Retrofitting Schools
Breakout Session

4th Annual Puget Sound Green Infrastructure Summit
March 22nd, 2019 | Cascadia College/U.W. Bothell
Orcas Love Raingardens

Photo credit: Center for Whale Research

Robb Krehbiel
Northwest Representative
Defenders of Wildlife
Stormwater runoff is the biggest source of pollution in the Salish Sea.

Raingardens absorb stormwater and slowly filter out pollution, leaving clean water.

Clean water filters into the ground and eventually reaches the Salish Sea, stopping pollution from harming orcas.

When stormwater enters the Salish Sea, it brings pollution into the food chain.

When a predator eats its prey, it also eats the pollution.

With each link in the Salish Sea food chain, the pollution builds up and concentrates.

At the top of the food chain are Southern Resident orcas, which are the most polluted whales in the world.
Vision and Goals

The vision of Orcas Love Raingardens is that all Tacoma Public Schools students and their families will have access to educational, interactive raingardens and will have opportunities to learn about the role of Green Infrastructure in protecting orcas.

- Raingardens....
  - Protect orcas
  - Enhance collaboration
  - Center equity
  - Are outdoor classrooms
  - Empower communities
  - Are supported
Benefits of Working Together
Educational Resources

Classroom Visits
• Identify the problem
• Investigate the solution
• Take Action

Free Curriculum Guides
• Pacific Education Institute
• Enviro Challenger
• Pierce Conservation District
Orcas Love...

EVERYONE can be part of the solution!

...Raingardens!
Questions?

Photo Credit: Rachel Merrett
Hawthorne Community
STEAM Play Space
<table>
<thead>
<tr>
<th>PLAY THEMES</th>
<th>STEAM THEMES</th>
<th>How we learn STEAM</th>
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</thead>
<tbody>
<tr>
<td>How Hawthorne wants to play (more...)</td>
<td>math measurement</td>
<td>MEASURE</td>
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<tr>
<td>CLIMB (HIGHER)</td>
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<td>COMPARISON</td>
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<tr>
<td>SIT</td>
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<td>OBSERVE</td>
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<tr>
<td>HANG OUT</td>
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<td>BUILD</td>
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<td>PRETEND</td>
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<td>EXPERIMENT</td>
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<td>SPIN</td>
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<td>IMAGINE</td>
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<td>HANG</td>
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<td>RESEARCH</td>
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<td>TUNNEL</td>
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<td>MODEL</td>
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<tr>
<td>SLIDE</td>
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<td>CREATE</td>
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<td>PERFORM</td>
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Climb and measure
HOW IS THE PLAYGROUND USED?
Use colors to show where people enjoy different activities. Fill out the Legend and label other important features!

**LEGEND**

- Sitting
- Running and Bull Games
- Nature
- Made-up Games (creative)
- Danger
- Puddles
- Best Places

Can you share other important features?

**HAWTHORNE ELEMENTARY**

NAME: Allison
Grade: 3
S.T.E.A.M. LEARNING

Student Created or Manipulated: Strongest learning opportunities, generate problem solving and science inquiry, meeting 20th Century Learning Objectives and Next Generation Science curriculum. Student ownership also builds a culture of caring and support for education.

Collection/Observation: Unique vantage points and contrasting phenomena support inquiry activities in and out of classroom.

Interpretation: Supports learning through content knowledge, shows community support for education.
Hawthorne Community STEAM Play Space
Clean Water Ambassadors Internship

Major funding provided by

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

MOUNTAINS to Sound
GREENWAY

BOEING
Fostering the next generation of conservation stewards
Internship Focus

**Water**
Natural and human water systems

**Professional Skills**
Interviews, final presentation, letter to councilperson, measuring water quality

**Environmental Work**
Field trips that focus on environmental issues and careers

**Job Shadows**
Project managers, engineers, environmental educators, water operators, etc.

**Community Impact**
Project ideas and proposals designed for their school and communities

**Equity and Social Justice**
Examine concepts, places, skills through an ESJ lens
Typical Week
High Point Neighborhood

- Porous concrete sidewalks
- Bioswales
- Storm drains
- Natural drainage corridor to pond
- Large rain garden
- Slotted pipes
- Sloped, narrow streets
DESIGNING
PLANNING, ENGINEERING, POLICY

DOING
FIELD, TECHNICAL

EXPLAINING
COMMUNICATION, EDUCATION

New this year!
CAREER EVENTS: Jobs for Clean Water
Hiring Process

- **September–May**: targeted outreach
- **March–May**: free career events
- **April–May**: accepting applications
- **June**: interviews and selection
- **July–August**: summer internship
CAREER EVENTS: Jobs for Clean Water

Interested in jobs that protect human health and the environment?

We are offering three events:

March 26
4:30 p.m. – 7 p.m.
King Street Center
Seattle

April 27
10 a.m. – 1 p.m.
Brightwater Center
Woodinville

May 11
10 a.m. – 1 p.m.
South Treatment Plant
Renton
Video link: mtsgreenway.org/blog/clean-water-ambassadors-leave-their-mark-in-paint
Thank You!

Becca Kedenburg
becca.kedenburg@mtsgreenway.org
Education Program Manager
Mountains to Sound Greenway Trust
Stormwater Pollution Solutions
Advancing GSI Through Curriculum Development

Sustainability Ambassadors
Empower youth to catalyze community sustainability

40 Ambassadors
9 School Districts
Private School Network
Sustainable Systems College
180 hours of professional training
Empower teachers to integrate rigor with relevance for real-world impact

Teacher Fellows
School Goals = Community Goals

Relevance drives Rigor

Educating for Sustainability
Green/Duwamish Problem Design Lab
10 Teacher Fellows in 4 School Districts

GOAL
Develop Problem and Place-Based (PBL) Curriculum Units that...
• motivate students and
• meet educational standards *in context* of
• improving conditions in the Green/Duwamish Watershed

STRATEGY
Teacher Fellows are paid a 12-month stipend to design PBL units, pilot them, coach our colleagues, and advocate for district-wide adoption.
Green/Duwamish Problem Design Lab
Problem Statements in Development…

Kent 7th Grade | Science: How can we improve the health of the Green/Duwamish watershed by collaborating with other community stakeholders?

Kent 7th Grade | Social Studies: Why does Mill Creek Middle School’s parking lot and sports field flood? What are the natural and human factors for flooding in the Green/Duwamish Valley?

Auburn 6th Grade | Science: How does human water use affect salmon populations in the Green/Duwamish Watershed?

Auburn 7th Grade | Science: What are the intended and unintended consequences of building the Howard Hanson Dam?

Auburn 8th Grade | Science: Why are boy fish turning into girl fish in Puget Sound?

Chief Sealth HS 9th Grade | Language Arts: How does the health of the Lower Duwamish Waterway affect communities within its watershed?
Problem Statement

“How can we inform our community about the impacts of polluted stormwater runoff in a way that influences behavior and results in a more healthy watershed?”
The Letter...

Sameth El, Stormwater Engineer at the City of Kent, calls for a “Blue Team” to help educate the community on the impact of polluted stormwater runoff and engage them in practical solutions.

Attention Students:

I am a water engineer and project manager for the City of Kent. I love my job as I get to work with all types of people and make our world a better place however, I cannot do this by myself. I am in need of help from our younger community members who can access and influence many people about stormwater runoff. This will be done by forming a Blue Team for the City of Kent made up of four members. This team will be challenged with the task of informing others and changing their way of thinking.

Currently stormwater pollution contributes to thirty percent of the polluted waters in the Sound area. Almost everyone who makes up our community contributes daily to that stormwater pollution with little to no awareness. This Blue Team is being challenged to inform our community on stormwater pollution in such a way that it impacts their way of thinking to reduce the pollutants entering our stormwater through their daily activities.

Ultimately, I am looking for innovative ideas that will bring awareness to our community in Kent on how they contribute to stormwater runoff and small changes they can make in their daily routines and activities to lessen their impact. Community members are key components to reducing pollutants in our waterways, so it is key to get the information to them and to have a way to track your project’s impact on the community to ensure its success of changing their habits of mind.

I look forward to seeing your projects and the power it will have on transforming our community’s connection to our waterways and doing our part in making our home a better place for all who make up our suburban ecosystem.

Sincerely,

Sameth EL
City of Kent Water Engineer and Project Manager
# Research – “Polluted Stormwater Runoff”

<table>
<thead>
<tr>
<th>Pollution Sources</th>
<th>Solution Strategies</th>
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<tbody>
<tr>
<td>Oil drops in parking lot</td>
<td>Don’t drip and drive</td>
</tr>
<tr>
<td>Car exhaust / acid rain</td>
<td>Drive less</td>
</tr>
<tr>
<td>Copper flakes from brake pads</td>
<td>Get an electric car</td>
</tr>
<tr>
<td>Carwash soap, grime, grease, grit</td>
<td>Better brake law to reduce copper</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>Use a commercial carwash</td>
</tr>
<tr>
<td>Dog poop</td>
<td>Use natural lawncare / compost</td>
</tr>
<tr>
<td>Plastic bits</td>
<td>lawns</td>
</tr>
<tr>
<td>Litter</td>
<td>Plant natives</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>Plant more trees</td>
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<tr>
<td></td>
<td>Scoop the poop</td>
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<tr>
<td></td>
<td>Buy less plastics</td>
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<tr>
<td></td>
<td>Use reusable bags</td>
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<tr>
<td></td>
<td>Recycle plastics into new martials</td>
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<tr>
<td></td>
<td>Depave impervious surfaces</td>
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<tr>
<td></td>
<td>Disconnect down spouts</td>
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<tr>
<td></td>
<td>Install a rain garden</td>
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<tr>
<td></td>
<td>Harvest rainwater with a cistern</td>
</tr>
</tbody>
</table>
Strategies for informing our community

Final Cut

- School-wide assembly
- School Newsletter
- Flyer with a pledge of actions
- Interactive bulletin board
- Informational Videos
- Articles for local newspaper
My Watershed

- Scoop the poop and put in the trash
- No chemical lawn fertilizer
- Practice "Natural Yard Care"
- Certified my yard as "Backyard Wildlife Habitat"
- Plant and maintain trees
- Disconnect and redirect downspouts
- Install a rain garden
- Harvest and hold rain with cistern
- Reduce impervious surfaces / increase pervious surfaces
- Never dump household chemicals, paint or car oil down storm drain
- Rake leaves and litter out from my curb and storm drain
- Don't drip and drive (fix oil leaks)
- Reduce how much I drive
- Use a commercial car wash
- Inspect and fix home septic system

Additional comments:
Enter comments...
My Watershed

My actions:
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Additional comments:
Enter comments...
Next steps...
Green/Duwamish Problem Design Lab

Problem Statements in Development...

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Mill Creek Middle School

7th Grade

Watershed Health

Problem Statement

How can we improve the health of the Green/Duwamish watershed by collaborating with other community stakeholders?
Problem Statement

How can we improve the health of the Green/Duwamish watershed by collaborating with other community stakeholders?
Hillside Paradise Parking Plots

Refugee and Immigrant Community Garden
Kent, Washington
44 garden plots with cover crops plus 6 handicap access beds
People from 20 countries have garden plots

- Bangladesh
- Burma
- Congo
- Iraq
- Nigeria
- Sudan
- Ukraine
- Barbados
- Burundi
- Haiti
- Kenya
- Pakistan
- Tanzania
- US
- Bhutan
- Chad
- Iran
- Nepal
- Senegal
- Trinidad
How do we water the gardens?
The arrival of 4 x 4,000 gallon cisterns...
One more part of the puzzle…

Can we capture, filter and infiltrate the rest of the polluted stormwater runoff from the parking lot?
Paradise Parking Plots

- Harvest rainwater from the roof
- Healthy soil soaks up more CO2
- Increase pervious surface area
- Decrease impervious surface area
- Depave a parking lot
- Build plant community where diversity is strength
- Build human community where diversity is strength
- Grow a range of culturally valued foods
- Provide food for local people
- Save money on water bills
- Store water to meet 80% of garden irrigation needs
- Reduce pollution in streams
- Save salmon
- Healthy Orca in Puget Sound
Sustainability Ambassadors

Equity Advocacy Internship Program

- Engage youth of color from low income communities
- Implement existing equity and social justice initiatives
- Empower youth to lead community-based projects
- Support green jobs pathways for youth
School Goals = Community Goals

Relevance drives Rigor

Educating for Sustainability
Questions?

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