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TO THE EDITOR:

[JAN JACOBS](#)  
360-236-3316

## Message from Office Director Jerrod Davis

### *Climate Change and Public Health*

Secretary of Health John Wiesman recently asked me to serve as our agency's lead for climate change preparations after declaring climate change as a priority area for the Department of Health. While the topic remains a difficult and polarizing issue, there is no other way to say it—warmer temperatures are affecting our area, and we're already beginning to see the effects. Warmer temperatures are affecting shellfish toxicity, ocean acidification is disrupting shellfish regeneration, and new "bugs" are causing illness. Washington's shellfish industry is currently coping with the effects of ocean acidification and increased closures associated with harmful algal blooms. Water and wastewater infrastructure may also be impacted, so we are turning to innovative designs for water reuse and decentralized systems that offer solutions for better water and wastewater management.

Here's a snapshot of what we're seeing and doing in relation to our state's shellfish resources.

#### Trends

- We're tracking indicators and identifying trends in the number, duration, and toxicity concentrations of harmful algal blooms.
- We've observed that all of the above are higher in the summer and fall during years with above-average sunshine and temperatures, and continue later into the year.
- Fresh water toxins are now being found in saltwater shellfish.

#### New biotoxin = new monitoring and testing protocols

- In 2011, illnesses caused by Diarrhetic Shellfish Poisoning (DSP) were reported in our state – the first ever in the U.S. where tests confirmed DSP in shellfish.
- The algae that produces the DSP toxin has been detected in our marine waters for some time, but had not produced toxins until recently.
- We recently invested in equipment at our Public Health Lab in Shoreline that detects DSP toxins. This technology is vital to our monitoring efforts, and saves time. Previously, samples were sent to Dauphin Island, Alabama for testing – the closest accredited and available lab source.

#### Ocean acidification is causing problems for shellfish

- Our marine waters are becoming too acidic for oyster shells to form properly.
- Increases in nutrients (nitrogen) contribute to acidification. Although on-site sewage systems contribute small amounts of nitrogen to our waterways, we're working to lessen their impact. We're finishing up a project to identify and approve low-cost on-site sewage system technologies that lower nitrogen in treated wastewater.

Public health has a role to play in adapting to our changing climate. Having public health officials work on this is a natural fit since we already spend our time preparing for, preventing, and responding to emerging issues that come our way.



## Poor Water Sample Results Identify a Failing LOSS

In late July a water quality specialist for the Skokomish Tribe's Department of Natural Resources called our office to report very high levels of fecal bacteria in routine water samples collected from a small creek. This creek drains onto a commercial shellfish beach in Annas Bay, and is adjacent to Potlatch State Park on Hood Canal.

Shortly after we received the call, staff from both our shellfish program and our wastewater program went to the location to get more information. The area where the contaminated sample was collected is adjacent to a large on-site sewage system (LOSS) that serves a nearby property. Staff collected water samples from the creek both upstream and downstream from the LOSS, and looked for other possible pollution sources in the area. No other potential sources were identified.

That same day, we officially closed the commercial shellfish beach to harvesting, the state park's beach to recreational harvest, and worked with the Mason County Health Department and Washington State Parks to close the beach to any water contact. Warning signs were posted at the park's entry and along the beach. The LOSS owners also notified all residents of the situation, and advised them to avoid the area.

Two days later, the water sample results from our State Public Health Lab confirmed the LOSS was the source of the problem: the samples taken upstream of the LOSS had low bacterial counts; samples collected downstream of the LOSS contained high bacterial counts.

The LOSS owners hired a septic installer to come troubleshoot their LOSS. The installer found a crushed outlet pipe from the septic tank and replaced it. We sampled again, and this set of samples showed no contamination. Unfortunately, the problem did not end there. This LOSS had recently come under our jurisdiction and a routine preliminary assessment, done earlier as part of the LOSS' permit renewal process, showed that adequate sewage treatment was unlikely. The system did not meet requirements for setbacks from surface water and the drainfield appeared undersized and installed in inappropriate soil.

Rather than spending money trying to fix the existing system, the LOSS owners want to replace it in a different site away from shellfish beds, swimming beaches, and the creek. We're waiting for a copy of the engineering report that will assess whether the alternative site is suitable, or is a cost-effective solution. If it isn't, the owners have an option to connect to a sanitary sewer system being designed along the property frontage that will soon be operational. If a new LOSS is built, the timing of the "fix" relies on the weather. It's likely that it won't be functioning until late spring of next year. Connection to sewer could occur before the end of this year.

Ongoing water quality results have increased the urgency of the replacement efforts. The next round of sampling done by the Skokomish Tribe in early September again showed contamination near the LOSS. The area remains closed to commercial and recreational shellfish harvesting and we continue to advise the public to stay out of the water.



*Wastewater staff Kay Rottell collects water data from the creek below the LOSS. The creek flows into Annas Bay.*

*Contact:  
Denise Lahmann  
360-236-3348*

## EPA Pathogens Grant Now in Fourth Year

Our office is managing a six-year Puget Sound pathogen reduction grant from the Environmental Protection Agency (EPA) in coordination with the Department of Ecology. The grant, funded through EPA's National Estuary Program, focuses on preventing and reducing pathogen pollution in Puget Sound from human and animal wastes.

We are now in our 4th year of the grant. Most of this year's \$3.3 million allotment is being used to fund two major activities: helping local health jurisdictions develop and carry out on-site sewage systems management programs including finding sustainable funding sources for repair and replacement, and increasing local water quality monitoring efforts to help identify and correct bacteria pollution sources affecting shellfish, recreational beaches, and water quality in Puget Sound. We have begun identifying resources and best management practices from these programs to share with local communities over the next several months.

*continued next page*

*EPA grant, cont'd*

Another project funded by the grant addresses managing boat sewage in Puget Sound. We are drafting a petition for a federal designation of a No Discharge Zone in Puget Sound to prohibit discharge of sewage from vessels, and we are working with Washington State Parks to install pump-out facilities at marinas and parks for boaters to use.

Contact:

Mary Knackstedt  
360-236-3319

We're also investing in research that will help prevent illness caused by pathogens and biotoxins in Puget Sound. This year summer interns collected temperature data and shellfish tissue samples to help us understand the correlation between temperature and *Vibrio parahaemolyticus*, a pathogenic bacteria in shellfish that typically appears in the summer. We will use this information to develop a more proactive *Vibrio* Control Plan. This fall we are studying biotoxins from freshwater algae blooms that flow from lakes into estuaries, and what effect they have on shellfish.

See related articles: [Sustainable Funding for On-site Sewage Systems](#) (below); [Vibrio Prevention Efforts Expand](#); [Whatcom Clean Water Program](#); [Summer Interns Help with Vibrio Monitoring](#).

## Sustainable Funding for On-site Sewage Systems

The Washington State Department of Health is leading a project to research and recommend two new funding programs in the Puget Sound region for on-site sewage systems (septic systems):

- a unified, self-sustaining, low-interest loan program to help property owners repair or replace systems; and
- a dedicated funding source to help local health jurisdictions (LHJs) implement management programs that work with property owners to ensure proper use and care of their systems.

Contact:

Stuart Glasoe  
360-236-3377

There are more than a half million septic systems around Puget Sound. Property owners bear the cost of the systems and their upkeep. Routine maintenance can cost hundreds of dollars, component repairs can cost thousands, and major repairs or full system replacements can cost tens of thousands.

Septic systems are regulated and permitted by LHJs. State law requires the Puget Sound LHJs to carry out management programs to help ensure good use and care of the systems and to protect water quality and public health.

The local septic management programs are complicated and costly to implement. To effectively carry out the programs on a sustained basis, the Puget Sound LHJs need stable, dedicated funding to complement local sources. At the same time, property owners need ready access to affordable financing to help repair and replace problem systems.

Several counties currently administer loan programs to help homeowners. However, as with other local management activities, these loan programs are all different, have limited capital and geographic coverage, and are expensive to run.

The project provides an opportunity to explore different models to address the septic funding needs of Puget Sound LHJs and property owners. The project involves partner agencies and an advisory committee comprised of community and government leaders for high-level policy direction. The project design includes tasks to:

- assess the financial needs of the respective programs;
- research optional funding mechanisms/sources;
- explore optional program structures and select a preferred approach for each program; and
- develop recommendations to successfully establish the funding programs.

The project brings together two priority actions of the 2012/2013 Puget Sound Action Agenda. If established, both funding programs would cover the 12 Puget Sound counties and could potentially share a common funding source.

The project started June 2013 and is scheduled for completion September 2014. It is supported by \$200,000 from the EPA pathogens grant.

## Vibrio Prevention Efforts Expand

### Industry helps explore proactive possibilities

Every summer when temperatures begin to rise we receive reports of *Vibrio parahaemolyticus* (*Vp*) illnesses caused by eating shellfish. A Vibrio Control Plan was placed into Chapter 246-282 WAC a number of years ago to help prevent *Vp* illnesses. The plan specifies temperature control measures during summer months to minimize excessive vibrio growth, and tightens controls when shellfish-related vibrio illness is reported. This somewhat reactive approach has had some success, but illnesses continue to occur.

We are working with stakeholders to develop recommendations for revising the Vibrio Control Plan in order to reduce illnesses. A *Vp* Advisory Committee (VpAC) was formed in January and has been meeting regularly to discuss how the Control Plan could be made more proactive—a plan that prevents rather than responds to vibrio-associated illnesses. The VpAC formed two subcommittees to dive into possible aspects of a new plan, such as collecting vibrio specific data. The committees have engaged their fellow industry members to voluntarily report oyster landings data, and have worked with our staff to align vibrio sampling sites with commercial production.

We expanded our monitoring efforts this season to include weekly sampling at 18 sites in Puget Sound and bi-weekly sampling in July and August at three coastal sites. We deployed continuous-temperature data loggers at 20 sites. The temperature data will allow us to explore the relationship between vibrio-associated illnesses and ambient temperatures.

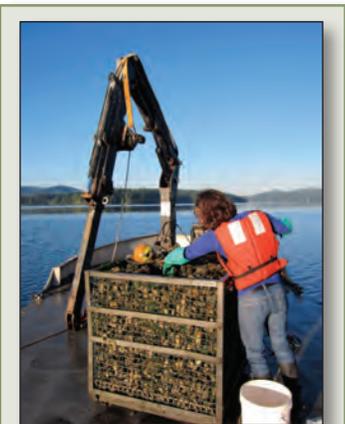
Monitoring at the inland sites has revealed a pattern in vibrio levels: lower levels are detected during weeks when low tides occur in early morning hours, and higher levels are detected during weeks when low tides occur at mid-day. We will continue working with this data to hopefully tease out relationships between tidal fluctuations, ambient temperatures, vibrio levels in oyster tissue, and occurrence of illness.

We are also comparing vibrio levels in shucked meats to shellstock, and vibrio levels in Pacific oysters to Kumamoto oysters. We have partnered with the Food and Drug Administration (FDA) Gulf Coast Seafood Laboratory, the National Oceanographic and Atmospheric Administration (NOAA), and the Pacific Shellfish Institute (PSI) to conduct research on how harvest practices affect vibrio levels in shellfish.

The Public Health Lab (PHL) in Shoreline continues to expand their detection capabilities as well. On August 14 the PHL notified us that they had isolated *Vibrio vulnificus* (*Vv*) in oysters collected as part of our routine *Vp* monitoring efforts. *Vv* has been isolated in Washington by the FDA in the past in a sediment sample from Willapa Bay in 1984 and in oyster samples collected at the retail level in 2007, but this is the first time our PHL has confirmed the presence of *Vv* through culture methods. We contacted Communicable Disease Epidemiology (CD Epi) and they are not aware of any past or current *Vibrio vulnificus*-associated illnesses among people who had eaten shellfish from our state or had come in contact with Washington's marine waters. Because this bacteria is known to cause serious illness, it's unlikely that cases have gone undetected. Like *Vp*, this bacteria can be killed by cooking and its growth can be limited by temperature control.

We are sharing *Vv* isolates with CDC and FDA labs in order to better characterize the bacteria and hopefully understand more about the potential pathogenicity of our strain(s). We have learned from the FDA lab that three of the 2013 isolates they have tested so far are of the less virulent genotypes and *Vv* is present in low levels. We'll continue to work with the PHL, CD Epi and our partners on this and provide information as we learn more.

As the vibrio season winds down we will continue to study the data collected this summer and interpret results from the various studies. The industry will share their perspective of this summer through members of the VpAC, which will continue to meet through the winter months.



*Gathering vibrio data: Vibrio staff [Laura Wigand](#) digs deep for an oyster (above) and records its internal temperature (below).*



## Whatcom Clean Water Program

The Whatcom Clean Water Program (WCWP) was created in spring 2013 to address concerns about high levels of fecal coliform bacteria in watersheds that drain to Drayton Harbor (Drayton Harbor Watershed) and to Portage Bay (Lower Nooksack Watershed). Funded with monies from the EPA pathogens grant, WCWP is tasked with identifying and correcting non-point fecal pollution sources in these areas. Pollution sources include livestock waste from farms (dairy and non-dairy, commercial and non-commercial) and failing on-site sewage systems. WCWP created separate pollution identification and correction (PIC) strategies for each watershed.

### Drayton Harbor - Community solutions

Drayton Harbor's Conditionally Approved shellfish area is closed from November through February each year because of high bacteria levels in marine water samples. Several hundred acres of important tribal, commercial, and recreational shellfish beds remain Prohibited year-round.

Whatcom County Public Works (Public Works) is collecting water samples and piloting a "community solutions" PIC program. The program is focused in a rural residential and small farm area of the watershed that has chronically high bacterial counts. Public Works is engaging citizens and encouraging landowners to implement voluntary actions to resolve bacteria pollution.

### Portage Bay - Data driven site inspections

From 2006 through 2010, bacteria levels at most of Portage Bay's marine monitoring stations met water quality standards. However, five monitoring sites most affected by freshwater flows are now in a Threatened status, and nearby shellfish areas may have to be closed.

The lower Nooksack watershed is large, with ten sub-watersheds contributing to flows. The WCWP chose to focus first on the Bertrand Creek sub-watershed, and then to move on to other sub-basins as water quality improvement is achieved. Land use in the Bertrand watershed includes rural residential and agricultural production, with about half the land mass in dairy fields. Berry fields and other commercial and non-commercial livestock properties are abundant. Washington Department of Ecology inspectors are collecting water samples and using data to target properties for site visits and pollution correction.

Washington Department of Agriculture maintains regulatory authority for water quality related to dairies.



*Ecology staff collect samples in Bertrand Creek watershed.*



### Progress

On September 10, the WCWP hosted its second community meeting to report on six months of progress, share data, and answer questions. The meeting offered a chance for pointed discussion among agency staff and attendees affiliated with Washington Dairy Federation, Portage Bay Shellfish Protection District Advisory Committee, Farm Friends, Resources for Sustainable Communities, Puget Sound Restoration Fund and a state Representative for the 42nd District.

### Partners

A group of thirteen agencies, tribes, and departments continue to work together to offer technical and financial assistance to help Whatcom County communities achieve clean, safe water. Links to maps, program contacts, landowner grant information, progress reports and other information is available online at [www.ecy.wa.gov/water/WhatcomCleanWater.html](http://www.ecy.wa.gov/water/WhatcomCleanWater.html).

*Contact:  
Andrea Hood  
360-715-5234*

## Summer Interns Help with Vibrio Monitoring

This year two interns provided much needed assistance with our vibrio monitoring. Dalila Zelkanovic and Amy Holler were our "boots-on-the-ground", gathering data on air and water temperatures, oyster tissue temperatures, water salinity, and weather conditions. They also collected oyster samples and delivered them to the lab, working long and unusual hours to accomplish these tasks.



*Dalila*

Dalila and Amy have wrapped up their internships with our office and have entered their final year at UW School of Public Health, Department of Environmental and Occupational Health. They also have leadership roles in the student chapter of the Washington State Environmental Health Association, so we may see them involved in next spring's conference.

We want to thank Amy and Dalila for their invaluable help with this year's vibrio monitoring. Their efforts in gathering much needed data regarding vibrio bacteria is appreciated by our staff and Washington's shellfish industry. We wish them both the best in their future endeavors!



*Amy*

## Staff Updates

### Andrea Hood



Andrea is working in a two-year, EPA-funded project position coordinating pollution identification and correction efforts for the Whatcom Clean Water Program. To be close to the action she works out of the Department of Ecology's Bellingham Field Office. Andrea has a bachelor's degree in Landscape Architecture from University of Georgia and a master's degree in Environmental Management from Yale. She grew up in suburban Atlanta, but has lived and worked in northwest Washington since 1996. Past work has included outreach and education associated with environmental programs for Northwest Straits Commission, City of Bellingham, and for conservation districts in both Skagit and Whatcom counties.

Andrea loves living in Bellingham and enjoying time with her environmental engineer husband and teen-age son and daughter. Family activities include sailing, hiking, and cross-country skiing. In addition to supporting kid activities, Andrea likes to read, run, and walk her dog through the many nearby trails.

### Clara Hard

#### Look familiar?

She should! Clara was a previous Marc Hershman Marine Policy Fellow working in our Biotoxin Program. We were fortunate to bring her back as a full-time employee working for our Licensing and Certification Section. She is happy to be back (she says!) splitting her time between inspecting shellfish companies and working in the Marine Biotoxin Program.

Clara is a Seattle native who received a BA in Biology from Williams College before sailing and teaching on environmental and science education-focused tall ships for several years. She returned to Seattle to earn a Masters of Marine Affairs from UW, and then joined us as Marine Policy Fellow. When the fellowship ended, she spent time on a local tall ship and took a trip to Morocco. Now that she's home, Clara enjoys adventuring in the mountains and baking in the kitchen.



## Staff Updates *cont'd*

### Darin Klein

#### *Another familiar face!*



Darin is our new Licensing and Inspection Program Supervisor, assisting Manager Rick Porso by overseeing day-to-day inspection and commercial licensing activities. Darin has over eight years' public health experience. He earned his Bachelor's Degree in American/Environmental Studies at The Evergreen State College and a Master's Degree in Safety and Health/Environmental Management from Columbia Southern University.

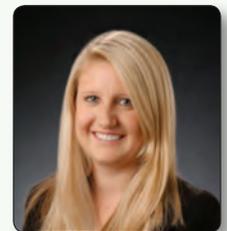
Darin comes from the Department of Health's Drinking Water Program where he was an Environmental Planner as well as an Acting Supervisor and Regional Manager. He started his public health career as a Research Analyst in our Shellfish Program working on harvest site database improvements and harvest site certifications. He was a State Standardized Shellfish Inspector before accepting a promotional position with the Drinking Water Program.

Darin has lived all his life in Washington. He spent his early years working summers unloading salmon and bottom fish from commercial fishing boats at his uncle's fish processing plant in Bellingham. He also spent a month in the jungles of Borneo tracking, observing, and writing about adult orangutans in the wild. He also manned infant and juvenile feeding stations for orphaned orangutans.

Darin loves the outdoors and has completed multiple Ironman and half Ironman triathalons. When he's not at work you can find him riding his mountain bike, trail running with his wife and dog, paddle boarding, and fishing.

### Emma Carroll

Emma Carroll is our newest CDC fellow. After graduating from UC Berkeley in 2012 with a degree in Social Welfare, she decided to veer towards public health and was accepted into the CDC's Public Health Associate Program. They unexpectedly matched her with the Washington State Department of Health, and a few short weeks later she was packed and driving north to Olympia.



Emma's CDC fellowship is a two-year program, and her assignment was split between two divisions in our agency. She spent her first year with the Division of Disease Control and Health Statistics, Office of Infectious Disease, and now joins our office to work on the effects of climate change on human health in the Pacific Northwest. She is also a part of the Healthy Communities team. Although Emma's public health experience is primarily in HIV/STDs, she is already beginning to feel protective over shellfish in the Puget Sound.

When out of the office, Emma spends her time hiking in the beautiful Washington parks, jogging, convincing herself not to eat another burrito at her favorite Mexican restaurant, and visiting friends in Tacoma and Seattle. She suffers from a severe case of the travel bug and is usually daydreaming about planning her next trip.

## OSWP Email Distribution Lists

Get the latest updates via email by joining our email distribution lists. You must join each list individually, and you can unsubscribe at any time.

[Shellfish](#) – Notifications that impact commercial shellfish operations such as closures, rulemaking activity, vibrio illnesses, newsletters, etc.

[Wastewater](#) – General information such as updates on RS&Gs, proprietary product lists, TAG agendas, newsletters, and other general topics.

[Wastewater-LOSS](#) – Large On-site Sewage Systems issues and updates.

**Staff Contacts**

**Wastewater Management Section  
(Water Protection)**

**Wastewater Manager**

Stuart Glasoe 360-236-3246

**Program Supervisor**

- Large On-site Systems, Reclaimed Water  
Denise Lahmann 360-236-3348

**Program Leads**

- LOSS Program  
Richard Benson 509-329-2147
- Reclaimed Water  
Mamdouh El-Aarag 509-329-2148
- On-site Sewage (OSS) Program  
John Eliasson 360-236-3041
- Sewage Tanks  
Jeanne Andreasson 360-236-3360
- Local O&M Support  
Lynn Schneider 360-236-3379

**Website:**

[www.doh.wa.gov/CommunityandEnvironment/WastewaterManagement.aspx](http://www.doh.wa.gov/CommunityandEnvironment/WastewaterManagement.aspx)

**Main Phone Numbers:**

Olympia: 360-236-3330  
Spokane: 509-329-2143



**Shellfish Programs**

**Licensing & Inspections Manager**

Rick Porso 360-236-3302

**Program Supervisor**

- Inspections  
Darin Klein 360-236-3341

**Program Leads**

- Biotoxins  
Jerry Borchert 360-236-3328
- Tribal Liaison  
Cathy Barker 360-236-3303
- Vibrio  
Cari Franz-West 360-236-3326

**Growing Areas Manager**

Bob Woolrich 360-236-3329

**Program Supervisor**

- Shoreline Evaluations, Non-point Pollution, Restoration  
Scott Berbells 360-236-3324

**Program Leads**

- Recreational Shellfish  
Liz Maier 360-236-3308
- Restoration, Marine Water Quality  
Jule Schultz 360-236-3349

**Website**

[www.doh.wa.gov/CommunityandEnvironment/Shellfish.aspx](http://www.doh.wa.gov/CommunityandEnvironment/Shellfish.aspx)

**Main Phone Number:**

Olympia: 360-236-3330

Jerrod Davis, Office Director  
360-236-3391

All DOH staff email addresses follow this format:  
firstname.lastname@doh.wa.gov