Requesting Organization: Clean Water Services (CWS)

Course Title: Making Great Things Happen: Spring 2026 Employee Innovation Showcase

Date: April 22, 2026

Time: 8:30 am – 11:30 am

Location: CWS Rock Creek Engineering Building, 3235 SE River Road, Hillsboro, Oregon 97123

Instructors: Randy Lawrence, Vance Kimball, Jason Cook, Scott Mansell, Tina Arrigotti, Jason Mayfield, John Goetz III, Matthew Brennan, Chris Maher, Michelle Adlong, Chris Hiett, Brooke Trabona, Cierah Alferness, Justine Abrook, Kevin Wegener, Ornella Sosa Hernandez, Greyson Carkner, Kaelen Stow

Course Outline: This is a half-day science fair style showcase highlighting what innovation looks like at CWS. Employees will share practical innovations, process improvements, new tools, field insights, and smarter ways of working in delivery of the CWS mission. There are 13 interactive poster and/or demonstration sessions total. Attendees will interact with the presenters one-on one and in small groups. They will learn how the projects relate to, support and benefit NPDES permit compliance, plant operations, field operations, business operations, and organizational goals. This showcase draws its title from, and brings to life, the CWS values:

- Dedicated to the river, our communities, and each other.
- Guided by science.
- Making great things happen by working and solving problems together.

Overall Course Training Goals:

- Learning in an environment of recognition, celebration, and connection.
- Knowledge of the practical and applicable research and innovative practices conducted by CWS employees.
- Pride in the innovative approach that characterizes teams and processes across CWS, all in the service of permit compliance and watershed enhancement and protection.
- Employee confidence in their ability to work together to identify and address opportunities for improvement.

CEU Summary (relevancy to Wastewater Operator Certification): Total time possible in sessions 95 – 165 minutes (rounded down to the nearest hour for CEU calculation)**.**

Minimum CEUs = .1, Maximum CEUs = .2

Attendance Tracking Method:

1. Participants receive an event card at checkin. Event card contains participant name, certification number, our event OESAC number, and stations and length of visit.
2. Event staff record the **check-in time** and provide a signature.
3. As participants visit stations, presenters at each station will **initial their section** of the card.
4. Event staff record and sign the **check-out time** when the participant exits.
5. Participants **submit their completed card** at the exit.
6. The Learning Coordinator reviews the card and **calculates total CEUs earned** based on stations attended.

Instructor Information

Name	Presentation Title	Instructor Background	Brief Session Description
Randy Lawrence, Vance Kimball	Climate Adapted Plant Materials	Randy Lawrence - BS Biology; 22 years of job experience in Ecology/Restoration/Horticulture; 6 years working on Climate Adapted Plant Materials Project with Tualatin Soil and Water Conservation District and Institute for Applied Ecology; Presented this work at Society for Ecological Restoration, Connect, and Urban Ecosystem Research Consortium conferences. Vance Kimball - Professional Science Master's in Environmental Science; Certified Ecologist with Ecological Society of America	CWS and Tualatin Soil and Water Conservation District have partnered with the Institute for Applied Ecology to develop and implement a climate-adapted native plant materials strategy with the assistance of several restoration, botanical, and climate science specialists. The strategy seeks to enhance genetic and species diversity in restoration projects by sourcing a portion of our plant material from areas expected to be future climate analogues for the Tualatin basin, either using multiple seed sources within a species (assisted gene flow) or new species all together (assisted migration). We will have plants from future climate analog regions on hand, maps of these areas, and other background information to share.
Jason Cook	Continuous Water Quality Monitoring	Seven years of experience at CWS in conveyance systems electronics, sensor stations, environmental monitoring, and contaminant tracking. Holds a degree in Environmental Sciences with specialization in water resources and policy.	Demonstrates data-logger functionality and efforts to streamline monitoring to reduce cost and expand accessibility. Includes poster/diagram, physical circuits, sensor cross-sections, and live data demonstration.
Scott Mansell	Developing and Optimizing CWS' Temperature Compliance Strategy	Licensed Professional Engineer with a PhD in Environmental Engineering and roughly 20 years of experience, including leading the 2021 TCS development.	Showcasing updates to our temperature compliance strategy into the future by analyzing all the possible ways we could benefit temperature in the river, coming up with costs and values of all of their

			environmental, societal, and regulatory benefits, and building a tool to be able to evaluate and compare thousands of combinations of different options into a comprehensive strategy in 5-year increments. This is one of CWS' highest priorities, and our approach to this is very unique and innovative. It will help provide the most benefit to the river and ratepayers at the lowest cost.
Tina Arrigotti	Increasing Laboratory Efficiency by Automating Oxygen Demand Analysis	Approximately 17 years of experience performing manual oxygen demand testing and overseeing instrument procurement. Copresenter has one year of experience in method development.	Cost versus time comparison of manual and automated oxygen demand methods presented via PowerPoint with a brief video.
Jason Mayfield	Maintaining Stormwater Facilities with Next Gen Mowing Technology	Experience maintaining water quality facilities with specialized training as Field Construction/Maintenance Technician 2 – hands on experience with public works maintenance and construction—including equipment operation, cleaning and repair, along with strong safety awareness	Poster(s), equipment demonstration, and hands on interaction showcasing next generation mowing technology and safety improvements.
John Goetz III	Managing Reed Canary Grass in Wetlands with Minimal Environmental Impact	More than 20 years of experience in research and management of streams, wetlands, and soils in forestry and agricultural contexts.	Poster summarizing a study of glyphosate based formulations for reed canary grass management using multispectral imagery and randomized field testing.
Matthew Brennan	Resilient Stream Corridors -- Better Stormwater Management Outcomes	Bachelor’s and master’s degrees in civil/water resources engineering and 30 years of experience in stormwater management and natural systems enhancement. Member and past board member of River Restoration Northwest.	Overview of stormwater management fundamentals, traditional approaches, and Resilient Stream Corridor (RSC) methods piloted in the Tualatin River watershed. This presentation will cover the basics of stormwater management, what the traditional and RSC approaches are, how RSC approaches have been piloted in the

			Tualatin River watershed, and how they are being further developed.
Chris Maher	Settle Down! Solids Settling Analysis and Improvement with Selective Wasting	Graduate and undergraduate degrees in Chemistry and Environmental Engineering and Science with 26 years of experience in treatment plant operations and maintenance, process control, and optimization as well as research and pilot project execution. WEF memeber, PNCWA member. Previous presentations approved by OESAC internally at Clean Water Services, ORWEF Short School, Albany Short School.	Explains solids settling, solids flux curves, and a pilot system classifying dense sludge particles. Includes demonstration of a settling column test.
Michelle Adlong, Chris Hiett	Tracking Exposed Sanitary Sewer Structures	Michelle Adlong - Professional Engineer with 14 years of water resources and stormwater engineering. Chris Hiett – Project Manager with nine years in river and wetland restoration in the Tualatin Basin.	Highlights new GIS tracking of sanitary sewers exposed through stream evolution and identifies high risk structures requiring mitigation.
Brooke Trabona, Cierah Alferness, Justine Abrook	Source Tracking Volatile Fatty Acids Disruption in the Conveyance System	Brooke Trabona – Bachelor of Science in Biology, Master of Science of Microbiology, seven years as a university instructor, currently working as a research operations specialist Cierah Alferness – Bachelor of Science in Environmental Science, currently working as source control inspector/environmental services specialist. Justine Abrook – more than 20 years in wastewater industry, grade IV Wastewater System Operator license, Bachelor of Science in Environmental Science and Forestry	Describes investigation of reduced VFA levels, source identification, and a pilot treatment effort to restore fermentation and stabilize BPR. CWS partnered with the industry to pilot a H_2O_2 treatment effort beginning in April 2026 to reduce excess oxygen and restore normal biological activity in the sewer. Improved fermentation and VFA production are expected to stabilize BPR at Durham WRRF and reduce treatment costs by roughly $200,000 annually.
Kevin Wegener & Ornella Sosa Hernandez	Using Bench-scale Digestion Stability Test to Support Operations Response to Digester Upset	Ornella Sosa Hernandez - Environmental Sciences PhD and engineering license; Keven Wegener – degree in Water and Environmental Technology and grade IV wastewater license.	Showcasing updates to our temperature compliance strategy into the future by analyzing all the possible ways we could benefit temperature in the river, coming up

			with costs and values of all of their environmental, societal, and regulatory benefits, and building a tool to be able to evaluate and compare thousands of combinations of different options into a comprehensive strategy in 5-year increments. This is one of CWS' highest priorities, and our approach to this is very unique and innovative. It will help provide the most benefit to the river and ratepayers at the lowest cost.
Greyson Carkner	The Employee Advisory Council: The Voice of Our Workforce	Journeyman level operator with seven years of experience and a bachelor's degree in environmental science. Co-chair the Employee Advisory Council. Experience visiting high schools for our education and outreach department, these visits include presentations about what a career in wastewater looks like.	Poster and discussion focusing on the role of the Employee Advisory Council as a communication channel between boots on the ground workforce and leadership.
Kaelen Stow	Wastewater Flow Simulator: A Career and Technical Education Tool	Education degree, former teaching license, more than 20 combined years of experience and multiple technical certifications (DEQ operations 2-3, PMT Journeymen, instrumentation license, and more).	Interactive lesson built from a discourse learning model in academia, blends traditional classroom format with modern day technology to reach all types of learning styles. This innovation impacts the way the program approaches teaching wastewater to schools and career fairs.

Detailed Time Schedule

All sessions are available from 8:30 am – 11:30 am. There are no breaks or mealtimes. Participants attend as many sessions as they would like. Session attendance is tracked.

Presenter	Title	Length *all sessions available for duration of event	Learning Outcomes	Detailed Description
Randy Lawrence, Vance Kimball	Climate Adapted Plant Materials	10-15 minutes	Potential for impacts from a changing climate on our local plant populations How we could address expected impacts through assisted gene flow and/or assisted migration How we will use our common garden study sites to help understand and answer questions related to effective ecological management of riparian plant communities in the Tualatin Basin	Clean Water Services (CWS) and Tualatin Soil and Water Conservation District have partnered with the Institute for Applied Ecology to develop and implement a climate-adapted native plant materials strategy with the assistance of several restoration, botanical, and climate science specialists. The strategy seeks to enhance genetic and species diversity in restoration projects by sourcing a portion of our plant material from areas expected to be future climate analogues for the Tualatin basin, either using multiple seed sources within a species (assisted gene flow) or new species all together (assisted migration). We will have plants from future climate analog regions on hand, maps of these areas, and other background information to share.
Jason Cook	Continuous Water Quality Monitoring	10-15 minutes	How dataloggers function How basics of how sensors function How Clean Water Services is attempting to utilize lower cost alternatives to reach monitoring goals.	Our presentation will be to demonstrate how some of our basic data loggers function, and show ways in which we are trying to streamline the monitoring process to reduce cost while expanding accessibility to monitoring to basic monitoring functionality. The impact we are hoping to have is to expand the collection rate of data to support or disprove assumptions we have during our restoration and operating processes so that we can make more informed decisions. Our presentation will incorporate a poster/diagram

				representations alongside physical circuits, sensor cross sections, and a live demonstration of data coming into a datalogger
Scott Mansell	Developing and Optimizing CWS' Temperature Compliance Strategy	5-10 minutes	How much thought and effort is going into our temperature strategy How innovative and unique our approach is The high level of complexity involved yet how understandable it is at the core, and that our approach will save ratepayers money while doing for the environment than a 'typical' approach	Showcasing updates to our temperature compliance strategy into the future by analyzing all the possible ways we could benefit temperature in the river, coming up with costs and values of all of their environmental, societal, and regulatory benefits, and building a tool to be able to evaluate and compare thousands of combinations of different options into a comprehensive strategy in 5-year increments. This is one of CWS' highest priorities, and our approach to this is very unique and innovative. It will help provide the most benefit to the river and ratepayers at the lowest cost.
Tina Arrigotti	Increasing Laboratory Efficiency by Automating Oxygen Demand Analysis	5-10 minutes	Demonstrate amount of time it takes to run oxygen demand analysis test manually vs instrument use	Automation of the analysis of oxygen demand reduced for the analyst from >5 hours for set up and read off to approximately 2 hours hands on time due to instrumentation innovation. This allows the analyst to set up the instrument and walk away to focus on other work. Cost vs time analysis, manual vs instrument-plan address and shown on a slide deck with a short video.
Jason Mayfield	Maintaining Stormwater Facilities with Next Gen Mowing Technology	5-10 minutes	The importance of safety in maintenance How the work we do in the field has become a lot more productive and safe	With the amount of water quality facilities, we maintain and the amount we gain each year these mowers were like gaining two extra employees. Safety is very important to us so with these mowers they will go do the work in those tough areas and the crew member can stand back and control the mower.
John Goetz III	Managing Reed Canary Grass in Wetlands with Minimal	5-10 minutes	Understand CWS as responsible for evolving the field of natural resource management	Reed canary grass (Phalaris arundinacea) is a ubiquitous plant species that degrades wetlands by forming monocultures throughout the Pacific Northwest. Applications of glyphosate-based pesticides are effective and

	Environmental Impact		Understand the value of sharing our successes and failures with our professional colleagues Demonstrate why we should always review our work and strive to do better.	commonly applied at a rate of 2% with an appropriate surfactant for the management of reed canary grass. However, the use of glyphosate has become controversial in recent years over concerns of the potential harm to humans, native vegetation and freshwater ecosystems. Additionally, the costs and time required to effectively manage reed canary grass continue to increase placing additional pressure on project budgets. We suggest using minimal concentrations of glyphosate with appropriate adjuvants when managing reed canary grass.
Matthew Brennan	Resilient Stream Corridors -- Better Stormwater Management Outcomes	5-10 minutes	What hydromodification is and how we are required to address it Why alternative approaches to addressing hydromodification can result in better watershed outcomes than traditional approaches	An alternative approach to addressing hydromodification caused by stormwater has been under development for many years at CWS. This presentation will cover the basics of stormwater management, what the traditional and Resilient Stream Corridors (RSC) approaches are, how RSC approaches have been piloted in the Tualatin River watershed, and how they are being further developed.
Chris Maher	Settle Down! Solids Settling Analysis and Improvement with Selective Wasting	10-15 minutes	Comprehension of sludge settling testing. Comprehension of analyzing sludge settling data to generate Vesilind parameters Understanding of clarifier solids flux curves.	Activated sludge settles in the secondary clarifier, producing clarified effluent. Secondary clarifiers are designed around a solids loading rate. The faster the sludge settles and the more it compacts, the higher the solids loading rate can be. Sludge settling characteristics are measured in settling column test and modeled to produce solids flux curves that are used in both design and operation. A pilot test is underway on a system that physically classifies the settled sludge to retain the densest particles, thus increasing the settling velocity of the sludge. There will be a demonstration of the settling column test.

Michelle Adlong, Chris Hiett	Shifting Streams, Static Structures: Tracking our Exposed Sanitary Sewer Structures	5-10 minutes	Pipes in streams can become exposed when streams move or erode We are tracking exposed sewers and want to hear if you encounter one While pipe condition is traditionally evaluated from the inside, we must "think outside the pipe" to get a full picture of condition and risk	CWS has many sanitary sewers located in streams, and some have been exposed through stream evolution or erosion. This increases the risk of failures and sewage overflows. We are tracking these sites in a new GIS layer and recommending high-risk structures for projects. Reducing current and future risk due to the exposed sewers will require innovative thinking during design and cross-team collaboration.
Brooke Trabona, Cierah Alferness, Justine Abrook	Source Tracking Volatile Fatty Acids Disruption in the Conveyance System	5-10 minutes	Industries can significantly influence collection system conditions and treatment plant performance Seemingly small changes upstream can have big impacts downstream Solving complex operational challenges requires strong collaboration across many groups, both within CWS and with industrial partners Thorough investigation, monitoring, and data-driven problem-solving can help uncover the source of an issue and design targeted, cost-saving solutions	Since 2022, Durham WRRF has seen reduced springtime volatile fatty acid (VFA) levels, leading to unstable biological phosphorus removal (BPR) and greater reliance on costly chemical treatment. Sampling efforts in 2025 traced the issue to elevated dissolved oxygen (DO) and hydrogen peroxide (H_2O_2) in the Fanno Creek Interceptor, originating from a semiconductor manufacturer. These oxygen-rich conditions suppress the fermentation processes needed to produce VFAs. CWS partnered with the industry to pilot a H_2O_2 treatment effort beginning in April 2026 to reduce excess oxygen and restore normal biological activity in the sewer. Improved fermentation and VFA production are expected to stabilize BPR at Durham WRRF and reduce treatment costs by roughly $200,000 annually.
Kevin Wegener, Ornella Sosa Hernandez	Using Bench-scale Digestion Stability Test to Support Operations Response to Digester Upset	10-15 minutes	Collaboration between departments can bring about organizational excellence, and process efficiency	Poster and equipment demo. CWS operations and research teams work together to analyze available and new information and make data driven decisions that ensure digester stability. There was an event that highlighted the value of cross-functional dialogue between different

			The audience will learn anaerobic digestion is interesting and more of a challenge than expected	groups within CWS, helping establish a framework for interpreting digestion data. This improves decision-making in uncertain conditions, strengthening organizational resilience. These troubleshooting methods used during this example can also be applied to build confidence and provide guidance feedback to respond to future challenges and propose operational changes in the future.
Greyson Carkner	The Employee Advisory Council: The Voice of Our Workforce	10-15 minutes	A better understanding of what the utility of the Employee Advisory Council Encouragement of employees to engage with the EAC members more as a resource	Poster and Q&A to discuss the details about the Employee Advisory Council. The innovation highlighted is the group itself. The group has the opportunity to serve as a conduit between high level executives and boots on the ground closing a common gap at organizations. The impact of this innovation is that the concerns of the workforce don't die in a vacuum, but travel to the ears that could help resolve the issue.
Kaelen Stow	Wastewater Flow Simulator: A Career and Technical Education Tool	5-10 minutes	A clear understanding of the work that happens inside the treatment plant Demonstration of collaborative teamwork that is required to keep the plant running Basic understanding what each craft's role in the plant is	Interactive lesson built from a discourse learning model in academia, blends traditional classroom format with modern day technology to reach all types of learning styles. This innovation will impact the way the CTE program approaches teaching wastewater to schools and career fairs. the format is a blend of demonstration, discourse and "lecture".

Total 95 – 165 minutes