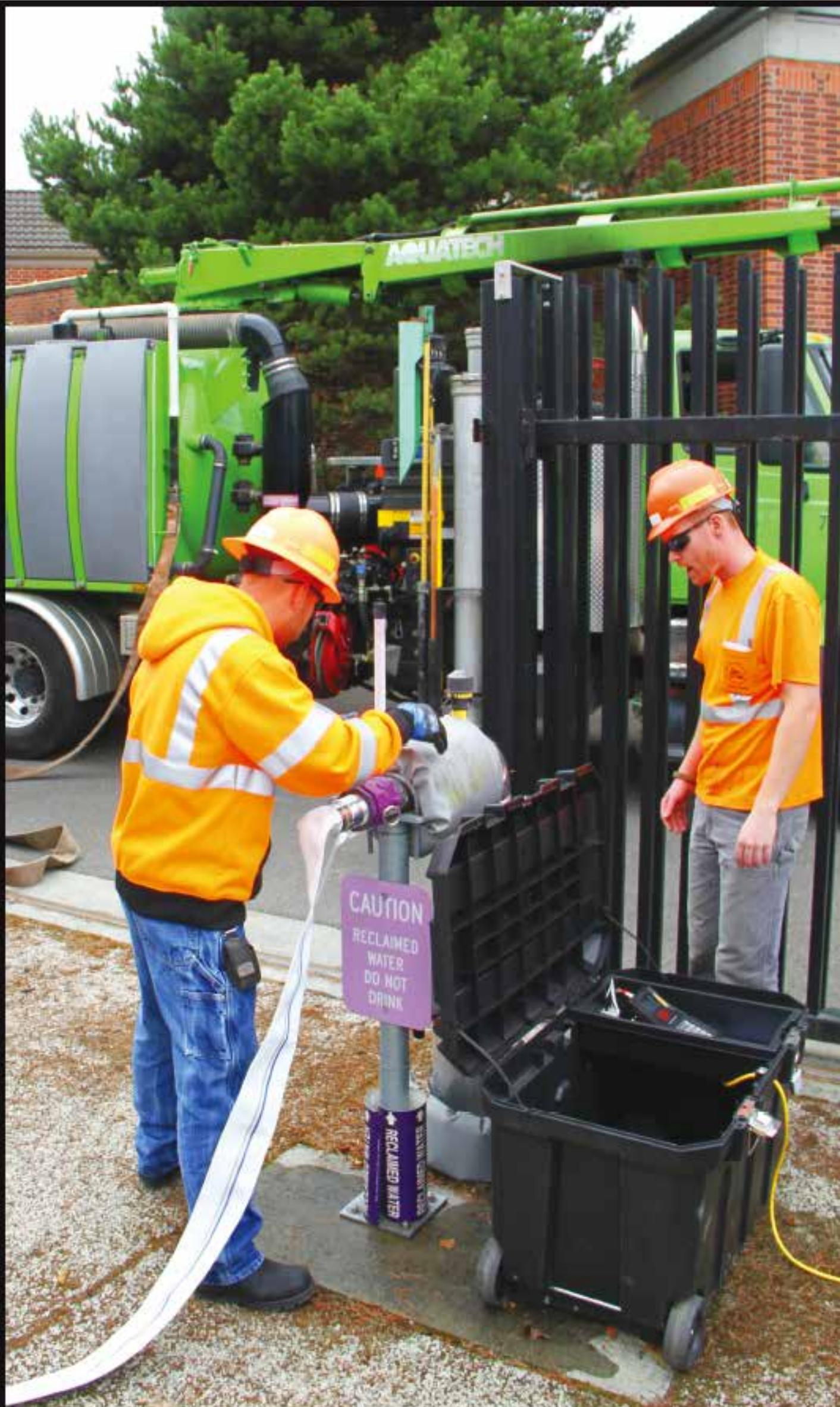


ENVIRONMENTAL OUTLOOK



LID DEVELOPMENT TRAINING IS A GAME CHANGER HERE

Planners, engineers and landscape architects face new stormwater design rules.



Students demonstrate infiltration testing for permeable pavement during an intermediate LID class.

PHOTO FROM HERRERA

Picture a room full of engineers, planners and landscape architects working intently together over the sounds of barking dogs, mooring cows and crowing roosters.

Not an everyday sight to be sure! This was the scene from a Jeopardy-style game (complete with animal-themed buzzers) using one of the many innovative teaching methods that are part of a new statewide training program covering new requirements for using low-impact development (LID) to manage stormwater.

As trainer Chris Webb of Herrera Environmental Consultants put it, "The work in these classrooms directly relates to the health of our region's waters."

As part of the statewide training program, attendees also participated in field inspections, site visits, infiltration testing and collaborative design exercises. The program aims to balance lecture-based training with hands-on exercises that increase information retention and provide practical information on LID design and construction.

The need for training

As of Jan. 1, 2017, the NPDES municipal stormwater permit issued by the state Department of Ecology will require all permitted jurisdictions in Washington to implement LID for new development and redevelopment unless site conditions are prohibitive.

The goal of this new permit requirement is to reduce stormwater runoff volumes and improve water quality through LID. This is significant because it changes the way planners, engineers and landscape architects implement stormwater design requirements, creating an immediate need for broad scale education.

These new requirements put Washington at the forefront of national efforts to reduce stormwater impacts through innovative new techniques and education.

To prepare the region for these new requirements, Ecology partnered with Herrera to develop and implement a statewide LID training program for public and private sector professionals working in a variety of fields related to development. The goal of this program is to increase understanding, knowledge and skills to ensure LID is successfully integrated into local codes and design manuals, and that new designs based on

WHAT IS LID DEVELOPMENT TRAINING?

Training covers:

- Bioretention
- Permeable pavement
- Rainwater collection
- Vegetated roofs
- Compost amended soils

Topics and tools are:

- LID facility design
- Planning/site assessment
- Hydrologic modeling
- Construction/inspection
- Operations and maintenance
- Regulations
- Principles of LID

these codes and manuals are effective.

Lead instructor Curtis Hinman of Herrera said, "The goal of this program is to bring the whole region up to a level of higher confidence in implementing LID."

Project scale

In 2014 and 2015, Herrera led a team of experts on LID to offer a series of free technical trainings at multiple locations throughout Washington. One session was also organized with representatives of local community colleges to discuss the potential for future technical courses related to LID.

The statewide LID training program was focused on five primary groups: design engineers; operations and maintenance staff; inspection and enforcement staff; planning and permit review staff; and construction contractors and land developers. The trainings were tailored to three levels of experience — introductory, intermediate and advanced — and covered a broad range of LID facilities, topics and tools.

Meeting the technical and geographic needs of this diverse audience was a logistical challenge over the program's first year. Despite this, the program has been immensely successful. All told, curriculum and training materials for 19 courses have been created through the program and presented at 48 different trainings. Across the 13 locations that were used for these trainings, the program has reached 1,168 attendees to prepare them for the new LID

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BUILDING GREEN? DON'T FORGET GREEN FINANCING

Lenders now have more financing options for green projects.

As environmentally friendly practices become more important to consumers and businesses alike, energy-efficient buildings are more prevalent than ever, especially in the environmentally conscious Pacific Northwest. By building smarter, owners can reduce operating costs, minimize strain on local infrastructure, improve air and water quality, and ultimately conserve resources in surrounding areas.

With these factors in mind, lenders are providing more resources and tools for finding the right financing options for green projects.

There are a number of practices gaining steam with developers and builders, and while an aim towards the familiar LEED certification will continue to be a focus for buildings, another movement is taking place: Net Zero, or passive, buildings. This sustainable solution takes energy efficiency to the next level by building houses and buildings that generate as much energy as they consume. Reaching Net Zero is a major accomplishment, as it requires securing energy from the sun,

wind or Earth to meet or exceed the annual demand for heating, cooling or electricity needs of that building.

While Net Zero is a major aspiration, there are myriad options for developers and businesses looking to add environmentally friendly practices to their buildings and workspaces.

For individuals and builders interested in the latest trends and practices, there are terrific resources available in and around Seattle.

For example, the Northwest Eco Building Guild empowers organizations and consumers to learn about and use sustainable practices through education and sessions ranging from innovation in heating systems to building energy-independent communities.

Also, the Cascadia Green Building Council organizes 15 collaborative groups that span from Alaska to Oregon, and holds regular events and congresses that drive professional development for those interested in furthering environmentally friendly practices and the LEED standard.

Organizations like these provide builders, designers, suppliers, homeowners and others concerned with ecological building in the Pacific Northwest with access to learning opportunities to help them make smarter decisions.

A few of the trends to watch as we head into 2016:

Lower loan rates for green projects

Homeowners and buyers will likely see savings from energy efficiency measures as lenders' underwriting processes recognize the value, allowing for more credit approvals.

Direct ownership of solar energy

As the solar energy market grows, it lends itself to more direct ownership through loans rather than the leasing habits of the past. Solar energy is one of the fastest-growing industries and continues to experience rapid adoption through government-sponsored incentive and rebate programs. With the decreasing cost of photovoltaic systems, along with incentives and rebates, solar energy is more affordable than ever before.

Increased green commercial space

Office tenants are demanding their spaces meet sustainabil-

ity standards. To meet these demands, commercial buildings must go above and beyond standard LEED practices to ensure they're staying competitive. This demand is already strong in tech sectors and markets on the West Coast, though growth is expected across the country.

Efficient new batteries

Solar energy is limited by the amount of time it takes to create — it usually creates the most energy during times when energy is needed the least, like on a sunny afternoon. The resulting demand for energy storage has helped push battery technologies to higher levels. Batteries are also used as a backup energy source during power outages and for electric cars.

Emerging green securities

As green financing grows, green securities are becoming more commonplace. Green securities are issued to outside investors who want their money to fund environmentally sustainable projects such as solar leas-

es and larger scale renewable energy installations.

Investing under green mandates

As environmental consciousness advances, large groups are going to greater lengths to ensure their investments are sustainable. As investors and donors are encouraging them to invest in green companies and industries, institutional investors such as university endowment and pension funds are beginning to remove unsustainable industries from their portfolios.

Finding the right solution for your project is no easy task. It's important to sit down with your lending officer to discuss all available options.

Tim Corrigan, MBA, is manager of Umpqua Bank's Phinney Ridge branch, chair of the Phinney Neighborhood Association Business Group's marketing committee and treasurer of the Northwest EcoBuilding Guild's Seattle Chapter. Corrigan specializes in green lending through Umpqua Bank's GreenStreet program.



BY TIM CORRIGAN
UMPQUA BANK

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ON THE COVER

As water becomes scarcer, agencies are tapping into reclaimed water. Turn to page 9 to learn how the city of Kirkland is using water processed through the Brightwater Treatment Plant.

PHOTO FROM KING COUNTY

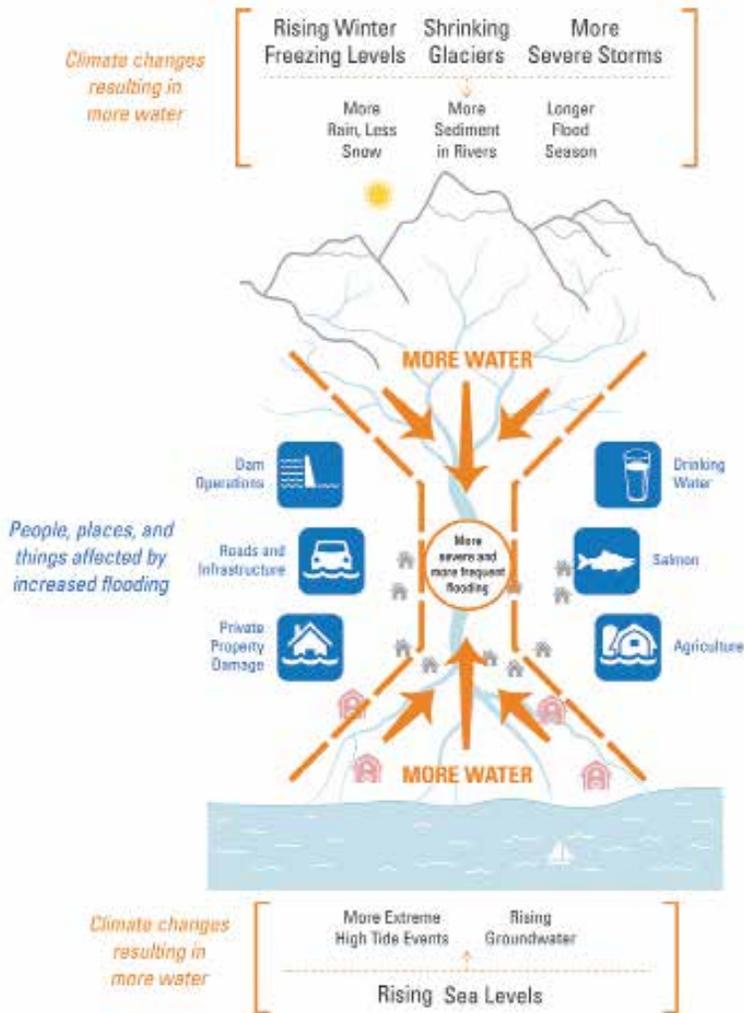
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Climate Change: Combining Forces

Why Skagit flood risk is increasing



DESIGNING INFRASTRUCTURE TO COMBAT CLIMATE CHANGE

Washington state communities face higher air temperatures, rising sea levels, flooding, increased sediment flows and lower river flows.

Most news reports about climate change focus on national- and international-scale information about melting polar ice caps and sea level rise.

It can be difficult to imagine making a significant difference by implementing personal changes such as driving less and turning down the thermostat. However, climate change impacts will be felt on a local scale in our communities and watersheds, and there will be a broader range of impacts than just rising air temperatures and sea levels.



BY SPENCER EASTON
ESA

The good news is that there are forward-thinking actions that agencies, cities and counties can take at the local scale to prepare our communities for climate change.

Adaptation means taking action now to change our infrastructure and our processes to reduce the anticipated negative impacts of a changing climate.

According to the American Society of Civil Engineers, Washington state's infrastructure needs serious upgrades: \$9.5 billion in drinking water infrastructure, \$217 million for our parks system and \$5.3 billion in wastewater infrastructure projects over the next 20 years, among other issues.

When decision-makers are given locally focused information on the range of climate change impacts facing their communities, they can design infrastructure replacements and upgrades to be resilient to climate change. Accounting for the full range of climate impacts will make our new infrastructure a better, longer-lasting investment.

A few of the climate change impacts beyond air temperature and sea level rise that Washington state communities will face include increased flooding and stormwater, increased sediment flows and lower river flows.

Floods and stormwater

Flooding is already a major problem for many rivers in Washington. According to the state Department of Ecology, flood hazards exceed the cost of all other natural hazards in the state. Unfortunately, climate change is anticipated to make flooding more common and more severe as precipitation patterns





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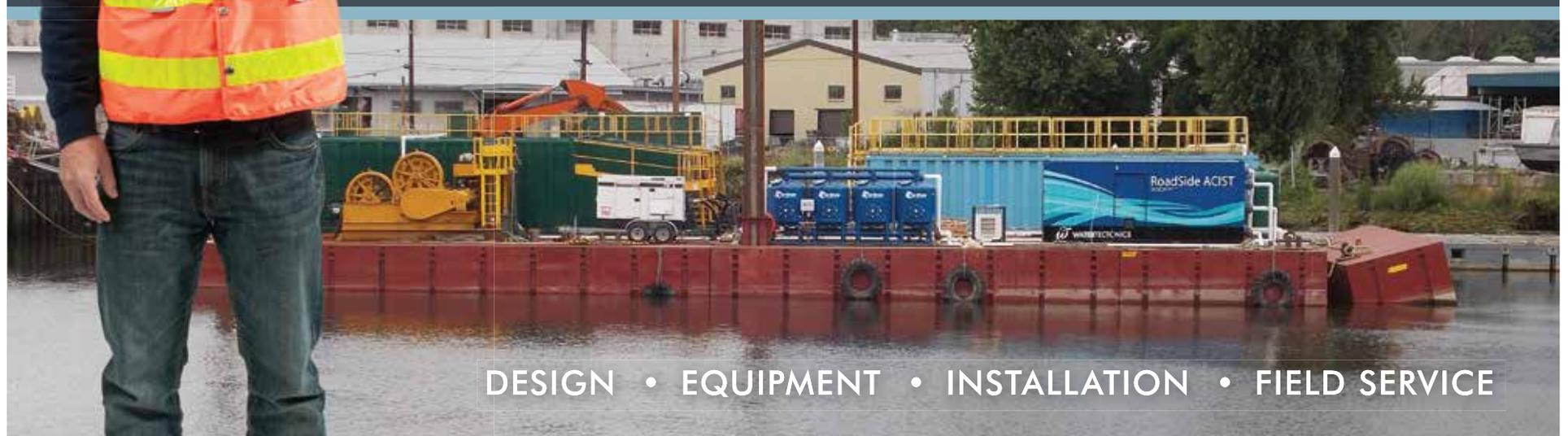
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change, glaciers melt, sea levels rise, high tides become more extreme and increased sediment fills in flood storage capacity.

More frequent and severe flooding is expected to substantially increase risks to water and wastewater treatment plants, transportation corridors and other critical infrastructure. This is in addition to the increased risk to human safety and property damage during these more frequent flood events.

In order to deal with these expected changes in flooding and stormwater, infrastructure needs to be right-sized and built to accommodate future flood levels.

Lower river flows

While rivers are expected to flood more frequently in the winter, less water is expected in the summer.

Changing precipitation patterns and retreating glaciers will contribute to lower flows, causing less water to be available for agriculture in the summer when it is needed most. As flows decrease, particularly as cold water from melting snow becomes rarer, the water in rivers will become substantially warmer.

Water temperature is a key limiting factor for salmon health and viability in many areas and is only expected to get worse with climate change.

Sediment

In most of Puget Sound's major river basins, sediment is a major concern. As steep slopes in upper watersheds erode, rivers carry sediment loads downstream and deposit them in river channels and deltas or shunt

them out to the sound.

While sedimentation is a natural process, it is a major concern for flood managers, restoration experts and others who are invested in our rivers. And climate change is expected to increase sediment loads.

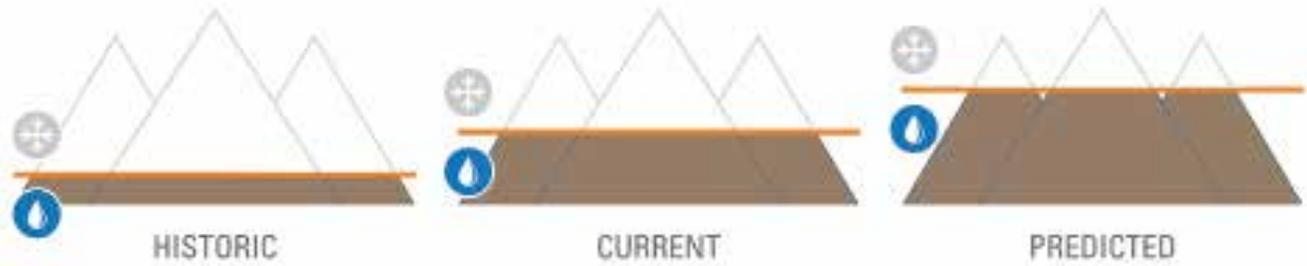
Shrinking glaciers and reduced

snowpack mean that less ice and snow will be covering slopes and slowing erosion processes in the headwaters of Puget Sound's rivers. Increases in rainstorms will also cause sediment to be released more frequently. Sediment will accumulate behind dams, put more pressure on

levees, fill in floodwater storage areas, cloud our water supply for drinking water and agricultural irrigation, and deposit in our restoration projects.

Anticipated future sediment loads need to be considered in

Rising Winter Freezing Levels



FREEZING LEVEL

When precipitation falls as snow, it is stored as ice and snow that slowly melts, providing water to the Skagit River throughout the year, including late summer and drought periods.

When precipitation falls as rain, water quickly enters the Skagit River during fall and winter, often contributing to flood risk. As freezing levels rise, the area potentially susceptible to flooding increases.

In the Skagit, the average winter freezing elevation has risen by about 650 feet since 1959

IMAGES COURTESY OF THE SKAGIT CLIMATE SCIENCE CONSORTIUM

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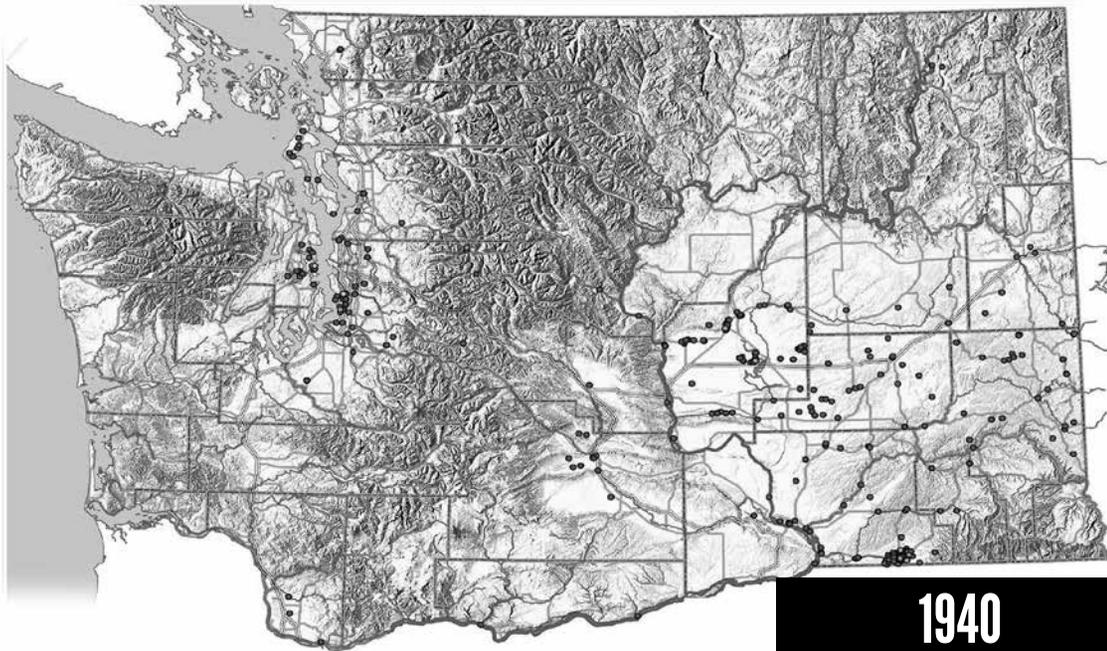


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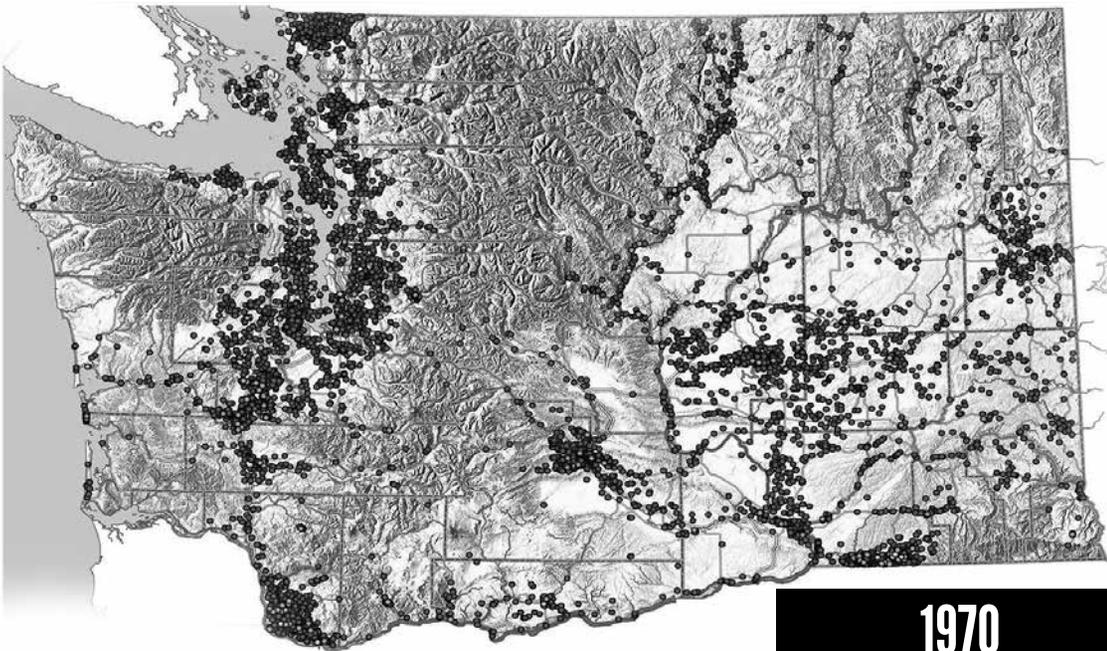
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DROUGHT HEATS UP BATTLE OVER WATER RIGHTS

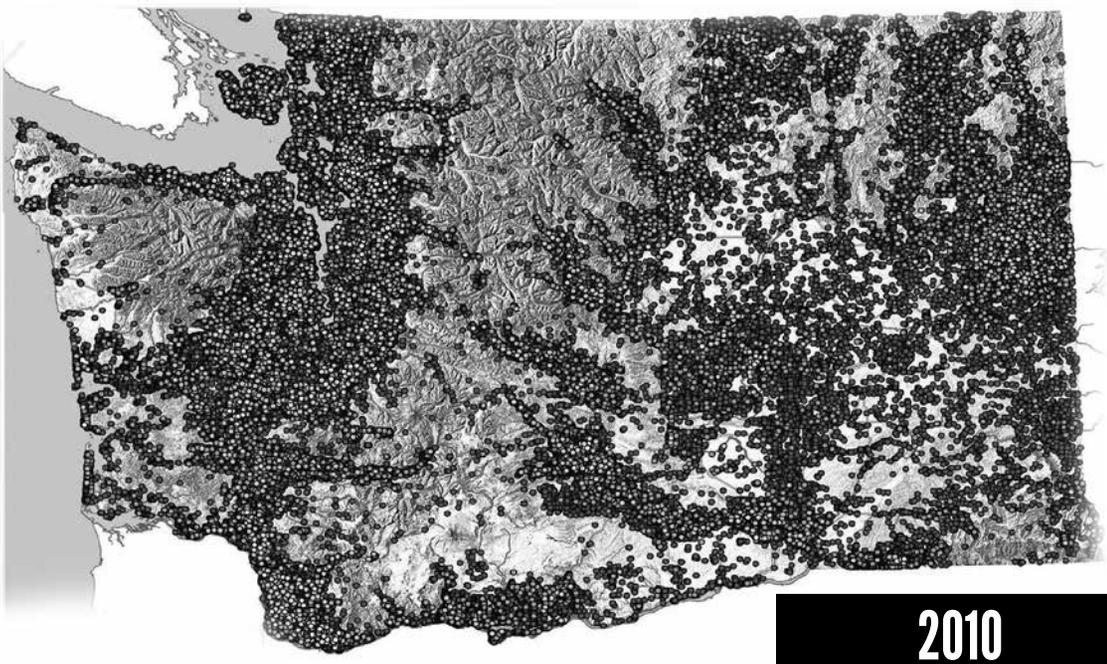
Much of the challenge of water rights stems from the way in which those privileges were developed in history.



1940



1970



2010

There are now more than 500,000 permit-exempt wells in Washington and most of them are not metered — leaving a loophole for drawing more water than is allowed.

IMAGES FROM ECOLOGY

In this land of “liquid sunshine” one might think access to water for potable supply, irrigation, hydropower and recreation is an inalienable right and abundantly available; but in reality, water is a limited resource and the systems in place for parsing out how water can be used are very complex.



BY CINDY EASTERSON
LANDAU ASSOCIATES

Water is considered a public resource and the laws that govern water rights have been developed over time and are interpreted through administrative rules and a growing body of case law. So when water resources become stressed, as in this past year with drought conditions, determining who has priority rights for water use is a resource management challenge — particularly in rural parts of the state.

Much of that resource management responsibility lies with the state Department of Ecology, which makes determinations on applications for new water rights or changes to existing water rights. Water resources are also managed by the holders of water rights, such as municipalities or irrigation districts.

A number of recent clashes

over water use have centered on the fact that water law was developed independent of land use law, causing disjointed and unclear procedures for growth and development in areas where water is in short supply. Growth planning, primarily a function of a county or municipal government, has been impacted in upper Kittitas, Skagit and Whatcom counties by litigation or new rules for managing groundwater resources.

When resources are abundant, we seldom consider who has priority rights for use because there is plenty to go around, but when resources drop below the need, rights to those resources are disputed and management strategies are critically scrutinized.

A changing landscape

Native Americans didn't use the concept of water rights; populations were small and water was abundant. Water was simply a feature of the land that was used for crops, domestic purposes or activities associated with hunting and fishing.

With the onset of European settlement, but prior to 1917, pioneers who came west could establish a water right in one of two ways: by purchasing land with an adjacent stream or lake, which automatically gave them riparian water rights; or by finding

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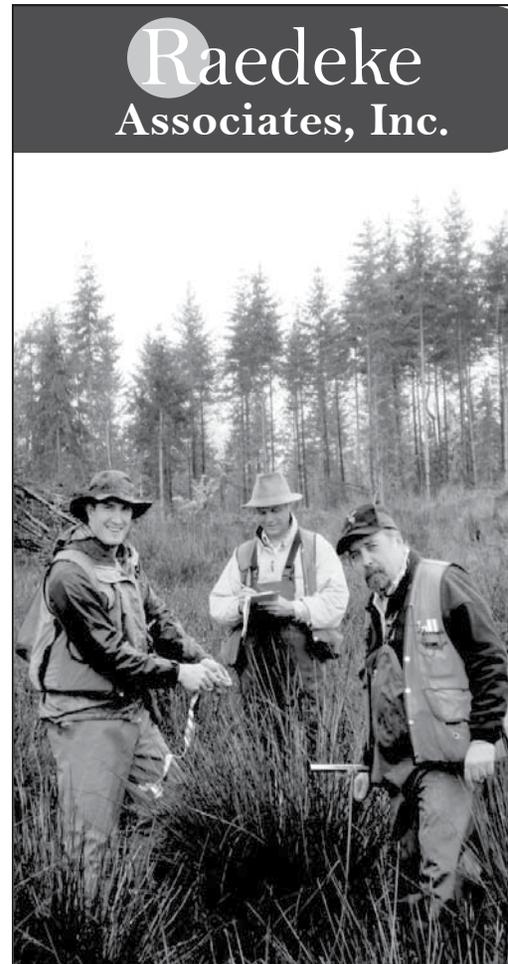
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the water they needed nearby, posting a notice that they were diverting the water for a beneficial use and thus acquiring the water through appropriation.

The system was chaotic and often fraught with the misconception that the owner of the land also owned the water, giving rise to water disputes.

In 1914, a report of the Washington Water Code Commission stated, "No state role in water rights led to water use that was not in the public interest." So in 1917, Washington state adopted the Water Code to manage surface water use. From that time on, before using or diverting water from a stream or lake, one had to apply to establish a water right.

Today those applications are managed by Ecology, which determines whether to grant a water permit allowing the development of a water right.

A water right allows the holder to use water, but only to the terms and conditions specified in the document. These conditions must include a beneficial use, the place of diversion or where the water is sourced, an annual quantity which caps your use, a rate of use, and a description of where the water will be used. No one person or entity owns the water itself, just the right to use it for specific purposes.

The priority date system of assigning a senior water right is an enduring legacy from the days when appropriating water was as simple as posting a note on a tree or digging a ditch to divert water. Washington uses a "first-in-time, first-in-right" system for establishing senior priority to water usage. In times of water shortage, the senior water right holder can use or divert the full extent of the water allowed by their water right before the next person that chronologically applied for a water right could access any water from the same source.

Establishing water rights

Sorting out water rights can be a daunting task, and much of the challenge stems from the way in which those privileges were developed in history. A

water claim (self-professed) and certified water rights (granted through application to a governing body after 1917) offer different documentation for water use. Early settlers believed that a water right claim was equivalent to a water right, but land uses changed over time and the original intent of a water claim might not exist, leaving little argument in favor of permitting a water right.

A water right can be challenged and subject to review by an agency or the court. Water rights can also be changed, but this exposes the documentation to investigation by Ecology for a determination as to the extent and validity of the water right. If Ecology finds that there is not adequate record of rights or that the historical use of the right is not consistent with the documentation, the water right can be modified, leaving the holder with less right to water use than was previously declared on paper.

A person can also lose a water right through abandonment or relinquishment. If the water identified in the water rights claim or certificate is not used or fully used over the course of five years, the portion of the right not used may be subject to loss.

Rights to groundwater use

With a growing population and an understanding of how surface water use is interconnected with the aquifer or groundwater sources, laws similar to surface water regulations were enacted in 1945 specific to groundwater. The key difference is an exception that under certain conditions a person can drill a well to extract groundwater without a water right permit for watering livestock, irrigating a non-commercial lawn or garden of less than one-half acre in size, and providing water for a single home, a group of homes, or a small industrial purpose — as long as the withdrawal is limited to less than 5,000 gallons per day.

These exemptions were enacted with the belief that the uses of small quantities of water should not be subject to the full burdensome process of applying for

a permit. Today, these exempt groundwater wells are one of the hotly contested issues over water resources management. There are more than 500,000 permit-exempt wells in Washington and most of them are not metered for water use, leaving a loophole for drawing more than the allowable limit of 5,000 gallons per day.

Some holders of certificated water rights are concerned that the growing number of wells will affect their ability to draw their full allotment of water.

Competing uses

Individuals are not the only ones vying for water rights; other competitors are municipal and industrial use, power generation, and with the adoption of the Minimum Water Flows and Levels Act in 1967 and the Water Resources Act of 1971, Ecology has had to balance the need for instream flows in addition to out-of-stream uses.

An instream flow is effectively a water right for a stream and applies a priority date just like any other water right. This means junior water rights can be suspended when stream flows fall below the established rule. Water rights pre-dating the instream flow rule are senior, but some instream flow rules do regulate exempt wells (such as in recent litigation in Kittitas and Skagit counties).

Residential development, encouraged by the county, cannot be approved for construction if water is not found to be physically and legally available. This puts agencies, typically tasked with growth, to share in the development of a water management framework that protects instream flows and senior water rights holders yet also allows for economic development, particularly in rural areas.

The legal requirement to not impair minimum instream flows and the resulting impact on water availability has sparked some of the most heated discussions over water availability and management. Some would argue that minimum instream flows are too complicated to assess and often result in requirements well above the reality of the actual stream flow. Other stakeholders make a strong case that instream flows alone don't directly correlate to protecting the true health of a stream and that a net benefit approach that considers stream restoration strategies would result in both more water for out-of-stream uses and improved stream health.

On both sides of the debate there seems to be agreement that additional technical data and measurement would support better management decisions.

Seeking solutions

Ecology is engaged with stake-

holders on all aspects of water resources, and has formed a Rural Water Supply Strategies Workgroup to help evaluate ideas for clarifying issues in water-limited areas. Working groups and stakeholder meetings have discussed how to better mesh development code with water law so that economic growth is not choked.

Strategies for measuring and assessing instream flows to maintain healthy habitats for fish and wildlife are being proposed and innovative ideas are being addressed for stewardship and management of existing resources.

John Thorson, who serves as a Federal Water Master in Washington state recently said, "Water links us to our neighbors in a way more profound and complex than any other."

His words hold particular meaning as we collectively strive to find balance and seek solutions for Washington's water needs.

Cindy Easterson is a senior marketing partner with Landau Associates, a firm that specializes in environmental remediation, environmental and geotechnical engineering, permitting and compliance consulting. Landau has offices in Edmonds, Seattle, Tacoma, Olympia, Spokane and Portland.



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INFRASTRUCTURE

CONTINUED FROM PAGE 5

the design of any infrastructure that depends on or is near our rivers.

Climate adaptation success

In 2013, the city of Anacortes replaced its water treatment plant, the largest supplier of potable water for both Skagit and Island counties.

When designing the new plant, Anacortes worked with the Skagit Climate Science Consortium. This nonprofit organization of scientists, which provides information about climate impacts, helped the city determine how climate change might impact the new plant.

Based on estimates of future sediment levels, Anacortes designed a new sediment removal system for the plant. It determined the proper level of flood protection for the plant by accounting for changes in future precipitation and sea level rise.

The new, more resilient, treatment plant was completed in 2013.

Governor Jay Inslee told the Skagit Valley Herald, "It's really refreshing to see a com-

munity just making practical, common sense, scientifically engineering-driven decisions rather than ideological issues. To me it's an inspiring example of how if you just focus on science and what it means in your machinery, you get things done."

In 2012, Seattle Public Utilities was concerned about increases in stormwater when designing a long-term control plan to address the city's remaining uncontrolled combined sewer overflow (CSO) outfalls, which can discharge pollutants from combined sewers and stormwater runoff into Lake Washington, Puget Sound and other water bodies during large rainstorms.

SPU wanted to design CSO storage facilities that would account for current conditions and the expected effects of climate change on the frequency and volume of CSO discharges.

SPU used climate change modeling to project how changes in precipitation patterns would affect CSO basins in the future and used the results to ensure that new CSO storage facilities are designed

in consideration of climate change and climate variability. As projects move forward, SPU plans to incorporate additional modeling in the design of individual CSO facilities.

On the other side of the Cascades, the state Department of Ecology and the Bureau of Reclamation teamed up to develop the Yakima River Basin Integrated Water Resource Management Plan.

Extensive climate change modeling looked at changes in precipitation, snowpack, stream flows and agricultural use in the Yakima River Basin. This information was incorporated into the planning effort to ensure that infrastructure was designed to meet climate projections.

A range of elements (fish passage, new water storage, habitat enhancement and conservation) were included in the integrated plan, which won an Integrated Water Resources Management Award from the American Water Resource Association in 2012.

Other changes

The range of climate change

impacts to ecosystems and to human infrastructure will be broad. In addition to the impacts discussed above, we will see changes in fire frequency, diseases in plants and animals, glacier melt, farmland and urban drainage, dam operations, lake recreation management and fishing.

Fortunately local and regional resources are available, including the University of Washington's Climate Impact Group (ces.washington.edu/cig) and the Skagit Climate Science Consortium (skagitclimatescience.org). Both organizations offer examples of how unbiased climate science can help local jurisdictions build climate change adaptation into their infrastructure replacements and upgrades.

Spencer Easton is an environmental planner and Certified Floodplain Manager at Environmental Science Associates, a multi-disciplinary environmental consulting firm that has addressed environmental planning, water resource issues, habitat restoration and regulatory compliance for more than 40 years.

LID DEVELOPMENT

CONTINUED FROM PAGE 2

requirements.

This represents the most ambitious LID training program to be implemented in the nation to date.

Collaborative effort

The statewide LID training program was funded by the state Legislature. Ecology engaged Herrera to develop and implement the program with support from Cascadia Consulting Group, Veda Environmental, SvR, CH2M Hill, Kindred Hydro, Leaping Frog Films, StormwaterOne and the Washington Stormwater Center. Mutual Materials, Associate Earth Sciences and the city of Puyallup also provided support for specific trainings.

Next steps

The statewide LID training program will continue in 2015-16 with an emphasis on high demand courses and expanding to other regions of the state not reached during the 2014-15 trainings. In the meantime, several of the courses are available online at www.wastormwater-center.org/lidswtrainingprogram

Melissa Buttin is the marketing manager for the water group at Herrera, which focuses on integrated water resource and low-impact development services for the life cycle of public and private projects.



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KIRKLAND TAPS COUNTY'S PURPLE PIPES FOR RECYCLED WATER

The city is using reclaimed water from the Brightwater Treatment Plant for uses that don't require drinking water.



BY KATHY BROWN & PAM ELARDO
SPECIAL TO THE JOURNAL

The right water for the right use" is the tagline for King County's Recycled Water Program. For the city of Kirkland, it represents a new approach to water resource management amid historic drought conditions.

For water in the Pacific Northwest, there hasn't been a year quite like the one in 2015. From May to late August, barely an inch of summertime rain fell — less than Phoenix. Conditions were so dry the coastal rainforest caught fire, mountain snowpack was just 16 percent of normal, and rivers that dwindled to record low levels are perilously warm for salmon now swimming upstream to spawn.

Late summer rains, while helpful, have not made up for the water deficit, and forecasters are calling for drier than normal conditions to continue through fall.

With no immediate relief in sight for low snowpacks and drought, King County and Kirkland decided to take a new approach to water resource management that goes beyond conservation alone.

Under an agreement signed earlier this month, the city will have access to high-quality recycled water produced at King County's Brightwater Treatment Plant for a variety of maintenance services including street sweeping, tree irrigation and cement mixing — all uses that don't require fresh, drinkable water.

City workers will access the water at a filling station at King County's York Pump Station in Redmond, using trucks to transport it to locations where it can be put to good use for the city and its residents. A recent example is a city sewer-line cleaning project in which workers outfitted a 1,500-gallon eductor truck with a high-powered nozzle connection and a jet-propulsion vacuum to remove debris and unwanted material from inside the sewer system.

The production and use of recycled water, also known as reclaimed water, is strictly regulated by the state Department of Ecology to ensure safety. As with lake or river water, recycled water is safe for human contact, irrigation, crops and other uses, but it is not approved for drinking. Recycled water is distributed through a separate set of purple pipes, the universal color for recycled water infrastructure, to guarantee it will not be mixed with certified drinking water supplies.

King County has been safely recycling and reusing water from its treatment plants in Renton and Seattle for over 20 years. What's particularly unique about the Brightwater plant, which came online in 2011, is that it was designed with an advanced membrane bioreactor technology that treats nearly all the wastewater there to the state's Class A reclaimed water standard.

Brightwater has the capacity to produce up to 21 million gallons of recycled water each day for distribution along separate, dedicated purple pipelines that run to Swamp Creek in Kenmore and to Redmond through the Sammamish Valley, so there are many future opportunities to provide more customers in these areas with a reliable, drought-proof source of water.

For Kirkland, tapping into this resource will support its effort to reduce water consumption by 10 percent at the urging of regional water providers. The voluntary water curtailment — encouraged by the cities of Seattle, Tacoma and Everett — has been in effect since mid-August, so far with positive results.

Not only will Kirkland save on its water consumption with recycled water, it will also save on costs. Under the agreement terms, King County's recycled water rate will be as much as 50 percent lower than drinking water that would otherwise be purchased and used for the same purposes.

Just as important, the city's use of recycled water leaves more water in rivers for fish to thrive, reduces the need to discharge highly treated wastewater into Puget Sound, and benefits water quality by returning nutrients to plants and crops.

Recycled water contains nitrogen, phosphorus and potassium — beneficial nutrients that can lessen the need for fertilizers.

Plus, it's safe, even for edible plants and produce.

Crops in California and Florida are commonly irrigated with recycled water treated to the same high standards as King County's recycled water. Anyone who purchases produce from a large chain grocery store has almost certainly consumed produce irrigated with recycled water.

Locally, recycled water is keeping soccer fields green, including 60 Acres Park in Redmond and Starfire Sports in Tukwila where the Seattle Sounders practice. One of King County's biggest customers is Willows Run Golf Course, which uses recycled water on its verdant fairways.

Willows Run is one of the Northwest's only certified Salmon Safe golf courses because it significantly reduced its use of chemical fertilizers and curtailed irrigation water withdrawals out of the Sam-

Kirkland city workers filled an eductor truck with 1,500 gallons of reclaimed water to clean out a sewer line.



RECYCLED WATER — PAGE 14

PHOTO FROM KING COUNTY

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NEW ECOLOGY CLEANUP GUIDANCE: MIRAGE OR OASIS?

A petroleum-contaminated site can be fast-tracked to closure if the soil, but not the groundwater, is contaminated.

Earlier this month, the state Department of Ecology's "model remedies" guidance for sites with petroleum-contaminated soil went into effect, and its vision is compelling.

Less time and less money to clean up a contaminated property? A fast-track process to getting regulatory thumbs up on site closure?



BY STEVE GERMIOT
ASPECT
CONSULTING

Using model remedies has some very good, red-tape-cutting intentions. It does this by prescribing a preapproved regulatory pathway that you can take if your site meets certain criteria.

On the face of it, this is great news.

However, because this first set of model remedies applies only to a very limited number of sites and establishes at least one troublesome policy precedent, this vision looks more mirage than oasis at this point. As such, it's best to look at this as merely a first step to speeding up Ecology's backlog of site reviews. A significant expansion of the program is needed to achieve the vision.

The vision

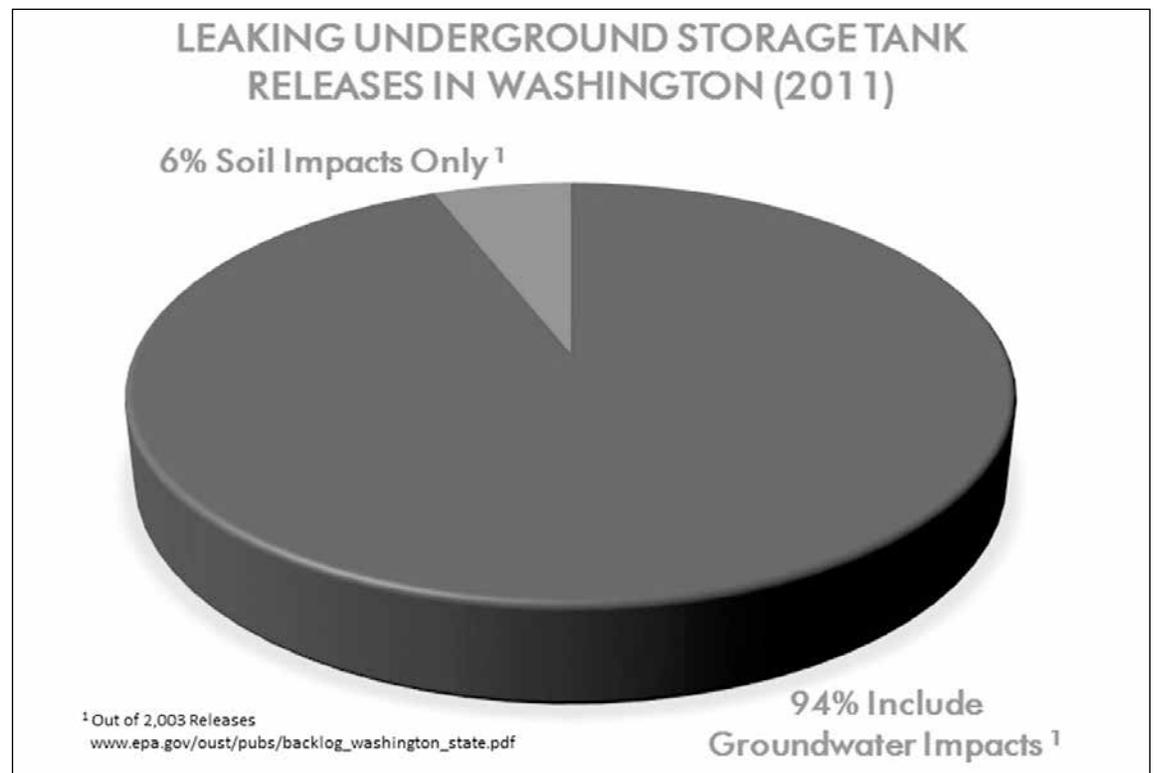
The provision for model remedies has been a part of the Model Toxics Control Act (MTCA) since 2001, but it has seen little use. In 2013, with a backlog of contaminated sites awaiting review, the state Legislature passed Senate Bill 5296 to open up new paths to permitting compliance and, hopefully, a faster route for restoring contaminated properties to beneficial reuse.

Ecology's approach is akin to the U.S. Environmental Protection Agency's presumptive remedies concept, which is commonly applied at certain sites (especially landfills) with good results.

In theory, the benefits of model remedies could be substantial.

In the MTCA cleanup process — encompassing site evaluation through remedy selection — the feasibility study, including the disproportionate cost analysis requirement, can be a substantial effort. With the model remedies shortcut, the feasibility study step can be bypassed, thus saving time and money. In addition, Ecology may waive its costs for reviewing independent cleanups using model remedies, which can provide modest cost savings.

Circumventing these costs and time looks to be a no-brainer



Petroleum sites with soil-only impacts are a very small portion of statewide contaminated sites.

GRAPHICS FROM ASPECT CONSULTING

for a site owner or redeveloper eager to put their contaminated property to productive use.

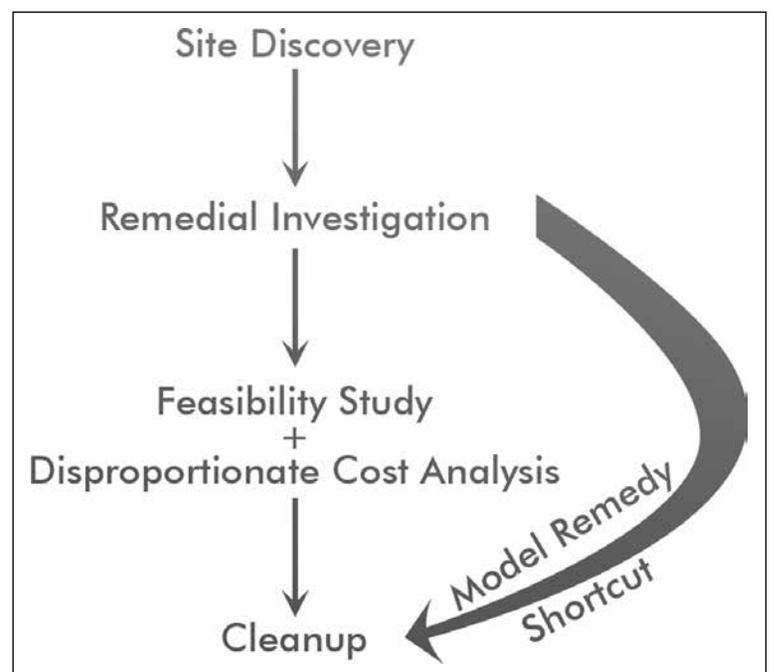
The reality

However, when homing in on the key measure of the model remedies process — the "criteria" — it's clear that this guidance is still in its infancy. The current model remedies are narrowly focused on petroleum-contaminated sites where impacts are to soil only and there are no detectable contaminant concentrations in groundwater. To look at just one example of how small this is, only 6 percent of leaking underground storage tank sites in Washington state fall into this category (based on a 2011 EPA study).

In addition, despite Ecology presenting seven model remedies for such sites, there really are only two: dig it all to meet cleanup levels, or dig all that is accessible and restrict land use (i.e., put an environmental covenant on the property to address what you can't remove).

Full removal is often the most costly option available for cleaning up a petroleum-contaminated site. Therefore, the price tag of digging out all the soil may cancel out any time and cost savings coming your way by avoiding some reporting requirements through the model remedies process.

Further limiting the applicability of model remedies is a provision that excludes sites where non-petroleum compounds have been detected, even if they are below



With the model remedies shortcut, the feasibility study step can be bypassed — saving time and money to get to cleanup more quickly.

applicable cleanup criteria. Introducing "non-detect" instead of a cleanup level as a new regulatory criterion is a particularly concerning policy precedent.

The good news

The model remedies guidance does provide some useful tools. It identifies a generic petroleum-cleanup-level protective of the direct contact pathway. Previously, this was only conducted on a site-specific basis using expensive laboratory analysis. For example, at petroleum sites

with no groundwater impacts, this allows a much less restrictive alternative to the standard MTCA cleanup level.

Where the model remedies are perhaps most helpful is in avoiding a disproportionate cost analysis to justify environmental covenants on properties where contaminated soil is inaccessible due to constraints such as buildings or utilities.

These approaches are good news, not just for the limited number of sites addressed by



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HERE'S HOW TO IMPROVE ENVIRONMENTAL HEALTH AND SAFETY

Don't blame an employee for an unsafe behavior; instead look at the factors behind the act.

Proactive organizations recognize that adopting a "systems approach" to their environmental, health and safety (EHS) management creates a stronger, more sustainable platform for success.

A systems approach promotes the view that a company is not just the sum of individual functions (finance, manufacturing, human resources, etc.) but rather a complex dynamic set of relationships between these functions. Performance and productivity on the manufacturing floor directly affects financial health; in turn, the hiring, retention and employee development practices of the organization directly impact the productivity and quality of its operations.

All functions are related and impact one other in many ways.

Systems thinking also acknowledges this dynamic context between employees — the organizational chart only depicts a portion of the relationships and networks that exist in any organization. Spreading critical information and engaging employees in EHS initiatives is as much about tapping into the informal networks, perhaps even more than the traditional cascade-it-

down-the-org chart approach we default to.

For example, consider the failure of an employee to secure the lid on a drum of liquid hazardous waste on the manufacturing floor. The very next morning, an environmental regulator makes a surprise visit and cites the company for this violation. Our standard default is the blame game — we hold the individual employee accountable.

Contrast this with a systems view that takes a more objective, holistic view. How long has the employee been responsible for this activity? Did the supervisor adequately train this employee? How committed is the company to proper environmental management and is the employee aware of this commitment? What types of behaviors do the employee's peers engage in (would another employee have placed the lid on the drum, given the same circumstance)? Were any safeguards in place to help this employee (or any other) take the right action, such as a visual reminder to secure the drum?

In this example, a simple drum lid can create an opportunity for a deep and broad-reaching exploration that would lead to a more successful solution.

Space industry inspiration

This way of thinking and ultimately behaving is the core concept of environmental management systems, which have

been implemented in organizations across the globe for several decades.

An exciting opportunity in our industry is the advent of safety management systems (SMS). After successful adoption in the defense and space industries, SMS is now making its way into the mainstream. For instance, the Federal Transit Administration recently adopted SMS as the basis for its new National Public Transportation Safety Program.

The three basic pillars of SMS are:

- A comprehensive corporate approach to safety that includes management's ongoing and explicit commitment to safety
- An effective organizational structure and safety processes
- A system for collecting, analyzing and acting on safety performance data

In addition to these pillars and what really differentiates SMS from traditional safety management approaches is the emphasis on employee engagement and safety culture.

In a healthy safety culture, employees at all levels feel empowered to report safety

concerns, knowing that these concerns will be proactively addressed without fear of retribution. Employees also feel ownership in the safety metrics of the organization, knowing that their behaviors have a direct impact on accident and injury rates, workers' compensation costs and other important performance measures.

True to the systems approach, strengthening the management of safety in an organization, if done well, will enhance the bottom line.

When Paul O'Neil took the helm of the Aluminum Company of America (Alcoa) in 1987, he announced a single-minded focus on safety that intended to make Alcoa the safest company in the country. During O'Neil's 13-year tenure as CEO, Alcoa's annual net income increased five-fold and its market capitalization rose by \$27 billion. At the same time, the injury rate at Alcoa fell to 1/20th of the U.S. average and some plants would go years without an employee losing a workday due to an accident.

A fascinating exploration of Alcoa's safety journey under

O'Neil is provided in "The Power of Habit" by Charles Duhigg.

A tempting 30-pound box

In summary, let's go back to the plant floor and observe a potential safety incident in an organization that has adopted an SMS approach.

Consider something as simple as retrieving a 30-pound box from an elevated storage rack. An employee has been asked to retrieve this box to fill an urgent customer order; the box is sitting on a wooden pallet at a height of 10 feet. The forklift operator who would normally retrieve the pallet and box is occupied on another order at the opposite end of the plant.

An extension ladder lies against a nearby wall.

Earlier this week, the employee attended an all-hands briefing with the plant manager who started the meeting with an acknowledgment of the safety accomplishments of the previous month. In an upbeat, positive manner, he identified and personally thanked several work-

HEALTH AND SAFETY — PAGE 14



BY ROB ZIEGLER
TERRACON
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HOW DEEP GREEN BUILDINGS CAN EDUCATE KIDS

Classrooms that are self-sustaining, nontoxic and beautiful can inspire students.

I have a 4-year-old son who is overflowing with curiosity and questions.

A couple of Saturdays ago, we stopped by the recently remodeled Skanska main office to play with the new shuffleboard table. But his eyes quickly went to the lights that turned on and off when we walked by, and his hands went for the removable panels in the raised floor.



BY STACY SMEDLEY
SKANSKA USA

He has a history of being interested in all things mechanical and functional. I remember a Sunday morning at Fred Meyer when he couldn't have been more than 3, where he pointed to the exposed mechanical ductwork and pulled me through the store to see where it went and figure out what it was there for.

Celebrating the WHY

It's a hunger for the why behind things that I wish more of us grownups could hold onto.

I was first exposed to this amazingly innate curiosity in children around how things work and why — specific to the built environment — through my role on the

Bertschi School Living Science Building.

It was my first educational project, and it was a very deliberate and intentional move by our entire design and construction team to involve the kindergarteners through fifth grade students from the onset of the design process so they could have the opportunity to understand and impact how the building looked and functioned to meet the 20 imperatives of the Living Building Challenge.

It was an experiment that paid off as their new science building opened, with all of its sustainable systems exposed and the students' design ideas incorporated. And our team watched as every student migrated to something with curiosity in their eyes and ownership in their excited expressions.

After the students had used the building for a while, they started telling us things like "This building is science" and "Why aren't all buildings living?"

It was a pivotal moment for me to live through that experience with those kids. And it pushed me to dig into how our current educational system expects kids to learn and what we are testing them on, versus how kids want to learn and what we should be teaching to prepare them for what this world will be like when they are grownups. It also made

Stacy Smedley teaches kids in her SEED class how plants in the living wall rely on rainwater from the classroom roof and daylight from a Solatube skylight.



PHOTOS COURTESY OF STACY SMEDLEY

me look hard at the schools and spaces we are providing for this learning, and how those spaces play into the positive or negative experience that their educational journey provides them.

Understanding the WHAT

At Skanska, we are building multiple public K-12 projects for multiple districts. Each district has its own standard in terms of systems and program, but there are two commonalities that resonate.

The first, that each district and the people that work there want what is best for their educators and their students, absolutely without question. And the second, that the funding and guidelines provided to them means that they have to many times put that first commonality aside, to simply ensure that they are able to provide space for the bodies they need to house in their schools.

The fact that funding is tight — thus "nice-to-haves" like highly sustainable systems and materials tend to get cut for the benefit of must-haves like program space — is not a new concept, nor is it specific to the educational sector. But in my mind, the educational sector is the place that suffers the most from losing those nice-to-haves, because we are dealing with the health and well-being of our kids when we look at things like materials toxicity, access to natural light and exposure to nature. Couple that with the tremendous missed opportunities on the educational side of the equation, when sustainable systems that benefit

our environment are not there to explore and understand.

I feel passionately about this because I see and experience both sides of the coin. Through my social purpose corporation, SEED Collaborative (Sustainable Education Every Day), I've worked with multiple schools to bring SEED workshops to expose students to sustainable design and construction through the lens of the Living Building Challenge, the most stringent and holistic green building certification system.

I ask school districts to think about what a classroom could be like or feel like if its purpose was to be self-sustaining, nontoxic, beautiful, and of course teach students. Following that conversation, I ask the students to draw what they are thinking.

The results of these workshops are piles of amazing, unique and sometimes mind-blowing illustrations of the spaces these kids can dream of learning in — healthy spaces that benefit the environment, where they want to spend their days and learn things that they may not find in a textbook, such as those from the building or classroom itself.

This is the what for me. It's the inspired looks on teachers' faces when they see what their students can imagine and illustrate where they would want to learn if there weren't the restrictions of budget and guidelines.

I've done this exercise with grownups too, and it produces the same results. Oftentimes, I couldn't tell the difference between a 40-year-old's drawing and an 8-year-old's. We all

want the same things with our own unique touches.

Implementing the HOW

I wish I had the golden answer to how to allow deep green buildings that teach our kids to be the standard for every public school district. But I do think that there is a path to allowing it to become at least a part of the conversation, where a building's sustainable features that have a human health and well-being benefit, along with an educational impact, could be weighted more heavily in the guidelines that are driven from the state downward.

As more examples like Bertschi find their way into public education — through small interventions like a drawing workshop where kids imagine a sustainable classroom, or as sustainable portable classrooms like SEED or SAGE (Smart Academic Green Environment) demonstrate the impact of healthy learning spaces — I believe the proof will be in the pudding.

Teachers will find ways to teach a building's sustainable principles as part of STEM and common core. Students will go home and tell their parents to turn off the lights to save energy. We will get there.

Stacy Smedley is a preconstruction manager and sustainable initiatives lead at Skanska USA. She previously was project manager at KMD Architects for the Living Science Building extension of the Bertschi School. She is also the co-founder of SEED Collaborative.

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SURVEYS

GOLDER ASSOCIATES

Specialty: Environmental, ground engineering and water services for the real estate, transportation, manufacturing, waste, power, mining, oil and gas, and water industries

Management: Travis McGrath, Pacific Northwest managing principal; Jim Kleppe, U.S. urban development and infrastructure sector leader; Hisham Mahmoud, global president and CEO

Founded: 1960

Headquarters: Atlanta; local office in Redmond

2014 revenues: Approximately \$184 million (U.S.)

Projected 2015 revenues: Similar to 2014

Projects: High-rise buildings, light rail, highways, bridges, dams, environmental remediation, solid waste, water supply and electrical utilities; unconventional oil and gas, pipelines and mining facilities; shoreline studies for the Kitsap Transit Fast Ferry; site identification and permitting for small modular nuclear reactors; more than 15 local redevelopment projects

Jim Kleppe answered questions from the DJC about his company and trends and issues in the industry.

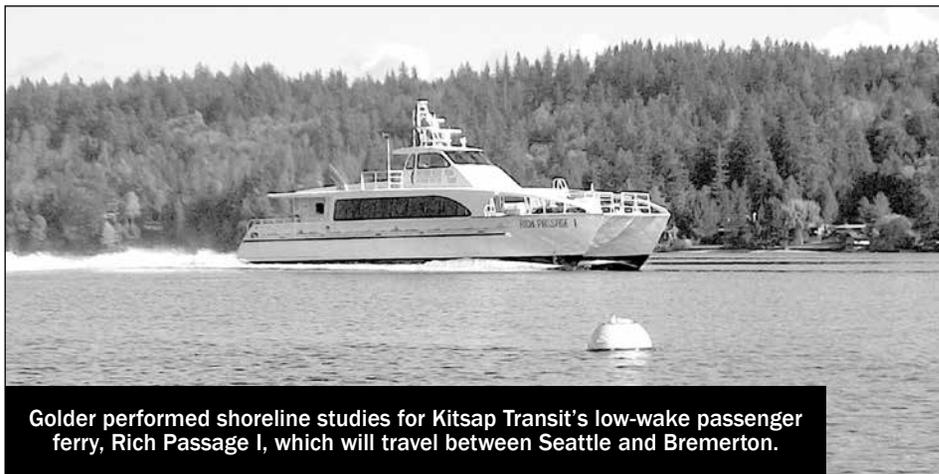
Q: How has your company changed over the last five years?

A: The biggest change has been the nature of our markets and the ebb and flow of client needs. Five years ago, the mining and oil and gas markets were doing well and offering significant growth globally for us. Now they have softened, with less spending on capital expansion (though operational support continues). However, five years ago the development and transportation markets were soft, and now each is offering significant opportunities for our staff. Power and manufacturing projects have held relatively steady.

Q: What are the biggest trends and issues in your industry locally?

A: The trends are:

- The interest of outside capital in the Seattle market. Seattle is seen as one of the best places in the U.S. — if not the world — to invest capital. So, many investors and developers are considering projects in this area.
- Continuing growth. Informal opinions gathered at some recent real estate and development forums indicate that growth in development will continue for the next two to four years in the Seattle area.
- Climate change. We've had some warm weather with poor snowpacks. Should this be a sustained trend, there could be stress on our water supply that may be even more significant given the growth mentioned earlier.



Golder performed shoreline studies for Kitsap Transit's low-wake passenger ferry, Rich Passage I, which will travel between Seattle and Bremerton.

PHOTO COURTESY OF GOLDER ASSOCIATES

Q: Where will growth come from in the next few years?

A: Growth will be related to the trends described earlier: in real estate development and water resources. Transportation will be strong as our state Legislature has thankfully passed a new investment package, offering improvements over a 16-year window. Sound Transit will be taking on more improvements and will be looking at another funding package. And local agencies, such as the city of Seattle, are considering their own funding mechanisms.

Q: How can cities become more sustainable?

A: The definition of sustainability, especially as applied to cities, is varied. But, if one assumes the economic and safety components of sustainability are covered, the more physical components promoting sustainability include:

- A variety of transportation modes, including buses, light rail, highways and roads with ample capacity
- Energy efficiency in buildings and production of cleaner energy
- Water conservation and reuse
- Make cities more resilient to address the effects of climate change
- Green spaces that incorporate our natural environment (landscapes, woods, beaches, creeks, etc.)

CASCADIA CONSULTING GROUP

Specialty: Environmental and sustainability solutions, including waste and recycling; water, energy and resource conservation; climate adaptation

Management: Francis Icasiano, CEO

Founded: 1993

Headquarters: Seattle

2014 revenues: \$7.3 million

Projected 2015 revenues: \$7.7 million

Projects: Seattle Public Utilities Green Business Program; Oak Foundation evaluation and strategic plan; city of Bellevue Refresh Recycling; Snohomish County Natural Yard Care Program evaluation

Francis Icasiano talked with the DJC about his company.

Q: Is business better this year, compared with 2014?

A: Cascadia's business is performing very well this year, comparable with our performance in 2014 plus a healthy margin of growth.

Q: Which sectors of your company are performing particularly well?

A: Cascadia began in 1993 primarily as a waste-focused company, performing waste characterization studies and working with the residential and commercial sectors to conserve resources and optimize waste streams. We continue to do such work today through our Recycling and Materials Management line of business, which will grow its revenue by over 14 percent including a major, statewide characterization study for the state of California, and recycling and composting outreach projects in and around King and Snohomish counties.

Cascadia's Climate Adaptation practice is also growing rapidly and is expected to grow its revenue by over 50 percent from last year.

Q: Have you made any additions to handle the new workload?

A: Yes. Cascadia continues to grow, and we've hired many new staff to handle our growing workload and tackle new initiatives in technology and social equity. And we're always looking for qualified, mission-driven folks, so please give me a call if you'd like to make a positive difference for the environment!

Q: What two projects in 2015 or '16 symbolize your work?

A: We have been working with

Seattle Public Utilities to manage the Seattle Green Business Program (formerly Resource Venture) for nearly 10 years. This project highlights several of Cascadia's core offerings and areas of environmental impact, such as waste reduction, water and energy conservation, and community outreach and engagement. The project provides local business owners with the tools and knowledge to reduce their footprint in a way that is economically viable and often improves the business' bottom line.

Cascadia is also working with the Yakama Nation in Eastern Washington to engage tribal staff and members in a new climate change adaptation planning effort. With climate change expected to impact an overwhelmingly broad range of systems and resources that are culturally and economically important to the tribe — including water, fisheries, wetlands, forests and wildlife — the Yakama Nation sought Cascadia's help to understand its vulnerabilities and weigh the pros and cons of various adaptation strategies.

Q: What are your predictions for 2016 for your firm?

A: Cascadia will continue to grow, thrive and support its clients in their efforts to create a more sustainable future. The need for resource efficiency will continue to increase, and we expect Cascadia to be on the

front lines of helping our clients prepare for climate change, understand and reduce their environmental impact, and achieve their sustainability

goals in a way that helps us to protect our fragile planet. What more of an exciting and challenging prediction could we ask for?

SURVEYS

O'BRIEN & CO.

Specialty: Green building consulting; policy and program support; education and training

Management: Alistair Jackson, principal and owner; Donna Trost, operations director and owner; Elizabeth Powers, principal and owner

Founded: 1991

Headquarters: Seattle

2014 revenues: \$1.3 million

Projected 2015 revenues: \$1.3 million

Projects: University of Washington North Campus housing, Seattle; Sullivan's Gulch multifamily, Portland; Enterprise 2015 Criteria single/multifamily specifications, Columbia, Maryland

Andrea Lewis, associate principal for O'Brien & Co., answered questions about the firm's activities, what happens when the building boom slows down, and what's around the corner for the sustainability movement.

Q: Which services are most in demand and where do you see growth in five years?

A: We're seeing a lot more interest in how we can provide services that bridge the gap between design and construction to ongoing operations, helping to maintain the performance of the project and the ongoing sustainability benefits for the long haul.

For us, that takes many shapes. In some cases it has been leading exciting research on new and innovative technologies that help create better visibility about how a building is operating — and

where there are opportunities for improvement. In others, it has been helping property managers and owners find ways to engage building occupants to understand their role in helping cut water, energy and waste.

If and when the building boom slows down in our region, this interest in the different ways to approach sustainable occupancy and operations in all buildings will take the forefront.

Q: What's a really interesting project you're working on?

A: We are just getting started on the rollout of our "building efficiency coaching services" to 12 different affordable housing buildings owned by two different affordable housing developers. We've been delivering coaching for individual buildings for some time, but we really see this as a portfolio-scale service and solution.

We're engaged with a technology partner, BrightPower, to help expedite and visualize all of the data we'll be collecting, and are partnering with Emerald Cities Collaborative under their RENEW program to provide building performance assessments that inform program scope for upgrades and maintenance schedules, as well as managing the construction phase for these upgrades.

Q: Has the direction of the business changed since founder Kathleen O'Brien sold her stake in 2011?

A: We are at our core still seeking to create a more sustainable built environment through our services, which almost always reflect Kathleen's foundational approach of building industry

O'Brien & Co. was the sustainability consultant for the Hilltop Regional Health Center in Tacoma. The LEED silver project opened in 2013.



PHOTO COURTESY OF O'BRIEN & CO.

capacity to do so. We also still have Kathleen's same yearning to be the wedge that helps drive change where it's most needed, though the kind of change needed now looks very different from what it did when she first started the business.

Now, we're seeing the scale of our services expand "out" in the realm of large-scale, high-performance infrastructure that has grown over the past few years, and we have one of the first Envision Certified Professionals and Trainers on staff. (Envision is a sustainability rating system for infrastructure.)

At the same time, we're seeing it move "in" to really focus on the role of the people inside buildings, and how buildings really impact those people — we also have one of the first WELL Accredited Professionals on staff. (The WELL Building Standard is a framework backed by health and design experts

to understand, measure and improve human health and well-being as outcomes from building design and operation.)

Q: What are a couple of the biggest challenges you're facing?

A: We used to say that getting buy-in on good process, like integrated process, was an upfront challenge we often faced on our projects. But increasingly, in part thanks to great IP standards, and inclusion of IP in various rating systems and even adopted at policy level here in our county, this is less the case.

The challenge we continue to face is helping our clients understand the array of technology solutions available to them and assessing which ones are best suited for their needs, as well as understanding the role of tenant behavior and operating practices on building performance.

Q: What's the next frontier for sustainability?

A: There are a lot of old frontiers that the industry is still working on to really figure out!

Energy has certainly gotten the most play, but water, waste and well-being are others that easily come to mind, and it's hard to note these without also noting the direct tie-in to climate, and the urgency for real solutions that we can scale without losing adaptability.

So this next frontier might really be about effectively scaling the broad range of solutions out there for greater adoption without bypassing the much-needed place-based thinking that has to happen for a solution to be effective.

We're working with some pretty progressive clients who are taking more of a strategic approach to their thinking and planning for larger scale development, but we'd love to see this become the norm across the board.

RECYCLED WATER

CONTINUED FROM PAGE 9

mamish River, a salmon-bearing waterway particularly stressed by the drought.

King County and Kirkland are excited about the potential for this alternative water resource, and have embarked on a study of the future expanded use of recycled water produced at the Brightwater Plant. The study will include a demand analysis, potential customers, possible distribution alignments, implementation policies and costs.

Make no mistake, water conservation needs to remain the top priority across the region during the drought. Recycled water is currently available in specific areas near King County's Brightwater and South Treatment plants. Offering it to those nearby as an alternative water source is a smart way to support current conservation efforts.

Recycled water is the right water for the right use. For King County and Kirkland, it's the right time to put those words into action to wisely manage water resources in a growing and increasingly thirsty region.

Kathy Brown is director of Kirkland's Public Works Department, where she is responsible for its operations, budget and programming. She holds a bachelor's degree in Germanics from the University of Washington.

Pam Elardo, PE, is director of King County's Wastewater Treatment Division. Elardo holds a master's degree in environmental engineering and a bachelor's degree in chemical engineering, and is a certified Group IV Wastewater Treatment Plant Operator.

CLEANUP GUIDANCE

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the current guidance, but potentially for other sites to which these tools may also apply.

Furthermore, Ecology is welcoming feedback on expanding the process. Just before releasing the current soil-only guidance this September, the agency held a listening session that included discussion of model remedies for groundwater contamination (i.e., the cleanup priority for most contaminated sites).

Good intentions, limited use

The current set of model remedies can provide substantive schedule and savings value for those sites that have only petroleum contamination, pose little risk to the property or human health, and for which the owner requires a fast cleanup with no long-term stewardship obligations.

However, for the vast majority of cleanup sites that do not meet that narrow profile, the model remedies break little if any new ground. They may prove to have negative consequences for the regulated community if the conservative criteria for identifying what qualifies as a model

remedy are adopted as a basis for remedy decisions at other sites. In particular, the model remedies guidance selects removal over containment capping even when the costs are disproportionate, and the overall environmental benefit is negligible or even negative (for example, through generating greenhouse gases).

How Ecology site managers bring the model remedies provisions into play on sites not applying model remedies remains to be seen.

In light of the current and future model remedies being developed, it is critical that owners of contaminated properties understand the proper context for their use, and equally understand the potential advantages of going through the full MTCA remedy selection process to arrive at the most protective and practicable cleanup remedy tailored to each site.

Steve Germiot is a principal hydrogeologist at Aspect Consulting with 26 years of experience in the MTCA cleanup process — from remedial investigation and feasibility study through remedial design and implementation.

HEALTH AND SAFETY

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ers on their near-miss reporting efforts.

Several months ago, this employee also participated in a ladder safety workshop that was designed and taught by shop floor employees, and supported by the plant safety staff.

The employee is well informed on the current standing of company safety measures and how the success of these measures impacts the company's financial performance. Last but certainly not least, the employee enjoys and takes pride working in the organization, and can't imagine missing an extended amount of time due to an injury.

What choice do you think the employee makes?

Rob Ziegler is a senior organizational development consultant with Terracon Consultants. He has more than 25 years of experience in environmental, health and safety consulting, with an emphasis on environmental management and safety culture.

SURVEYS

CLIMATE SOLUTIONS

Specialty: Clean energy economy nonprofit that finds practical and profitable solutions to global warming

Management: Gregg Small, executive director; Kristen Sheeran, Oregon director; Eileen V. Quigley, director of strategic innovation

Founded: 1998

Headquarters: Seattle

2014 revenues: \$3.4 million

Projected 2015 revenues: \$2.9 million

Projects: Founding member of Renew Oregon and the Alliance for Jobs and Clean Energy, two state-level networks of leaders dedicated to strengthening the economy by reducing global warming; involving businesses in climate and clean energy policy; researching ways to transition from a fossil fuel economy to a low-carbon, clean economy

Jonathan Lawson, digital communications manager for Climate Solutions, answered questions from the DJC about the nonprofit's work.

Q: What do you do for businesses, and who pays for it?

A: Climate Solutions works with businesses to promote practical and profitable solutions to our climate and energy challenges, including energy efficiency,

renewable energy and alternative fuels. We help inform businesses about clean energy and energy efficiency solutions most applicable to their own operations, and give them a voice in the development of smart policy that promotes clean and efficient energy.

We played a key role in convening the Washington Businesses for Climate Action, and are organizing Washington and Oregon businesses as a powerful constituency for backing strong action to combat global warming. Climate Solutions shines a spotlight on companies that are leading in developing climate solutions, and provides opportunities for networking and engagement with other executives.

Our work is funded through support from individual donors, business sponsorships, foundation grants and fee-for-service consulting work for governmental clients.

Q: How can developers and public agencies make buildings more efficient?

A: New buildings are capable of exceptional energy performance. Designing and constructing buildings to minimize energy demand — through high-performance walls, advanced air systems, daylighting, passive solar heating, water conservation, conversion of waste heat into energy and other measures — is just the beginning.

Regular building “tune-ups” are also critical to show what’s working and what’s not. In its public buildings, King County is partnering with MacDonald-Miller, Iconics and Microsoft on an energy-smart buildings project at five King County facilities that will show county building managers the real-time energy use of their facilities.

Without adding new meters or sensors, the software the managers use will draw from existing data to show where buildings are wasting energy, why, and what to fix.

Q: How can cities become more sustainable?

A: Cities represent over 70 percent of global carbon emissions. Over the past decade and more, local governments have made enormous progress in charting their paths to a low-carbon future through building energy efficiency, renewable energy and clean transportation. Examples include financial support for deep building retrofits, rooftop solar installation campaigns, and expansion of electric vehicle charging networks.

Local officials have set bold climate and clean energy goals, exerted political power to achieve those agendas, and are working on durable, meaningful carbon reduction solutions. These reductions are not drops in the bucket: a New Climate Economy 2015 report found that local climate actions in buildings, transportation and waste management could save \$16.6 trillion from now to 2050, concluding that investments would pay for themselves within 16 years. The same report found that with national support for city efforts, savings could reach \$22 trillion, and the planet could avoid emissions on the scale of India’s current carbon footprint.

Q: What’s the most exciting innovation you’ve recently seen?

A: There are two types of innovations that are important to our work. Here are

examples of both:

- From a technical standpoint, the Bullitt Center in Seattle is the greenest and most efficient commercial office building in the world, producing zero carbon emissions and slashing other wastes and toxics. Many cutting-edge innovations embodied in that project are already making their way into commercial projects.

- From a policy standpoint, California stands out. With the most comprehensive climate and clean energy policies in the country if not the world, California has also shown that economic growth and cutting carbon can go hand in hand, with job growth well above national benchmarks. Increasingly, business leaders in the state are uniting behind strong climate and clean energy policies, recognizing that the state can brand itself as a world leader in the transition to a low-carbon economy.

Q: Too much regulation or not enough?

A: The Northwest is burning, and the global climate is changing faster than anyone expected. It’s not just that we are not moving fast enough in the right direction. We are continuing to move in the wrong direction. That’s why we urgently need to regulate carbon emissions, to stop exacerbating the problem. It’s important good news that the market for clean energy solutions is accelerating; we need and will have new sources of energy that are clean, sustainable and profitable. We are seeing enormous strides in energy efficiency and renewable energy.

Just as we need to keep expanding innovation on those areas, the market we have will not solve the problem of runaway carbon emissions on its own.

RIDOLFI

Specialty: Cleanup and restoration

Management: Callie Ridolfi, president

Founded: 1990

Headquarters: Seattle

2014 revenues: \$3 million

Projected 2015 revenues: \$3 million

Projects: Port Gamble Bay, Mid Columbia River, Commencement Bay

Seattle-based Ridolfi is working on environmental projects in Washington, Oregon, Idaho and Alaska. It is restoring and monitoring habitats in Commencement Bay, the Puyallup River and on Bainbridge Island. Ridolfi is working on sustainable development projects for tribes in Alaska and Washington, as well as a waste transfer station in Neah Bay.

Callie Ridolfi discussed some of the pressing issues in environmental work.

Q: What types of projects has the firm done lately?

A: This past year we have been engaged in cleanup of contaminated sediment, fish consump-

tion surveys and the evaluation of mining impacts.

Q: What are a few changes you have noticed in the industry?

A: Transboundary and watershed concerns related to proposed mineral development, and regional cleanup decisions being made around contaminated sediment sites.

Q: What is the next big innovation in sustainable building?

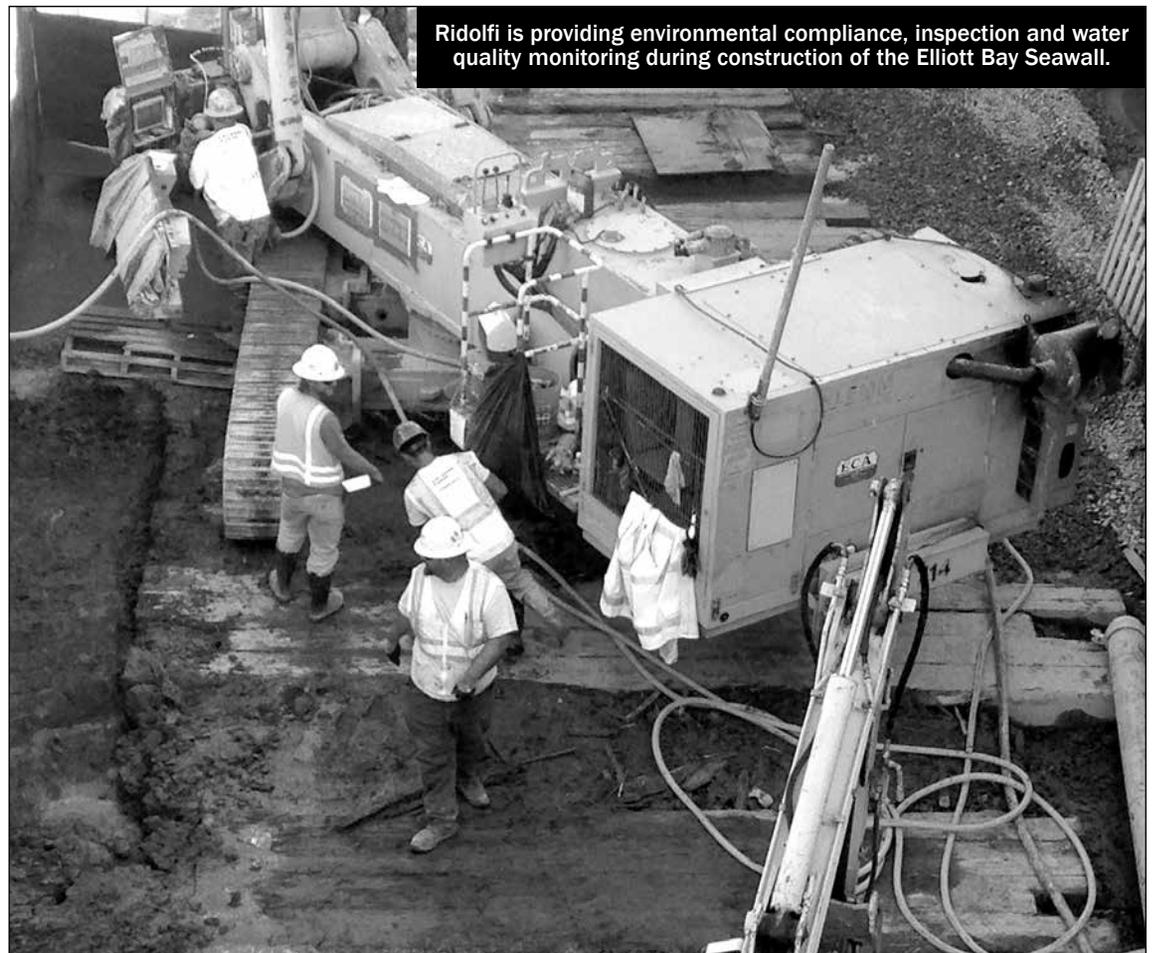
A: Application of living building techniques to new housing development.

Q: What are the risks and benefits of building on a potentially contaminated site?

A: Legacy soil and groundwater contamination; an opportunity to convert an underutilized brownfield into green building.

Q: What is the biggest environmental issue in real estate?

A: Allowing for denser development and friendly, walkable neighborhoods while accommodating transit for commuting. Public-private partnerships are needed, with community outreach and input to achieve solutions that are sustainable for growth in the long term.



Ridolfi is providing environmental compliance, inspection and water quality monitoring during construction of the Elliott Bay Seawall.

PHOTO FROM RIDOLFI

SURVEYS

Shannon & Wilson is one of the consultants for the new SR 520 floating bridge over Lake Washington.



PHOTO FROM SHANNON & WILSON

SHANNON & WILSON

The DJC asked Shannon & Wilson vice presidents Katie Walters and Dave Cline about their company.

Q: What types of projects is the firm working on?

Walters: Shannon & Wilson continues our focus on public sector work. We have several large ongoing projects for WSDOT, Sound Transit and BNSF. In addition to those infrastructure projects, our water resources group is working on several projects that involve levee setbacks for habitat and shoreline restoration using funding that is related to salmon enhancement grants.

Q: How has technology changed what you do?

Cline: Advances in geospatial technology combined with the ability to integrate soil, groundwater and surface water numerical modeling has created more

opportunities to provide integrated environmental and infrastructure studies and designs to our clients. These technologies also provide visual output that improves our ability to communicate complex scientific information to our clients and their project partners.

Q: What markets are you entering or exiting?

Cline: We believe that our geology, geotechnical, water resources, environmental and natural resources services are well suited to provide solutions for climate change and sea level rise related issues including river and coastal flooding, salt water intrusion, landslides and drought.

Q: What is the most difficult project your firm recently worked on?

Cline: We had the opportunity to be the lead for design and permits on the Washington State Department of Fish & Wildlife's Fir Island Farms estuary restoration project. The project involved feasibility, design, permitting and stakeholder outreach for a mile-long levee setback, drainage improvements and 130-acre tidal marsh and estuary restoration. A key challenge was completing an expedited design and permit schedule in an 18-month period involving multiple stakeholders, technical advisory committee and regulatory agency reviews, to dovetail with construction grant funding available in 2015-16.

The construction of the levee setback and drainage infrastructure is near completion in 2015, and the project is on schedule for levee removal and marsh restoration in 2016.

Q: What is your outlook for the Seattle area?

Walters: We are very optimistic about the next couple of years. Passage of the state transportation package and local transportation budgets has created a lot of opportunity for road and other infrastructure projects at both the state and local level. We have historically done a lot of public sector work and have already seen a lot of projects moving into design and construction as a result of these new budgets.



Innovex is managing environmental liability for BP/Arco.

PHOTO FROM INNOVEX

INNOVEX ENVIRONMENTAL MANAGEMENT

Specialty: Environmental engineering and consulting

Management: Ron Chinn, CEO and president

Founded: 2002

Headquarters: Concord, California; local office in Redmond

2014 revenues: \$3.1 million

Projected 2015 revenues: \$3.6 million

Projects: Environmental liability management for BP/Arco; on-call environmental services for Sound Transit; dewatering and contaminated media management for Skanska at the University of Washington

Ron Chinn, president and CEO, answered questions about the industry and his firm.

Q: How's business and have you seen an increase in workload in the last year?

A: I think that overall, the broader market is up and money is beginning to flow into our industry again. Nevertheless, the energy sector is being weighed down by the current price of oil, and environmental work associated with the energy companies appears to be down across the board.

The environmental industry with respect to the energy sector will certainly recover, however that recovery may be several years off.

Construction and development is returning, and we're making a move toward those sectors. This works particularly well for us as Innovex has strong expertise in the mitigation of complex contaminants that can be found in the industrial areas currently proposed for development.

Q: Are you adding staff members?

A: Innovex is adding construction support capabilities to its suite of environmental services. While our core services revolve around the investigation and cleanup of contaminated lands, we're adding expertise in construction dewatering, asbestos, lead-based paint, and health and safety.

Q: Can you tell us about two projects you're working on?

A: Innovex's largest client in the Pacific Northwest is BP/Arco. As their environmental consultant, Innovex is responsible for performing environmental site investigations, cleanup operations and regulatory negotiation with the Department of Ecology and other agencies. Our work has expedited the closure of several cases over the past year, and we are anticipating the closure of several additional environmental cases in 2016.

As a certified MBE, Innovex has been awarded contracts with public agencies and contractors interested in supporting diversity goals. Innovex's diversity status has given us the opportunity to showcase our capabilities as a firm. We firmly believe that while our diversity status may open a door for us, our ultimate success is based solely upon how well we perform once we walk through that door.

NEBC northwest environmental business council

The Business Association for Sustainable Environment • Energy • Resources • Development

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