sun. This engaging program will help your students to develop an understanding for the complex, interdependent relationships within an ecosystem. By exploring different components of the food chain, students will recognize the role of abiotic factors as well.

### **Ecosystem Health:** *Monitoring a wetland restoration*

Grades: 6-8            3 hours, May-October            Cost: \$8/student  
(minimum \$160/group)

Wetlands function as highly efficient water filtration plants, help to control flood waters, and provide vital habitat for many plant and animal species. In this class, your students will see first-hand the results of our recent restoration project. They will learn sampling techniques, and gain hands-on experience collecting data that will be used to evaluate the real-world impacts of this wetland on biodiversity and water quality.



## 2018 Summer Camps

### **Nature Spy Camp – Level 1**

Grades entering: 1-2

*June 25-28 or July 23 – 26*

9 am – 4 pm

### **Nature Spy Camp – Level 2**

Grades entering: 3-5

*July 9-12 or July 30-Aug 2*

9 am – 4 pm

Campers will enjoy a variety of fun, age-appropriate activities: exploring the wetland, identifying the critters that live here, learning to be a good steward of the environment, making crafts and playing games. After participating in all four days of camp, kids will be registered as an ELC Nature Spy, and receive an official membership packet!

### **Teen Nature Academy**

Grades entering: 6-8

July 16-19 or Aug 6-9

9 am – 4 pm

This camp is for teens who enjoy playing and learning in the outdoors, but then also relish in some sit-down, creative time at the computer. Teens will explore our wetland, doing hands-on lab activities in a variety of subjects related to the environment, engage with college faculty, and visit college classrooms. The week culminates with each teen creating their own, personal digital story (video production), using photos that were taken throughout the week!



**Before & After Care available!**

**For more information:**

503-594-3015 or [www.clackamas.edu/kids](http://www.clackamas.edu/kids)



## **Adult Workshops**

### ***Wildlife Friendly Gardening***

Create wildlife-friendly spaces in your own yard or community area! Learn to incorporate native plants and other wildlife habitat to attract beneficial insects and pollinators. Discover Naturescaping design tips, and learn what you can do to become a sustainable gardener. Please dress for the weather - we will be both indoors and enjoying the great outdoors! 4/14/18

### ***Yoga at the ELC!***

This class brings all the benefits of yoga- meditation, breathing, stretching, strengthening and balance, in the serene setting of the Environmental Learning Center at CCC. No experience required. Please bring yoga mat. Meets in the Pavilion. 5/8/18 – 6/12/18 and 6/26/18 - 9/4/18

### ***Plein Air Painting***

Want to combine your creativity with your love of nature? Through discussion and demonstrations, master plein air painter, Leland John, will prepare you to take your painting outdoors! You will learn all the fundamentals, including: techniques, equipment, aesthetic concerns and dealing with the elements (rain, snow and even wild animals!). Any level of student is welcome. 5/19/18

### ***Meditative Movement***

Looking for a way to rejuvenate your inner spirit? Connection with nature through creative movement or walking meditation may be the ticket. Sacred dance teacher, Jane Rickenbaugh, will guide you using inspiration from the beauty of the newly restored Environmental Learning Center – wandering among its singing creeks, gardens, trails and wildlife. Will take place indoors if it's raining. 5/26/18

### ***Green Burials***

Participants will be given guidance in environmentally sound end-of-life burials. Learn about the different options for green burial, the legal aspects pertaining to each, and suggestions for discussing your preferences with loved ones. Instructor is a licensed mortician, experienced in gently guiding people through the green burial process. Bring your questions and concerns. 7/14/18

### ***Star Party!***

Do you want to see the phases of Venus? ...the cloud bands and largest moons of Jupiter? ...the rings of Saturn? ...the polar cap on Mars? If so, weather permitting, join us for a star party on July 27th from 9:00-11:00pm. Volunteers from Rose City Astronomers will be here to share views through their telescopes. In addition to viewing these four bright planets, there will be double stars, star clusters, nebulae, and maybe even a few galaxies to look at. 7/27/18

## General Advisory Committee Membership

|                      |  |
|----------------------|--|
| Dawn Bolotow         | Springwater Elementary School                  |
| April Chastain       | CCC Horticulture Dept.                         |
| Lara Christensen     | Oak Lodge Water Services                       |
| Jaime Clarke         | CCC Office of Education Partnerships           |
| Karen Doersam        | Oregon City High School, Environmental Science |
| Jen Gorski           | OSU Extension                                  |
| Christine Hollenbeck | Clackamas River Water Providers                |
| Jim Nurmi            | CCC Water & Environmental Technology Dept.     |
| Lisa Oreskovich      | Oregon City Public Works                       |
| Laurette Scott       | CCC Education Dept.                            |
| Kris White           | Oregon City High School, Environmental Science |

## **Environmental Professional Technical Advisory Committee Membership**


|                        |  |
|------------------------|--|
| Todd Alsbury           | ODFW<br><i>Fish Biologist</i>  |
| Zach Bergen            | Clackamas River Basin Council<br><i>Restoration Project Manager</i>            |
| John Borden            | Clackamas River Basin Council<br><i>Board member</i>                           |
| Rowyn Cooper-Careselli | Wolfe Water Resources<br><i>Water Resources Engineering Tech</i>               |
| Esther Lev             | Wetland Conservancy<br><i>Director</i>   |
| Cheryl McGinnis        | Clackamas River Basin Council<br><i>Executive Director</i>                     |
| Bill Monroe            | Clackamas River Basin Council<br><i>Board Chair</i>                            |
| Doug Neeley            | Greater Oregon City Watershed Council<br><i>Board Chair</i>                    |
| Devin Patterson        | Clackamas County<br><i>Engineering Technician</i>                              |
| Joe Rudolph            | Wolfe Water Resources<br><i>Landscape Ecologist &amp; GIS Analyst</i>          |
| John Runyon            | Cascade Environmental Group<br><i>Principal/Watershed Ecologist</i>            |
| Gail Shaloum           | Clackamas Water Environment Services<br><i>Environmental Policy Specialist</i> |
| John van Staveren      | Pacific Habitat Services<br><i>President/Senior Scientist</i>                  |
| Ben Walczak            | ODFW<br><i>Fish Biologist</i>  |





*Clackamas Community College and the Environmental Learning Center have shared a long history together...*

## From Vision to Reality




**Jerry Herrmann and Leland John, 1973**

Shaped around a vision of environmental learning and stewardship, the Environmental Learning Center was developed early in the college's history under the leadership of then President John Hakanson, in response to intense community interest for new strategies for living in harmony with nature.

Located on the site of a former Smucker's berry processing plant, the Environmental Learning Center demonstrated the power of community action by turning the industrial site into one that benefited the environment. In 1973, a group of art students, along with former faculty member Leland John, drafted a plan. Under the leadership of CCC alumna Jerry Herrmann and countless community volunteers, the site evolved and became a hub for environmental innovation and education. Many great ideas and impassioned students of nature have grown out of this place!



In 2017, thanks to a Metro Nature in Neighborhoods grant and support from many other organizations and community members, the site underwent a significant restoration to create what you see today — a living laboratory dedicated to stormwater management, wetland habitat and environmental education.

CCC's president from 1969-1985, Dr. John Hakanson

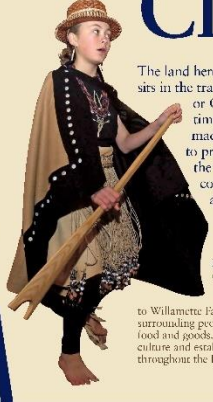


This project is supported in part by the Metro Nature in Neighborhoods program.

Supported by:








## The Clackamas People



The land here at the Environmental Learning Center sits in the traditional homeland of the Clackamas or Clow we walla people. In mythological times, Coyote and other beings made changes to the landscape to prepare it for the arrival of the Clackamas people. This connection to place created a culture in which the people and landscape are inseparable.

**LIFEWAYS** Newell Creek and other local waterways served as a lifeblood to the area's early inhabitants. With the resources in this region and with their proximity to Willamette Falls, the Clackamas reached agreements with surrounding peoples, providing the Clackamas with a wealth of food and goods. These agreements allowed them to maintain a rich culture and establish a sustainable trade-based economy that reached throughout the Pacific Northwest and beyond.





**CHANGE** As trade routes expanded and early exploration began, so did diseases that had a devastating effect on the native populations of western Oregon. By the early 19th century, 90 percent of the native population succumbed. With western expansion and increased hostilities between settlers and native peoples, negotiations were made with the Clackamas and others, resulting in the Willamette Valley Treaty of 1853, which relocated the Clackamas to the Grand Ronde Reservation.

**TODAY** The Clackamas people — the namesake of Clackamas Community College — have persevered through this difficult time. Conservation efforts made by the tribes have led to reestablished gathering rights and the increased ability to manage their natural resources and to partner with places like the Environmental Learning Center. The continued presence of the Clackamas, here and at Grand Ronde, maintains identity and ensures cultural knowledge of this place for future generations.

This project is supported in part by the Metro Nature in Neighborhoods program.

Supported by:







Have you seen any birds, insects or other animals using these plants?

# Native Plants

## What is a Native Plant?

Native plants were growing in our region before European settlers arrived. They evolved and adapted to the local climate and geology, and are critical parts of the ecosystem. See if you can find the plants shown here.

**Coastal Strawberry** (*Fragaria chiloensis*)

**Common Snowberry** (*Symphoricarpos alba*)

**Red-flowering Currant** (*Ribes sanguinale*)

**Black Twinberry** (*Lonicera birotundata*)

**Kinnikinnick** (*Achillea millefolium*)

**Douglas' Spirea** (*Spiraea douglasii*)

**Wild Mock Orange** (*Philadelphus lewisii*)

**Ferns:** How many different types of ferns can you find?

**Pacific Bleeding Heart** (*Oenothera lamarckiana*)

**Inside-out Flower** (*Castilleja leucostachya*)

**Redwood Sorrel** (*Rubus cuneifolius*)

## Why Plant a Native Garden?

Native plants are important habitat for wildlife – providing food and shelter for many species of insects, birds and other animals. Because natives are adapted to local conditions, they often require less maintenance and less water than other ornamental plants.

**CLACKAMAS PEOPLE LORE**  
The Ameria said to Coyote, "We are going to make you!" He replied, "You can't if the people will not pass."

The project is supported by:  
Clackamas Community College  
Metro  
Water Environment Services

# Fallen Trees Give Life

## The Life of a Nurse Log

**1 Tree falls to forest floor**  
This creates an opening for sunlight.

**2 Wood begins to decay**  
Fungi, bacteria and insects feast on the wood of the log, slowly breaking it down into rich organic soil.

**3 Seeds germinate**  
Seedlings live on the nutrients and moisture provided by the nurse log.

**4 Seedlings become independent**  
Roots grow down the sides of the log and into the soil and be able to make them no longer dependent on the nurse log.

**5 Seedlings mature into trees**

When a log falls in the forest, it can become an incubator for baby plants – nursing them to a healthy start in life. As a log decomposes, it slowly provides nutrients to new plants that root on its surfaces. This nurse log also gives baby trees warmth, moisture, and a valuable height advantage.

**Why not grow on the forest floor?**

In some Pacific Northwest forests, most flowers and fruit reaches the forest floor to sustain an ecosystem, which is necessary for some seedlings to grow. Trees benefit from the life of a nurse log, because it raises them out of the dense forest undergrowth, where they are then able to get enough sunlight to grow!

**CLACKAMAS PEOPLE LORE**  
Once, a bear-boy found a wood-germinating in the forest. The boy drove his axe into a log, making a crack, and the wood-germinating tried to show her nesting it well by holding the crack open with its flowers, but the bear-boy got stuck, and the boy killed it.

The project is supported by:  
Clackamas Community College  
Metro  
Water Environment Services

## How Does this Bioswale Clean Our Water?

**1** Water flows in

**2** Plants and soil filter out sediment and pollutants

**3** Water flows through and is slowly absorbed

**4** Plants and soil break down pollutants

Flows to Newell Creek

**What's in the Runoff?**  
When it rains, anything on the ground can be picked up and carried into nearby streams, including bacteria, oil, grease, pesticides, fertilizer, sediment and other pollutants.

**If it's on the Ground, it's in the Water**  
Our roads, homes and parking lots contribute huge volumes of pollutants runoff to our streams and can affect water quality and harm organisms that live in those streams. Just as each of us may contribute to pollution, we can also be part of the solution. To find out how, see [clackamas.wa.gov](http://clackamas.wa.gov).

The project is supported and funded by Clackamas Metro's Hydrologic Program.

Supported by:

- Clackamas River Water Providers
- Water Environment Services
- Metro
- Clackamas Community College Environmental Learning Center

## How Does This Rain Garden Clean Our Water?

**1** Rain Garden collects rainwater

**2** Plants and soil filter out pollutants

**3** Water flows through and is slowly absorbed

**4** Plants and soil break down pollutants

Different plants have different preferences for water; be sure to use appropriate plants for each zone. Rain Garden plants should be able to survive some summer drought.

**Moist Zone:** Plants can soaks very well too.  
**Moderate Zone:** Plants prefer moderately moist soil.  
**Dry Zone:** Plants thrive in dry soil.

Moist zone/bottom  
 Moderate zone/side slopes  
 Dry zone/top

The project is supported and funded by Clackamas Metro's Hydrologic Program.

Supported by:

- Clackamas River Water Providers
- Water Environment Services
- Metro
- Clackamas Community College Environmental Learning Center



## Small Signs (1' x 1.5')

# Bird Voices

**STOP AND LISTEN**

This Bird Blind lets you listen to birds without being seen.



**Songs:** Our most vocal birds are the *songbirds*. Their relatively long and complex *songs* are often used to attract a mate, or to declare that this habitat belongs to me! *Songs* are most often heard in the springtime.

**Calls:** These typically short, sharp sounds can be heard year-round. *Calls* can communicate alarms or warnings to other birds, or just help flock members to keep in touch.

**Mobbing:** If you hear a large group of birds making loud repetitive *calls*, it may mean that they are *mobbing* a predator to force it to leave their territory.

**Other Bird Sounds:** Listen for the *quack* of the Mallard, the *buzzing* of the Anna's Hummingbird, or the *kyeer* of the Northern Flicker.

It's amazing what you can hear, if you stand quietly and listen!



# Plastic Lumber

## What happens to recycled milk jugs?

Plastic from recycled milk jugs and juice bottles can be used to make long-lasting decks, fences and picnic tables. This Recycled Plastic Lumber has many benefits in addition to having rescued plastic containers from the landfill.

- Doesn't need to be painted
- Is resistant to decay, cracking, termites and graffiti
- Benefits the environment by reducing CO<sub>2</sub> emissions, and the need for toxic wood preservatives

