Appendix B

Public Education and Outreach on Stormwater Impacts

Stormwater Utility Program

Operations & Maintenance

Stormwater Quality Management

Engineering & Project Management

Capital Improvement Projects

Utility Administration & Public Response

Stormwater Utility

The Utility strives to meet the operational and regulatory requirements of both its piped and dispersed stormwater systems to prevent flooding and protect water quality.

The City is responsible for 47 miles of pipe, 5,500 underground injection controls, such as drywells and drill holes, 28 river outfalls, and over 10,000 other features.

Current Efforts:

- The City implements its Integrated Stormwater Management Plan for water quality.
- The City's first Stormwater Master Plan is in the process of being finalized.
- The City is currently upgrading the higher-risk area drill holes with plugs in case of spills.
- The City is implementing refined development rules to ensure stormwater facilities are adequately planned, sized, treated, operated, and maintained throughout the project life.
- The City is engaging in a pipeline replacement and capital improvement projects.

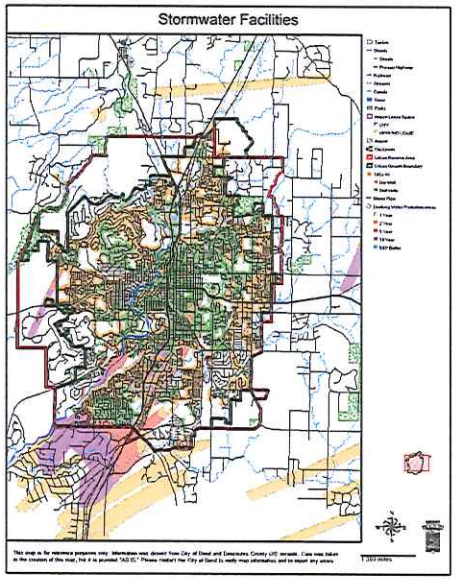
Did you know your Stormwater Utility dollars must only be spent addressing stormwater issues?

City of Bend
Engineering and Infrastructure Planning
Program Manager: Wendy Edde

Accomodation Information for People with Disabilities
To obtain this information in an alternate format such as Braille, large print, electronic formats and audio cassette tape please contact Karen Morris at (541) 693-2141, Fax: (541) 385-6676, and/or email: Accessibility@ci.bend.or.us

Managing Stormwater with a Sensible, Science-based Approach.

"Only rain in the storm drain"



Illicit Discharge

Drywell Under Construction

Monitoring

Drill Hole

Pipe to river - Outfall

Stormwater Swale

Public Involvement

The stormwater utility provides for public involvement in several ways:

- Stormwater Quality Public Advisory Group
- Public Meetings
- Infrastructure Advisory Committee
- Council Meetings
- Coordination with Volunteer Coordinator
- Storm Drain Markers
- Presentations, Trainings, and Mailers
- Stormwater Webpages
- Utility Service Charge Appeal and Credit Programs
- Public Opinion Surveys

Program Schedule

The work of the utility—operation and maintenance, water quality regulatory compliance, new and redevelopment improvements—is ongoing.

Current Projects

- Stormwater Master Plan 2014
- Third Street Underpass Capital Improvement Project 2013-14
- Drake/Dohema Flood Control Project 2013-14
- Pipe Replacement Program began Fall of 2013
- UIC Spill Control Upgrade Program began Summer 2013

For project updates visit: bendoregon.gov/stormwater

CITY OF BEND
What Are Your Stormwater Fees Paying For?

Winter 2013

LATEST NEWS

On January 4, 2012, the City Council adopted City Code Title 16 to replace the Grading and Clearing ordinance. This new stormwater management ordinance adopts the Central Oregon Stormwater Manual and improves the City's regulatory enforcement of erosion and sediment controls, design standards, maintenance requirements, and illicit discharges.

Did You Know?

-As an enterprise fund, your stormwater service charge may ONLY be used to pay for stormwater services.

-Bend's storm drains either flow underground towards groundwater or directly to the river. Help keep our waters clean—remember: "Only rain in the storm drain." See www.bendoregon.org/stormwater

Formed in April 2007, the City of Bend Stormwater Utility is responsible for maintaining, repairing, and expanding the City's stormwater system while complying with federal and state water quality regulations. Through the stormwater service charge of $4 per Equivalent Residential Unit per month, the City raises approximately $2.4 million per year. The Fiscal Year 2013-14 budget, including carryover from past years, is broken down and generally includes the following activities:

Operation and Maintenance Activities

($1,236,450/year; 22% budget)

- Perform preventative maintenance at needed frequencies
- Inspect/clean approximately 5,000 catch basins per year
- Inspect and clean as necessary 5,500 dry wells per year
- Restore 6-8 drill holes per year
- Monitor, clean and repair 47 miles of stormwater pipe as needed (14 miles of which drain to the Deschutes River)
- Perform minor repairs and drainage swale maintenance
- Conduct stormwater system inventory and asset management tracking
- Respond to road flooding and high water complaints
- Provide water quality treatment maintenance
- Support street sweeping (goal: sweep every public street at least once per year; on average 1-9 times per year depending on level of use)

Engineering and Project Management

($580,700; 11% of budget - This includes project carryover from multiple years, annual budget is approximately $200,000/year)

- Provide technical support for all stormwater program areas
- Conduct plan and design reviews
- Perform construction inspections and enforcement
- Conduct structural and non-structural project/program planning
- Ensure consistent design criteria and standards
- Provide capital improvement project management
- Update City standard and specifications to better incorporate stormwater.

Capital Improvement Projects

($2,747,000; 50% of budget – This includes carryover from multiple years; annual budget is approximately $300,000/year)

- Provide neighborhood improvements and repairs
- Finalizing Stormwater Master Plan
- Completed CIP Project Prioritization model
  The City is aware of over 100 drainage problem areas throughout the City.
- Implementing Priority CIP projects

Water Quality Management

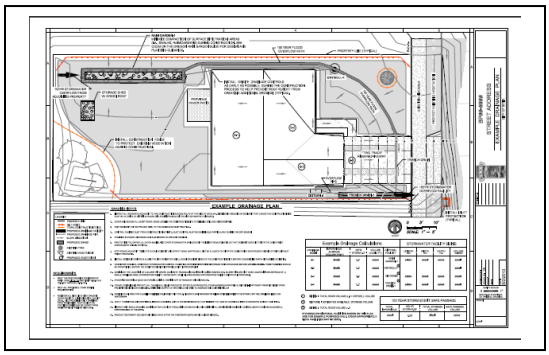
($377,900/year; 7% of budget)

- Completed all regulatory compliance activities within the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer (MS4) Phase II stormwater permit via implementation of the Integrated Stormwater Management Plan
  - Complete NPDES Annual Report (due each Nov. 1)
  - Implement public education/participation programs
  - Implement illicit discharge program
  - Implement construction site pollution prevention and post-construction control programs
  - Report on stormwater monitoring conducted
  - Track municipal maintenance
- Completed Underground Injection Control (UIC) Systemwide Assessment
- Secured issuance of and meeting requirements for the City's first UIC Water Pollution Control Facilities (WPCF) permit to help protect all groundwater drinking water sources (including private and franchise, not just City of Bend drinking water) that could be impacted from pollutants entering City stormwater drywells, drill holes or other injection facilities.
- Conducted Groundwater Protectiveness and stormwater monitoring studies.

Utility Administration & Public Response

($575,900/year; 10% of budget)

- Provide Utility Support—financial, personnel, management
- Implement credit and appeals programs
- Provide complaint response and tracking
- Engage in interdepartmental coordination
- Provide continual updates to the GIS geodatabase of stormwater utility facilities
- Provide contract and program administration



CITY OF BEND PUBLIC WORKS DEPARTMENT

62975 NE Boyd Acres Rd.
BEND, OREGON, 97701
541-317-3000
FAX: 541-317-3046
Wendy Edde, *Stormwater Program Manager*

How Are We Doing?

To provide some highlights, in the utility we has: (a) created a GPS database of each facility in the stormwater utility system; (b) thoroughly cleaned our system multiple times; (c) conducted a first-ever television inspection of our piped system to the river; (d) increased our understanding of stormwater quality, fate, and transport through the soil towards our groundwater supplies; (e) met stormwater quality permit requirements (see our annual reports at: www.bendoregon.gov/stormannualreport (f) improved design, construction, maintenance, and illicit discharge standards; (g) conducted several maintenance fixes, prioritized capital improvement projects and installed stormwater facilities at the 3rd Street underpass and Drake and Dohema ; and (h) obtained state grant money to help pay for projects.

Accommodation Information for People with Disabilities

To obtain this information in an alternate format such as Braille, large print, electronic formats and audio cassette tape please contact the City of Bend Accessibility Manager at 541-693-2141, fax 541-385-6676 or Accessibility@ci.bend.or.us.

CITY OF BEND

ANNOUNCES STORMWATER MANAGEMENT TRAINING WEBINARS

Planners, Engineers, Project Manager, Project Proponents, Reviewers, and Agency Staff Are Invited

The City of Bend Stormwater Utility is sponsoring these upcoming Center for Watershed Protection webinar training opportunities. Attendance is free. Please see registration information on back. PDHs and CEUs are available upon request.

Winter 2014

Why?

Protection of our water resources is important for our river, and associated economy; and for protection of our drinking water aquifers. Private and public Underground Injection Controls (UICs) such as drywells and drill holes are prevalent here, and these must meet Oregon Department of Environmental Quality and federal requirements to protect groundwater quality. The workshops will provide tools to help effectively address stormwater quality requirements, including Bend Code Title 16.

Location

Unless Otherwise Noted:

City of Bend Utilities
Eisenhower Training Rm
62975 Boyd Acres Rd
Bend OR, 97701

Reimagining the Parking Lot & Roadway as a Stormwater Practice

Wednesday, February 12, 2014 10:00 AM to 12:00 PM

Special Location: North Fire Station Training Room (63377 Jamison St)

From Center For Watershed Protection`s website announcement:

Historically, parking lots, roadways, and similar infrastructure have been single-purpose facilities – designed to move and store vehicles. However, especially in urban areas, these land covers consume a large percentage of the land area. The economics of urban land use is "driving" a different way of thinking about how these surfaces can serve multiple purposes, including stormwater management. This webcast will cover several ways of reimagining the parking lot and roadway as a place where stormwater can be reduced, stored, harvested, and treated.

Instructors:

Tom Price, P.E., Director of Water Resources Engineering, Conservation Design Forum
Rob Roseen, PhD, PE, Water Resources Engineer, Geosyntec Consultants
Tim VanSeters, Manager, Sustainable Technologies at Toronto

The Role of Local Codes

Wednesday, March 12, 2014 10:00 AM to 12:00 PM

From Center for Watershed Protection Announcement:

Local zoning, subdivision, drainage, and stormwater ordinances have a powerful influence on how stormwater design is conducted in a community. Often, the local codes act as barriers to implementation of certain innovative practices, which may include better site design and low-impact development. This webcast will feature strategies to analyze local codes and a process of changing codes in a community to achieve desired outcomes for stormwater design, and, ultimately, water quality in the community.

Instructors:

Julie Todd, Environmental Compliance Manager, City of Atlanta
Abby Hall, Community Planner, US EPA, Office of Sustainable Communities
Julie Schneider, Watershed Planner, Center for Watershed Protection, Inc.

Design & Construction of BMPs

Wednesday, April 9, 2014 10:00 AM to 12:00 PM

From Center for Watershed Protection Announcement:

This webcast will explore available resources for design, the hallmarks of a good stormwater design, and the process to make sure BMP installation is done correctly. The emphasis of this design and construction webcast will be on low-impact development and green infrastructure practices.

Instructors:

Jason R. Vogel, Ph.D., P.E., Assistant Professor, Oklahoma State University
Bryan Seipp, Watershed Manager/Professional, Center for Watershed Protection, Inc.

BMP Maintenance
Wednesday, May 21, 2014 10:00 AM to 12:00 PM

From Center for Watershed Protection Announcement:
Even if a stormwater practice is properly designed and installed, the long-term maintenance can make or break the performance and community acceptance. Learn from the trenches ways to rapidly conduct maintenance inspections and needed maintenance tasks. Doing this will prevent future costly repairs. The webcast will also address how local governments can build a successful stormwater maintenance program.

Instructors:
Tom Schueler, Executive Director, Chesapeake Stormwater Network
Ted Scott, PE (MD), CPESC, MSP, LEED AP, Executive VP, Stormwater Maintenance & Consulting
James Houle, Outreach Coordinator and Program Manager, University of New Hampshire

How to Pick the Right Vegetation for Bioretention
Wednesday, June 11, 2014 10:00 AM to 12:00 PM

From Center for Watershed Protection Announcement:
Bioretention and its various cousins (rain gardens, bioswales, street bioretention, stormwater planters) are becoming popular and widespread practices around the country and the world. Putting the "bio" into bioretention designs is of course important, but sometimes not the major focus of the design process. However, in the long-run, it is vegetation that everyone sees and that constitutes perhaps the major maintenance task. The webcast will provide guidance on how to design with long-term maintenance in mind, and how choices of vegetation can influence aesthetics, performance, community understanding and acceptance, the provision of multiple benefits, and (importantly), maintenance budgets. We will also address the hot issue of whether to include trees in bioretention planting plans.

Instructors:
Nate Cormier, ASLA, PLA, LEED AP, Principal Landscape Architect, SvR Design Company
Dave Hirschman, Program Director, Center for Watershed Protection, Inc.
Bryan Seipp, Watershed Manager/Professional Forester, Center for Watershed Protection, Inc.

TO REGISTER

For the webinars, please register by emailing or calling David Buchanan, City of Bend, dbuchanan@bendoregon.gov or (541) 693-2176 with your name, agency/company, and contact information. Registered attendees earn 0.2 CEUs or 2 PDHs

Register today—seating is limited!

CITY OF BEND PUBLIC WORKS DEPARTMENT

62975 BOYD ACRES RD.
BEND, OREGON, 97701
541-317-3000
FAX: 541-317-3046
Wendy Edde, *Stormwater Program Manager*

Accessible Meeting Information
This meeting event/location is accessible. Sign language, interpreter service, assistive listening devices, materials in alternate format, such as Braille, large print, electronic formats and audio cassette tape, or any other accommodations are available upon advance request. Please contact the City of Bend Accessibility Manager Karin Morris no later than three days prior to the webinar at 541-693-2141, Accessibility@ci.bend.or.us, and/or fax 541-385-6676. Providing at least 3 days notice prior to the event will help ensure availability.

It's All Connected

Protecting Our Drinking Water Quality Through Stormwater Pollution Prevention Measures

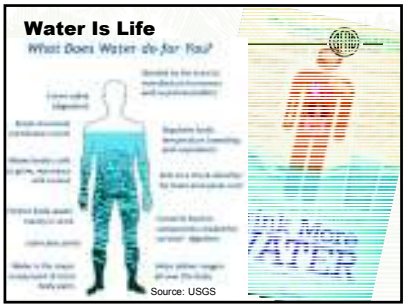
Wendy Edde
Stormwater Program Manager
Public Works Department

March 7, 2014

Water is Life

Water Is Life

What Does Water do for You?

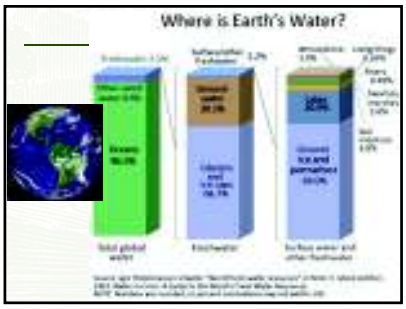


Source: USGS

Ours is just a little orb, but special

City of Bend

Where is Earth's Water?



Human Influences to Water Cycle

City of Bend

Water is Life

City of Bend *Infographic Source: WaterStep*

In short, without clean water….

- "We're Toast"
- *The work that drinking water, wastewater, and stormwater professionals do is critical to public safety and well-being.*

Water is Life

Cayahoga River (1930s-1969)

1952 Fire

Source: Cleveland Press, Cleveland State University

Source: Plain Dealer

City of Bend

Regulatory Perspective

- 1972: Clean Water Act (CWA)
- 1974: Safe Drinking Water Act
- 1987: CWA Amended: Stormwater
- 1992: CWA: Total Maximum Daily Loads

Slide courtesy of Russ Kazmierczak, R.G., OHA

12

Where Does Stormwater Go?

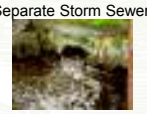
- Surface Water via Outfalls
- Infiltration through upper reaches of soil
- Underground via Underground Injection Devices (UICs)
  - Drill holes, dry wells
  - Deeper than width

Stormwater Pollutants

Start at the Source, 1999.

Stormwater and Surface Water

- National Pollutant Discharge Elimination System Permits
  - Municipal Separate Storm Sewer Systems



- The impact of Impervious Surfaces

City of Bend

Impervious Surfaces …fast track pollutants

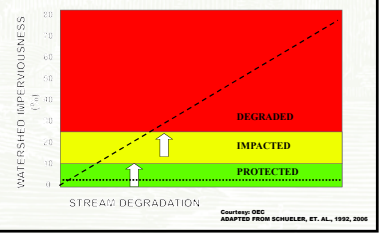
Watershed Before Development

Courtesy May, U of W

Watershed After Development

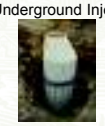
Courtesy May, U of W

Waterway Health & Imperviousness



Stormwater and Groundwater

- Water Pollution Control Facility Permit
  - Underground Injection Controls



- Deeper than wide (dry wells, drill holes)

City of Bend

5 (Mostly) Simple Things to Do to Help Protect Drinking Water Quality from Stormwater Pollutants

- Understand Your Storm Drainage System
- Conduct Public Outreach and Participation
- Focus on Illicit Discharge Elimination and Spill Prevention
- Be a Good Example to the community—municipal operations
- Incorporate Permanent Controls for new and redevelopment

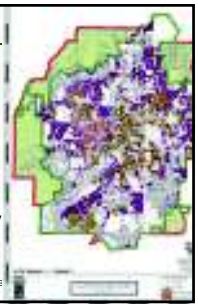
City of Bend

Simple Things to Do to Help Protect Drinking Water Quality from Stormwater Pollutants--#1

- Understand Your Storm Drainage System

Understand Your Storm Drainage

- Location and Types
  - Map it
- What is in the Water
  - Kennedy-Jenks Reports
- Groundwater Protectiveness Study



City of B

Drinking Water Wellhead Protection Areas

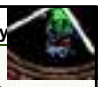
2003 Delineation

2010 Delineation

Costly Consequences

26

Kennedy-Jenks Stormwater Quality



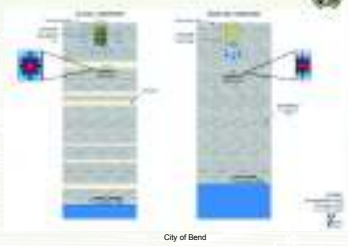
- Statewide:
  - 25,247 samples, 15 public agencies, 1990-2008
  - 10 of 45 analytes above UIC screening levels, only 3 > 1% samples
    - Lead (12.7%);
    - Pentachlorophenol (PCP)(11.7%);
    - Di(2-ethylhexyl)phthalate (DEHP) (4.7%)
  - Higher concentrations > 1000 trips per day

Stormwater Quality

- Central OR
  - 754 samples, 2 cities, '06-'10
  - 4 of 38 analytes above UIC screening levels
    - Lead (7 %);
    - Cadmium,
    - Chromium,
    - Nitrate-nitrogen (NO3-N) (~1% each)
  - No significant difference > 1000 trips per day

City of Bend

Groundwater Protectiveness



City of Bend

Benefits of Knowing the System

- Sensible Regulatory Requirements
- Improved tools, methods to clean our piped system effectively
  - Keeping pollutants/sediments out of river
- Targeted, prioritized repairs of our system
- Opportunity costs

City of Bend

Groundwater Protectiveness

- Demonstrated protectiveness for stormwater discharged from UICs in Wellhead Protections Areas
- *"The Fate and Transport Tool simulation results indicated that concentrations of lead, benzo(a)pyrene, PCP, and DEHP could be 1000, 1000, 527 and 1000 times higher than the EDL respectively, while still being protective of groundwater."*
- EDL= Effluent Discharge Limit

Simple Things to Do to Help Protect Drinking Water Quality from Stormwater Pollutants #2

- Conduct Public Outreach and Participation

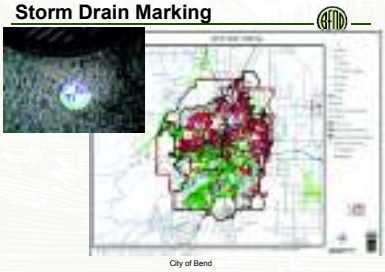
City of Bend

Conduct Public Outreach and Participation

- Storm Drain Marking
- Educational Pieces – Newsletter, Local Cable Access, Local Events, Facebook
- More staff time…
  - Public Advisory Committee
  - Volunteer Projects
  - Educational Outreach to School-Aged Children

City of Bend

Storm Drain Marking



City of Bend

Watershed Diorama

Develop Partnerships

City of Bend

It's All Connected

City of Bend

Movie Slides

City of Bend

Recreational or Buyer's Guide

Auto Advertising--Magnets

City of Bend

City Newsletters or Cable TV

City of Bend

Munch 'n' Movies

City of Bend

Focus on pollutants of concern

- Care in removing lead-based paint
  - EPA 1-800-LEAD-FYI
- Source Controls
  - Encourage household hazardous waste collection efforts
  - Encourage switch from lead wheel weights
  - Encourage proper battery recycling
- Street Sweeping

City of Bend

Simple Things to Do to Help Protect Drinking Water Quality from Stormwater Pollutants #3

- Focus on Illicit Discharge Elimination and Spill Prevention

City of Bend

Prevent/Minimize Illicit Discharges and Spills

- Construction Site Activities
- Landscape Activities
- Outreach to Higher Threat Activities
  - *Consider Activities in your Watershed, especially within Wellhead protection areas*
  - Industrial
  - Autobody
  - Carpet Cleaning
  - Pesticides/Herbicides/Fertilizers

City of Bend

Costly Consequences: onsite practices

48

Be Extra Eyes in the Field…

49

Illicit Discharge example

City of Bend

Dry Weather Flows

51

Costly Consequences

Illicit Discharge: chemicals, oils…

52

Household Fats, Oil & Grease (FOG)

Proper Disposal is Important

Fats, Oil, and Grease (FOG) should not go down a storm drain, a drain in your house, or the toilet. Whether or not FOG enters the drain as a liquid, it hardens downstream. FOG accumulates in pipes like cholesterol does in an artery. Buildup can cause overflows. Overflows into your home are costly and unpleasant to clean up.

In the kitchen, FOG may consist of used cooking oil, or in the garage, it may be motor oil. Proper disposal depends on the kind of waste. Proper containment will prevent leaks and spills which might be washed into the sanitary sewer or storm drain systems.

Examples of FOG in the household include:

- ☹ Meat Fats
- ☹ Lard / Shortening
- ☹ Butter
- ☹ Dairy Products
- ☹ Margarine
- ☹ Fatty / Greasy Food Scraps
- ☹ Sauces
- ☹ Cooking Oil
- ☹ Salad Dressing
- ☹ Motor Oil or Lubricants

Questions? Call –

City of Bend
Industrial Pretreatment -
FOG Program
541-322-6330

Best Management Practice (BMP)

This Best Management Practice (BMP) is intended to prevent oil and grease from entering the sanitary sewer or the storm drain system.

DO:

- ☺ If kitchen FOG will harden, put it in an old milk carton, coffee can, or any container that will seal and not break. Cool down your cooking oil, fats and grease, and collect them in a container. Store container in the refrigerator until trash pick-up day.
- ☺ If kitchen FOG is liquid, put it into large container with a lid and add an absorbent until the FOG is completely absorbed. Examples of absorbents include kitty litter, shredded newspaper, napkins, or paper towels.
- ☺ Wipe out any leftover FOG in pots, pans, etc. with paper towels before washing. Put the paper towels in the garbage.
- ☺ Used motor oil must be recycled. Use a funnel to pour motor oil into a sealed container such as its original container, or a plastic milk jug. Take it to a local recycling facility or household hazardous waste collection site.

DON'T:

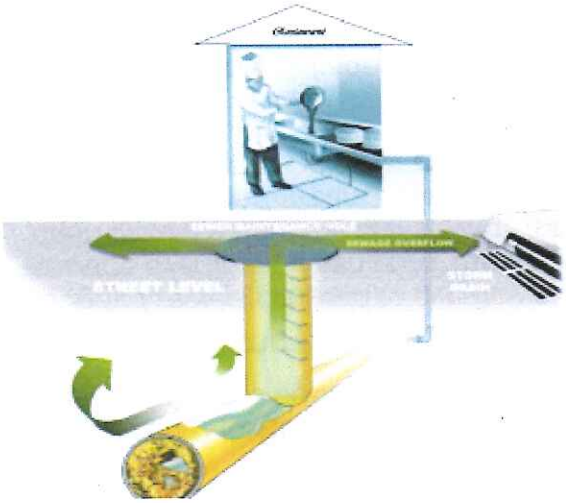
- ☹ Never pour oil and grease into the storm drain, gutters, or street. Dumping in storm drains is illegal. Do not store FOG in containers that may break in the garbage or in transit. (i.e. glass jars). Spilled oil or grease may be accidentally washed into a storm drain.
- ☹ Do not pour FOG directly into the garbage. Seal it in a container.

City of Bend -
Industrial Pretreatment
62975 Boyd Acres Road
Bend, OR 97701

Do you have FOG in your home?

WHERE DOES IT GO?

When fats, oils and grease are washed into the plumbing system, usually through kitchen sinks and floor drains found in food preparation areas, the fats stick to the insides of sewer pipes both on your property and in the streets.



WHAT DOES IT DO?

Fat, oil and grease in a drain pipe or sewer line build up and harden. Sewage backups and overflows are typically the result of this type of grease buildup. Fats, oils and grease get into the sewers mainly from commercial establishments that do not have adequate grease control measures in place.

Property damage, environmental problems and other health hazards can result from sewage backups.

There are preventive measures that can help stop t' lamage caused by fat, oil and grease.

CITY OF BEND
PUBLIC WORKS DEPARTMENT
62975 BOYD ACRES ROAD
BEND, OREGON 97701

CITY OF BEND

PUBLIC WORKS

FAT FREE

SINK TO SEWER

INDUSTRIAL PRETREATMENT PROGRAM

RESTAURANT INFO. .IATION

FATS, OILS AND GREASE

ARE THE NUMBER ONE CAUSE OF SEWER BACKUPS IN FOOD SERVICE

Costs

To Your Business:

Improper disposal of grease can cause rancid odors and potential contact with microorganisms that may cause illness.

When sewer pipes back up, accumulated sewage and food particles can attract insects and vermin.

Property damage can result from sewage backups. Cleanup and repair costs can be expensive.

Health code violations or closures can severely impact a business.

To the Environment:

Clogged sewers can lead to overflows. As sewage overflows, it can enter the storm-drain system where the raw sewage is carried to local rivers and streams, creating a health risk for swimmers and other marine life.

To the City:

Increased sewer blockages and overflows lead to excessive and costly maintenance, and can result in severe fines from regulatory agencies.

Fact sheets are available on:

- Best Management Practices
- When a Grease Interceptor is Required
- Grease Interceptor Sizing Criteria
- Disposal and Hauling Information.

Grease Traps and Grease Interceptors

Design

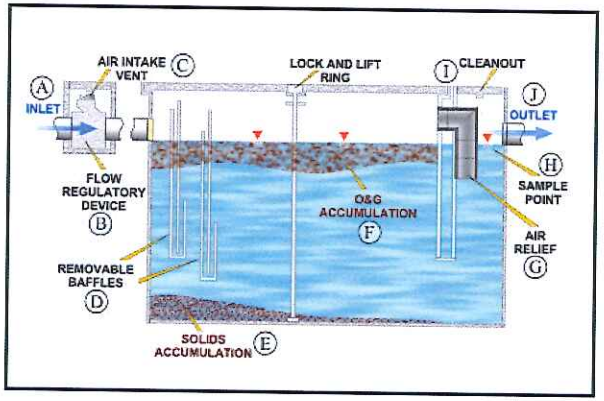
Interceptors and grease traps must be properly sized and manufactured to handle the amount of grease byproduct anticipated.

Installation

Interceptors and grease traps must be level and vented.

Maintenance

Interceptors and grease traps must be cleaned and serviced on a frequent basis, often daily, to reduce or prevent blockages.



Training

Educating employees about fat, oil and grease problems can mean long-term benefits to your business and our community.

- **Discuss**
  Discuss good pollution control practices with all employees at least quarterly.
- **Inform**
  Systematically inform new employees about Best Management Practices.
- **Post**
  Post "NO GREASE" signs above sinks and on the front of dishwashers.
  Post proper maintenance guidelines and checklist.
- **Monitor**
  Monitoring is the only way to maintain the life of any program.

FOR MORE INFORMATION CONTACT:

KELLY GRAHAM
PRETREATMENT COORDINATOR
541.322.6348

WATER RECLAIMATION FACILITY
541.322.6330

DEPARTMENT OF ENIRONMENTAL QUALITY
541.388.6146

SEPTEMBER 2013

OUR CITY

A NEWSLETTER FOR BEND CITIZENS
PUBLISHED BY THE CITY OF BEND

REED MARKET ROAD CONSTRUCTION UPDATE

The Reed Market Road G.O. Bond project is scheduled to have Stage 1 completed (SE Newberry Drive to SE Shadowood Drive) and Stage 2 construction started (SE Shadowood Drive to SE Orion Drive) early this month. SE Teakwood Drive will be open and SE Shadowood Drive will be closed during Stage 2 construction. Stage 1 and 2 are expected to be completed by mid-November 2013. The entire Reed Market Road corridor is scheduled for completion in late 2015.

In May 2011, Bend voters passed a General Obligation Bond Measure to fund street improvements throughout the city. This allowed the City of Bend to authorize $30 million to upgrade several major street corridors and intersections, including Reed Market Road. Three new roundabouts were completed in 2012 as part of the G.O. Bond projects. For more information, visit bendoregon.gov/GOBond.

KEEP TRACK OF CITY CONSTRUCTION PROJECTS

Need to know if construction projects are coming to your neighborhood and if they will affect you? Find the answers at bendoregon.gov/bendprojects. You'll find an interactive city-wide map displaying every project, including project information and links to detailed project webpages.

Focusing on protecting public health and the environment and supporting local economic development and jobs, Bend's infrastructure projects are a long-term investment in our community. Bend is improving streets and utilities in all parts of the city. Projects include improvements to Reed Market Road, the 3rd St. Underpass Stormwater Project, Bridge Creek Pipeline Replacement Project, street maintenance work and more.

We'd like your feedback: City of Bend, City Manager's Office | P.O. Box 431, Bend, OR 97709 | communications@bendoregon.gov | **www.bendoregon.gov**

UTILITY PAYMENT ADDRESS CHANGE

The City of Bend has changed its utility payment mailing address to a Seattle P.O. box. Utility payments were previously processed locally by the Bank of the Cascades. The bank no longer provides this service and outsourced it to Retail Lockbox Inc., a company located in Seattle. As a result, Retail Lockbox began processing City of Bend utility payments in March 2013.

When the U.S. Postal Service closed the Bend mail processing center earlier this year, utility payments went first to the Portland processing center, back to the City's local post office box in Bend, and were then overnighted to Retail Lockbox in Seattle. This caused delays in the processing of payments. In order to better serve our customers, the City rented a post office box in Seattle and payments now travel directly to Retail Lockbox.

Customers can also make utility payments online at **bendoregon.gov**, in person at 639 NW Franklin Avenue, by phone at 541-388-5515, or at the drop box located in the City Hall parking lot at 710 NW Wall Street. For additional information, please call Customer Service staff at 541-388-5515.

BEND FIRE DEPARTMENT

FIRE PREVENTION WEEK OPEN HOUSE

Saturday, October 12 • 11:00 a.m. - 3:30 p.m.
63377 Jamison Street • Bend

Fire station tours, demonstrations, kids' activities, free ice cream and more!

City Council

The Bend City Council meets the first and third Wednesdays of each month. For upcoming meeting dates, agendas and more information, visit **www.bendoregon.gov**.

APRIL 2014

OUR CITY

Modernize Utility Rates | ESC Program | Ballot Measure #9-98 | Neighborhood Association Meeting | City Council

A NEWSLETTER FOR BEND CITIZENS

PUBLISHED BY THE CITY OF BEND

HELP US MODERNIZE OUR UTILITY RATES

The City plans to develop new policies about utility rates to ensure consistent service, protect quality of life and natural resources, and provide financial stability to operate, maintain and upgrade utility systems.

Utility Rate Program

The City delivers clean water, conveys and treats wastewater, and manages stormwater for a population of over 75,000. Funding for utilities' operations and capital investment comes primarily from user rates, and when the work is directly attributable to new development, system development charges. Over time the City has increased its utility rates to maintain the system, meet regulatory requirements and improve and expand the system where needed.

Need for Utility Rate Modernization

While in recent years the City has made rate increases to respond to infrastructure needs, the increases have been largely project-specific. The staff, community, and council have identified the need to review the rate structures for the utilities to better address long-term financial stability, equity across ratepayers, and efficient use of resources. This process will start with defining needs, values, objectives and priorities for utility rates. Then we will explore options for rate structures that best meet these.

Public Involvement

The city is seeking agreed-upon policies and guiding principles for review and adjustment of the City's water, wastewater and stormwater rates.

In the first phase of outreach to the public, we will use BendVoice, our online forum, so you can participate in the discussion about utility rate policy. The City will regularly post information about the project and pose questions for the community to consider. Visit **BendVoice.org** now to participate.

As the project progresses there will be opportunities to provide input in a focus group format. If you wish to be part of those groups, email Gillian Ockner at gockner@bendoregon.gov.

EXTRA STRENGTH WASTEWATER CHARGE

The City, in cooperation with a group of business representatives, has created an equitable Extra Strength Charge (ESC) Program to protect our investment in the Wastewater Reclamation Facility (WRF) and recover costs of treating higher strength wastewater.

Extra Strength Wastewater has a higher pollutant level than typical residential wastewater. Technically, it is wastewater with higher concentrations of solid materials and organic water pollutants. Businesses with these discharges will be included in the ESC Program.

(continued on back)

We'd like your feedback: City of Bend, City Manager's Office | P.O. Box 431, Bend, OR 97709 | communications@bendoregon.gov | **www.bendoregon.gov**

In general, these businesses include breweries, restaurants, grocery stores, hospitals, industrial laundries and auto shops. All non-residential sewer customers are subject to evaluation to determine if they should be included in the ESC Program.

Businesses are placed in one of four strength categories: low, medium, high or super high. Categories are determined by industry standards and test results from samples. Extra strength charges will be established by the City Council.

If you disagree with the classification of your business, you can appeal. For more information on the program, visit **bendoregon.gov/ESC** or call 541-388-5505.

MAY BALLOT MEASURE #9-98

Ballot measure #9-98 , if approved, would authorize the City of Bend to levy $0.20/$1,000 of assessed property value for 5 years, beginning July 1, 2014. If approved, the levy would raise a projected $1,800,000 in the first year and $10,000,000 over 5 years for fire and emergency medical services.

The Bend Fire Department provides fire suppression, emergency medical care, emergency transport, rescue, and fire prevention services. The staffing level in the Bend Fire Department has fallen below that of comparable Oregon Fire Departments. Response times do not meet national standards for comparable sized cities.

This revenue would be used to increase staffing with the goal of improving response times to reach people more quickly in the event of a fire or medical emergency. The increased funding could also pay for additional training and equipment, to maintain well-trained fire and emergency medical personnel.

If approved, the proposed levy would pay for the following:

- Hiring firefighters and ambulance personnel to help ensure sufficient personnel arrive within the initial minutes of an emergency.
- Supporting positions in training and fire prevention.
- Firefighter and emergency medical safety equipment.
- Tools for firefighting and emergency medical response.
- Technology enhancements.

This levy, if approved, would be offset to some extent because bond measures are expiring for the Deschutes County Jail Bond and for the Deschutes Public Library. The levy would result in annual taxes of $40 on a home with an assessed value of $200,000.

The measure will coincide with a companion ballot measure in the Rural Fire District, which is also asking for a local option levy of $0.20/$1,000 of assessed value.

This information was reviewed by the Oregon Secretary of State's Office.

NEIGHBORHOOD ASSOCIATION MEETING

Mountain View Neighborhood Association
will hold its annual general membership meeting on
Monday, May 5, 6:30 - 8 pm
at Hollinshead Barn

Topics include:

- Fire Levy on the May Ballot
- Sewer Infrastructure Plan
- Work Planned for Mountain View High School

All residents in MVNA are invited to attend. Pizza and beverages will be provided.

Accommodation Information for People with Disabilities
To obtain this information in an alternate format such as Braille, large print, electronic format and audio cassette tape please contact Karin Morris at (541) 693-2141 or email Kmorris@bendoregon.gov.

City Council

The Bend City Council meets the first and third Wednesdays of each month. For upcoming meeting dates, agendas and more information, visit **www.bendoregon.gov**.

JUNE 2014

OUR CITY

A NEWSLETTER FOR BEND CITIZENS
PUBLISHED BY THE CITY OF BEND

FINALIZING THE CITY'S FORMAL STORMWATER MASTER PLAN

The City of Bend has been working this spring to finalize its first formal Stormwater Master Plan. The Stormwater Master Plan establishes goals and potential solutions to address stormwater quantity and quality issues and needs within the City.

Stormwater is the runoff from hard surfaces such as rooftops, walkways and the streets after a rainstorm. In Bend, stormwater either flows to the Deschutes River through our storm drain system or into the ground towards our underground drinking water through dry wells and drill holes.

The City released a public draft of the stormwater master plan in 2008 but decided not to finalize it until receiving an initial permit for underground injection controls (dry wells and drill holes) from the state Department of Environmental Quality in May 2013.

The City is no longer proposing a piped system. The new, more adaptable approaches proposed allow for more flexibility and significantly reduced up-front costs.

The City held two public workshops in April to collect input on proposed infrastructure improvement approaches. The results were taken to the City Council in May for input on a preferred approach, and a revised draft was released in May for more public comment. The City Council is expected to consider the plan in July.

For more information on the Stormwater Master Plan, including a copy of the revised draft, please visit our website at: **www.bendoregon.gov/stormwatermp**.

WOODSTOVE BUY BACK

Did you know that before you sell a home you must remove old, polluting woodstoves and fireplace inserts that are not certified? It's part of the Oregon "Heat Smart" Law that went into effect in 2010. This new law is designed to protect homebuyers and clear the air of unnecessary wood smoke pollution. It requires the removal and decommissioning of any uncertified woodstove or fireplace insert from a home when it is sold. The City of Bend has had a similar measure in place for over 15 years.

If you are selling your home or just wanting to upgrade to a certified woodstove or insert, the City has a woodstove buy back program in place to help mitigate the costs of removal of the noncertified equipment. $200 is available to a limited number of people who qualify for our program and are willing to recycle their non-certified woodstove or insert. The non-certified equipment must currently be in use within the City limits. The program is for residential property owners only, with a limit of one stove per property.

For more information, call 541-617-4524.

We'd like your feedback: City of Bend, City Manager's Office | P.O. Box 431, Bend, OR 97709 | communications@bendoregon.gov **www.bendoregon.gov**

PLANNING DIVISION GENERAL SERVICES

One of the primary roles of the City of Bend is to regulate land development according to rules that balance the needs of private property owners with the desires of the community and City Council.

The City's Planning Division is where developers turn to get land-use permits processed, for a fee. It's also where the general community can get answers to development and zoning questions at no charge.

The way general front counter services get funded may soon change. The City Council is beginning a discussion of a planning fee strategy.

General planning services can be any number of things. For example, prospective property buyers can find out from the Planning Division staff what could potentially happen with lands on or surrounding a property that is for sale.

Or, before developers get approval to proceed on a project, the planning staff sends notices to surrounding properties. "Then you contact Planning's front desk and you can start asking questions, 'Is this going to affect traffic? How many homes are going in there?'" said Ruth Zdanowicz, an active member of the Summit West Neighborhood Association.

Planning staff helped Christine Walsh, a Northwest Crossing resident, understand the land-use process and achieve a group of neighbors' goals. Walsh turned to the planning staff when she found out a developer was proposing to build a mini-storage facility that she and neighbors felt was incompatible with the surrounding area.

"The planners there did a good job of informing us without compromising their responsibility to the developer," Walsh said. "I don't want them to be on the developers' or the neighbors' side. They negotiated the fine line of informing people about rules and regulations."

About 25 percent of planning staff time is allocated to providing general services at the permit center front counter or over the phone. Funding for that general service currently comes through planning permit fees paid by developers when they submit land-use applications to the City for applications such as a site plan review or a zone change. City policy says the cost of reviewing applications and issuing land-use permits must be funded by permit fees. But there is no City policy about paying for general, front counter services.

Some in the development community have argued that it is not fair to charge general service costs to the permit fees. Others have argued that the general services provided by the permit center front counter benefit the development community.

The Bend City Council will review this policy during upcoming budget discussions with staff.

A PARTNERSHIP FOR PROSPERITY

U.S. Highway 97 is an economic engine for many communities in Central Oregon. The TRIP97 Partnership was formed with the shared vision to continue that legacy today and into the future. TRIP97 is pursuing collaborative solutions that maximize investments and make the best corridor management decisions for the region.

For more information on the partnership and who is involved, visit **www.trip97.com**.

BEND OREGON 1905

Accommodation Information for People with Disabilities

To obtain this information in an alternate format such as Braille, large print, electronic format and audio cassette tape please contact Karin Morris at 541-693-2141 or email kmorris@bendoregon.gov.

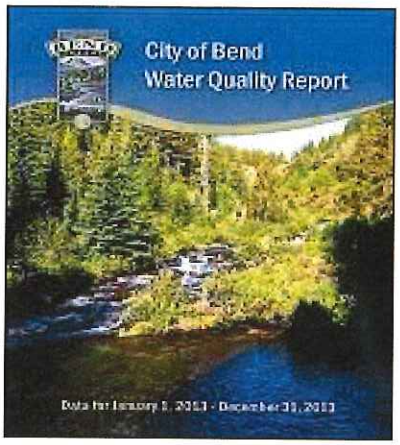
City Council

The Bend City Council meets the first and third Wednesdays of each month. For upcoming meeting dates, agendas and more information, visit **www.bendoregon.gov**.

NEWS

Annual Water Quality Report

Posted Date: 7/1/2013 9:30 AM



City of Bend's Annual Water Quality Report is available online at http://bendoregon.gov/water. The report includes where our water comes from, lab test results and other important information.

In 2012, City of Bend's drinking water met or exceeded every public health requirement—over 120 drinking water quality standards—set by the Oregon Health Authority and the U.S. EPA. In fact, Bend is proud to say that it has never violated a maximum contaminant level or any other water quality standard established by the EPA.

If you would like to receive a paper version of the report please call (541) 317-3000 or complete an online request form at http://bendoregon.gov/reportrequest.

For more information on Bend's drinking water, please visit the City of Bend website at http://bendoregon.gov/waterquality.

More News »

NEWS

3rd. St. underpass project officially underway

sted Date: 7/11/2013

City Councilors Doug Knight, Victor Chudowsky, Jodie Barram and Sally Russell helped officially break ground on the 3rd. Street Underpass Stormwater Infrastructure Improvement Project. The plan includes designing and constructing a series of storm water drainage structures that work together as a comprehensive system during storm and snow melt events. Once completed, this project will reduce risks for groundwater contamination, improve automobile safety and emergency vehicle access by minimizing road closures due to flooding.

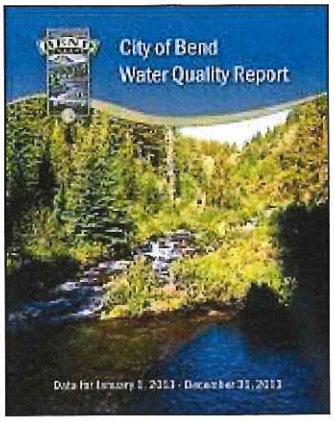
More information.

More News »

NEWS

Annual Water Quality Report

sted Date: 6/30/2014



City of Bend's Annual Water Quality Report is available online at http://bendoregon.gov/waterreport. The report includes where our water comes from, lab test results and other important information.

In 2013 City of Bend's drinking water met or exceeded every public health requirement—over 120 drinking water quality standards—set by the Oregon Health Authority and the U.S. EPA. In fact, Bend is proud to say that it has never violated a maximum contaminant level or any other water quality standard established by the EPA.

If you would like to receive a paper version of the report please call (541) 317-3000 or complete an online request form at http://bendoregon.gov/reportrequest.

For more information on Bend's drinking water, please visit the City of Bend website at http://bendoregon.gov/waterquality.

More News »

NEWS

Reed Market Road Phase 2 Construction Begins in June

sted Date: 5/6/2014

Construction of the second phase of the Reed Market Road project, from Third Street to Newberry Drive, starts June 2014.

The City of Bend Public Works Department invites the public to drop in during either of these informational meetings to talk to project engineers and learn more:

Monday, May 12, 2014
5:30 p.m. - 7:30 p.m.
City of Bend Municipal Courtroom
555 NE 15th Street

Wednesday, May 28, 2014
5:30 p.m. - 7:30 p.m.
Bend Park and Recreation Senior Center
1600 SE Reed Market Road

The roadwork includes widening Reed Market Road to include two travel lanes and a center turn lane/median, adding 6-foot shoulder/bike lanes, 6-foot sidewalks, and landscaped stormwater swales. The traffic signal at the intersection of Reed Market and 15th Street will be removed and replaced with a roundabout. The project is scheduled for completion in November 2015.

Reed Market Road improvements are part of the General Obligation (G.O.) Bond measure passed by voters in May 2011 for street improvements throughout the City of Bend. For more information about Reed Market Road and other GO Bond projects, visit bendoregon.gov/gobond.

More News »

Bend Bulletin
Sept. 12, 2015
B1
(Local & State)

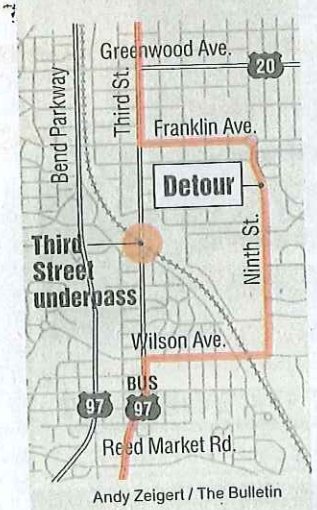
reader photos

• We want to see your photos of clouds for another special version of Well shot! that will run in the Outdoors section. Submit your best work at **bendbulletin.com/clouds** and we'll pick the best for publication.

Submission requirements: Include as much detail as possible — when and where you took it, and any special technique used —as well as your name, hometown and phone number. Photos must be high resolution (at least 6 inches wide and 300 dpi) and cannot be altered.

Third Street underpass detour

Third Street is closed at the underpass between Franklin Avenue and Wilson Avenue, from 7 p.m. to 7 a.m., Sunday through Friday, through the week of Sept. 23. The Third Street stormwater project will stop dirty storm runoff from draining into an injection well at the bottom of the underpass. After the project, a new system will pump that water into a pipeline that drains into a stormwater pond near U.S. Highway 97, where the water will filter into the ground.



Andy Zeigert / The Bulletin

"The water's not that cold," said Matt Gadow, of Bend, after
Lake on Wednesday morning. Gadow was enjoying the warı
Cultus during an outing with friends from WOW Surfboards
board. Wakesurfing is a sport where riders are pulled up on
boat while being pulled at a low speed. The large wake behir
optimum spot where they can then drop the tow rope and co
boat. Riders pump the board up and down the watery lip to
refreshing ride.

CENTRAL OREGON COMMUNITY COLLEGE

Locals learn how to launch

By Tyler Leeds
The Bulletin

Central Oregon Community College is offering a program that allows locals to turn their hobbies and skills into a startup business without taking the two years required for an MBA.

The Center for Entrepreneurship Excellence and Development, now in its second year, offers programs ranging from a 15-week certificate course to a two-year associate's degree.

Bend has recently received attention for its startup scene, being noted by Entrepreneur Magazine as the next big city for entrepreneurship. CEED is attempting to offer a pathway for entrepreneurs who may know a lot about their product, but nothing about market research, angel investors or distribution.

"The intention of CEED is to take students and community members who are not seeking a traditional business degree and who may come from any discipline," said Eric Spieth, CEED project coordinator and an assistant professor. "It could be a culinary student or an engineer who has an idea for a product from their field but no exposure to business. This will allow them to get started without taking the time for a traditional degree."

Spieth said CEED teaches

"CEED is entrepreneurial datin
for the right combination of pe
go through a lot of partners. S
that perfect combination of pe
successful, so this allows you

— Larry Jacobsen, COCC Center for Entr
and Development studer

to be 7 million years old were unearthed in Virginia's Tidewater region in April.

But the whale excavated in April was unusual, said Lockwood, a professor of geology

intact whale could have been 60 feet in length. Even a "very rare" flipper was found.

Deschutes

Continued from A1

The DEQ has been sampling and studying the water of the Deschutes and its tributaries for decades, with data for some sites going back to 1958. The data comes from 10 sites sampled every other month.

From 1999 to 2009, the three sampling sites upstream of Bend and the sampling site at Mirror Pond yielded data that rates as excellent in the Oregon Water Quality Index, which scores a river for eight categories to describe general water quality.

Singled out and compared to state standards, certain Deschutes characteristics stand out in the volumes of DEQ data. The amount of dissolved oxygen in the Deschutes is the main concern, said Eric Nigg, DEQ water quality manager in Bend. High levels of nutrients are often the cause of low oxygen levels, as well as high temperatures and high acidity. But the DEQ hasn't found a nutrient overload in the river. The agency has been checking for nitrates in particular.

For decades, nitrates in groundwater near the river has been a concern around La Pine in south Deschutes County, an area with a high density of homes using septic systems. Tests of the groundwater there by the DEQ in the mid-1990s, followed up by the U.S. Geological Survey last decade and the DEQ again in 2011, show increasing levels of nitrates, an indicator that septic contamination is likely seeping into the aquifer.

In a 2007 report, USGS scientists said nitrates from septic tanks in La Pine could eventually reach the Little Deschutes and Deschutes rivers and trigger increases in the amount of algae growing in the rivers. The same report noted some reaches of the river already show excessive algae.

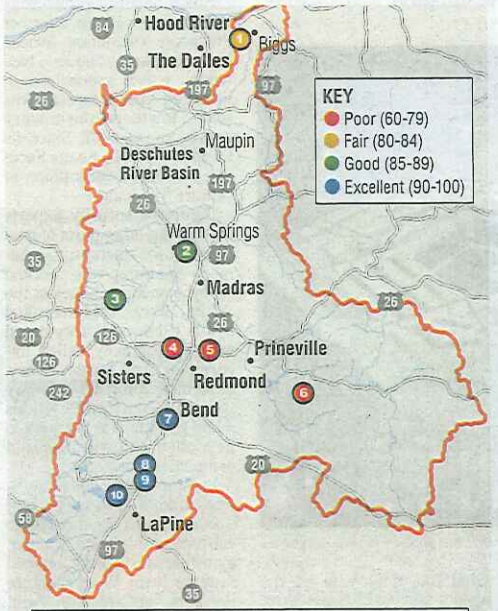
The DEQ has found no evidence that nitrates are reaching the rivers, Nigg said. "We don't see anything that would indicate a plume coming in at any point along the river," he said.

Curves and wetlands could be filtering out any nitrates in the rivers, but Nigg said the river needs further study to understand what is really happening in the water.

"We don't know that nitrates

Testing the water

The Oregon Department of Environmental Quality has 10 water monitoring sites around the basin feeding water into the Deschutes River and in the river itself. The DEQ uses the Oregon Water Quality Index, which is based on eight factors ranging from temperature to nitrogen levels, to rate the water around the river system. The ratings below are based on bimonthly sampling from 1999 to 2009. The ones on the Deschutes downstream of Bend and along the Crooked River are "poor" in part because of water diversions causing low flows, according to the DEQ.



STATION DESCRIPTIONS

1. **Deschutes River** at Deschutes River Park
2. **Deschutes River** at Highway 26 (Warm Springs)
3. **Metolius River** north of Camp Sherman (Bridge 99)
4. **Deschutes River** at Lower Bridge
5. **Crooked River** at Lone Pine Road (Terrebonne)
6. **Crooked River** at Conant Basin Road
7. **Deschutes River** at Mirror Pond (Bend)
8. **Deschutes River** at Harper Bridge (Sunriver)
9. **Little Deschutes River** at Highway 42 (Road 2114)
10. **Deschutes River** at Pringle Falls

Source: Oregon Department of Environmental Quality

Andy Zeigert / The Bulletin

members of the Brotherhood, the conservative Islamist group backing Morsi. In Suez this month, police and military forces breaking up a steelworkers strike charged that its organizers were part of a Brotherhood plot to destabilize Egypt.

On Saturday, the chief prosecutor ordered an investigation into charges of spying against two prominent activists associated with the progressive April 6 group.

When a journalist with a state newspaper spoke publicly about watching a colleague's wrongful killing by a soldier, prosecutors appeared to fabricate a crime to punish the journalist. And the police arrested five employees of the religious website Islam Today for the crime of describing the military takeover as a "coup," security officials said.

The government installed by Gen. Abdel-Fattah el-Sissi has renewed the Mubarak-era state of emergency removing all rights to due process or protections against police abuse. And police officials have pronounced themselves "vindicated." They say the new government's claim that it is battling Islamist violence corroborates what they have

tioning," said Heba Morayef, a researcher for Human Rights Watch.

In the more than seven weeks since Morsi's ouster, security forces have carried out at least three mass shootings at pro-Morsi street protests, killed more than a thousand Morsi supporters and arrested at least as many, actions Morayef characterized as "massive police abuse on an unprecedented scale."

But even beyond the Islamists, she said, "anyone who questions the police right now is a traitor."

Prosecutors had already begun investigating Mohamed ElBaradei, the liberal former U.N. diplomat, for betraying the public trust. Prosecutors set a court date to begin investigating a citizen complaint against ElBaradei after he quit as interim vice president to protest the police violence against the Islamists. A conviction could carry only a fine, and he had already left the country.

President Barack Obama has said the new government is on a "dangerous path" marked by "arbitrary arrests, a broad crackdown on Mr. Morsi's associations and sup-

tary exercise. He pledged a review of the $1.3 billion a year in military aid to Egypt, and the State Department took steps to hold back some of the roughly $200 million in nonmilitary aid.

The police appear to be rounding up Brotherhood members on the basis of their affiliation, without other publicly known evidence of crimes.

But some of the recent charges, like those against the two Canadians, strain credibility. Tarek Loubani, a Canadian physician with Palestinian roots and a history as a liberal and pro-Palestinian activist, was in Egypt on his way to the Gaza Strip to provide training to Palestinian doctors. John Greyson, a liberal Toronto filmmaker whose work often focuses on cosmopolitan sexual themes, was with him, documenting the trip for a possible movie. A lawyer for the two said they were stopped at a checkpoint near a street battle, trying to walk back to their hotel after the 7 p.m. curfew.

"They were just in the wrong place at very much the wrong time," the lawyer, Khaled El-Shalakany, said Saturday.

tanks in La Pine could eventually reach the Little Deschutes and Deschutes rivers and trigger increases in the amount of algae growing in the rivers. The same report noted some reaches of the river already show excessive algae.

The DEQ has found no evidence that nitrates are reaching the rivers, Nigg said. "We don't see anything that would indicate a plume coming in at any point along the river," he said.

Curves and wetlands could be filtering out any nitrates in the rivers, but Nigg said the river needs further study to understand what is really happening in the water.

"We don't know that nitrates is a central issue at this point," he said.

The Upper Deschutes Watershed Council, a Bend-based nonprofit focused on collaborative restoration of the Deschutes River, also keeps watch on its water quality. The group has sampled river water over the past decade and noted results matching those of the DEQ, with some parts of the river not always meeting state standards.

Ryan Houston, executive director for the group, said he wouldn't be surprised if the septic situation in La Pine is contributing to the problems in the river. Houston, like Nigg, said the river needs more study.

"We don't have a smoking gun that would connect groundwater issues in south county with problems in the Deschutes River," he said.

While the temperature, acidity and dissolved oxygen readings don't impact public health, they are a concern for fish in the river, Houston said. "They matter for the ecological integrity (of the river) more than they do for the direct water contact type of health issues."

The city of Bend is also sampling Deschutes River water but has seen nothing that indicates a problem, said Drexell Barnes, laboratory supervisor for the city. Samples are taken at least twice a year from 10 sampling sites. So far, the city lab has found no sign of the problems noted upstream.

"We haven't seen any declining water quality," Barnes said.

—Reporter: 541-617-7812, ddarling@bendbulletin.com

Source: Oregon Department of Environmental Quality Andy Zeigert / The Bulletin

he Bulletin
bendbulletin.com
SUNDAY AUGUST 25, 2013

o school: How much will it cost you?

STORY IN SUNDAY BUSINESS • E1

DARK TIMES OR BOOMERS

but one local man leaves them behind

By Mac McLean • *The Bulletin*

hecked my rope several times a day, not just to make sure it was still there but that he knot was still tightly wound and would not fail on its final use," reads a note Greg Murphy, 59, left in his room at the Bethlehem Inn when he checked out of the shelter ths ago and started a new chapter of his life.

DEQ

Deschutes water tests OK, but not so good for aquatic life

By Dylan J. Darling
The Bulletin

State sampling of Deschutes River water upstream of Bend shows hints of imbalance, from occasional readings of high temperatures to some samples with low oxygen.

The Oregon Department of Environmental Quality is planning to increase its study of the river's water to determine what is causing the quality issues, said Bonnie Lamb, natural resources specialist for the agency in Bend. She said it is unclear what is causing the problems.

"It is something we need to take a harder look at," she said.

Lamb and others who study the river are quick to say nothing in its water raises alarms about public health. Compared with other rivers around Oregon, the Deschutes overall fares very well. Those problems that exist could be a concern for aquatic life in the river, though.

See Deschutes / *A4*

Bend Park & Recreation DISTRICT

fall 2013

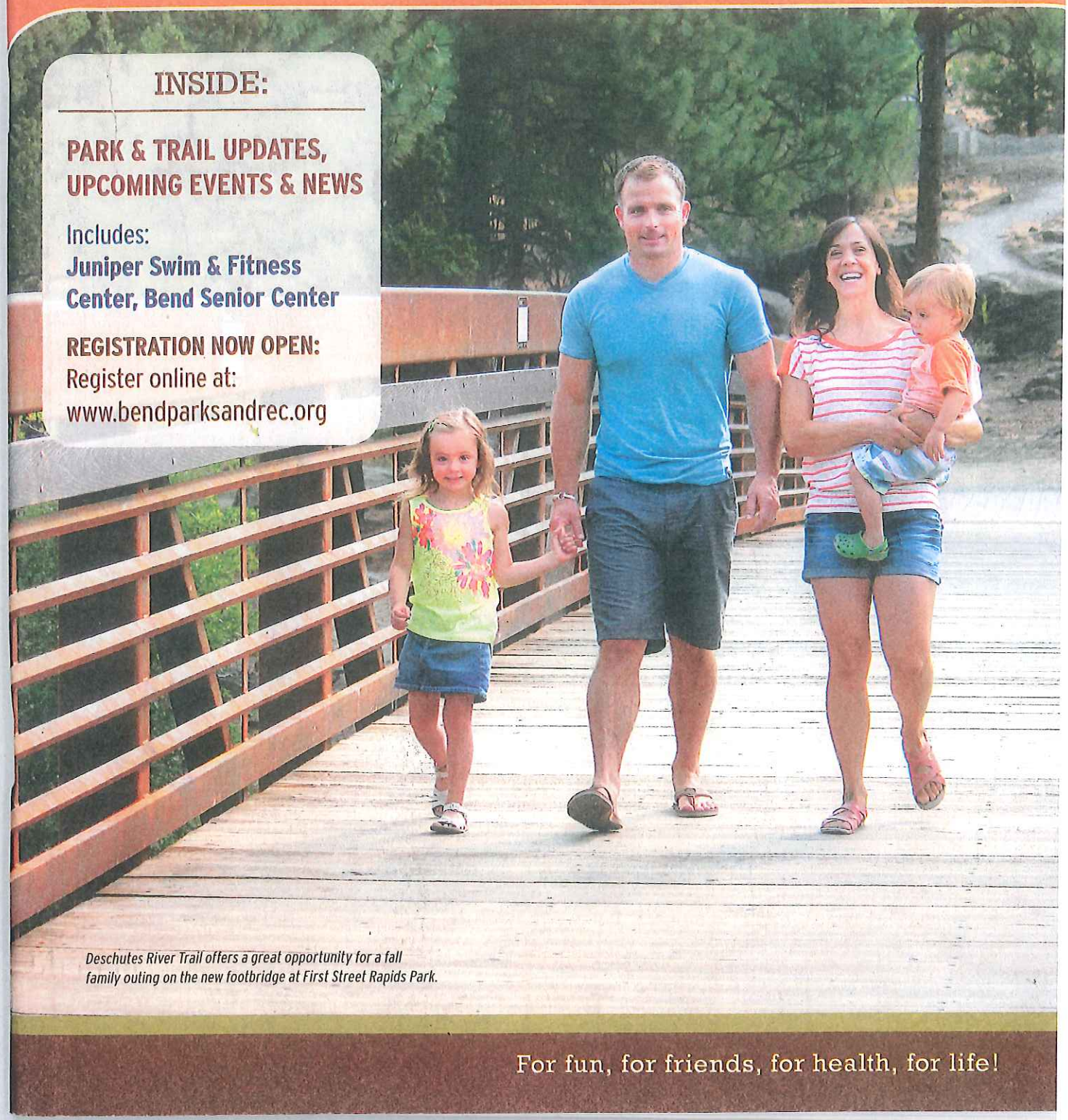
recreation guide

INSIDE:

PARK & TRAIL UPDATES, UPCOMING EVENTS & NEWS

Includes:
Juniper Swim & Fitness Center, Bend Senior Center

REGISTRATION NOW OPEN:
Register online at:
www.bendparksandrec.org



Deschutes River Trail offers a great opportunity for a fall family outing on the new footbridge at First Street Rapids Park.

For fun, for friends, for health, for life!

Bend Park & Recreation DISTRICT

winter-spring 2014

recreation guide

INSIDE:

PARK & TRAIL UPDATES & NEWS

REGISTRATION NOW OPEN:
Register online at: www.bendparksandrec.org

Includes: **Juniper Swim & Fitness Center, Bend Senior Center**

KIDS INC
bend park & recreation district

Celebrating 25 Years of Caring for Kids in Bend!

Bend Park & Recreation DISTRICT

summer 2014

SWIM SESSIONS & LESSONS

SUMMER CAMPS GALORE

REGISTRATION NOW OPEN

your playbook

ays

play:
summer
for all

in history
ears in
ylin Park

& trail projects
the works

play for life

The 2014 Central Oregon Directory & Preferred Contractors Buyers' Guide

COBA
CENTRAL OREGON BUILDERS ASSOCIATION

Building | CENTRAL OREGON

COBA
CENTRAL OREGON BUILDERS ASSOCIATION

Building | CENTRAL OREGON

2014 COBA Signature Events

COBA Spring Home and Garden Show
Presented by Standard TV & Appliance
Dates: May 2, 3 and 4, 2014
Hours: Friday 12-6 • Saturday 10-6 • Sunday 10-5
Location: Deschutes County Fair and Expo Center in Redmond Oregon.
Admission: FREE

Chefs on Tour
Dates: July 16, 2014
Hours: TBA
Location: Scattered sites
Admission: Ticketed Event

COBA Tour of Homes
Dates: July 18-20 and July 25-27, 2014
Hours: Friday 12-6 • Saturday 10-6 • Sunday 10-6
Location: Scattered sites throughout Central Oregon
Admission: FREE

The Fall Remodeling & Interior Décor Show
Dates: September 12 and 13, 2014
Hours: Saturday 9-5 • Sunday 9-4
Location: The Athletic Club of Bend
Admission: FREE

The COBA Tour of Remodeled Homes
Dates: May 10, 2014
Hours: To be announced
Location: Scattered site throughout Central Oregon
Admission: FREE

For details about these and all other COBA events, visit
www.ConnectionDepot.com

COBA COUNCILS & FORUMS

REMODELERS FORUM

BUILDING GREEN COUNCIL™

2014 COBA Board of Directors

OFFICERS:

President:
Chuck Schermerhorn, Neil Kelly

First Vice President:
Jay Campbell, WoodHill Homes

Second Vice President:
Dan Goodrich, Structure Development NW

Associate Vice President:
Justin Perkey, Bend Fire Protection

Secretary:
Debbie Baldwin, Century 21 Gold Country Realty

Treasurer:
Rockland Dunn, U.S. Bank

Immediate Past President:
Randy Miller, Attorney at Law

DIRECTORS:

Galen Blythe, Noble Insurance Solutions
Jerry Bogart, Van de Bogart & Associates
Pat Kesgard, Compass Commercial
Tate Morgan, OrePac
Jeff Payne, Panterra Homes
Ron Wanless, Technology Design Associates
Hayden Watson, Hayden Homes
Greg Welch, Greg Welch Construction
Jake Woodruff, Northwest Quality Roofing

CITY OF BEND STORMWATER QUALITY STRATEGIC EDUCATION OUTREACH CAMPAIGN

FY2013-14 through FY2018-19

Public Works Department

Stormwater Utility
November 2013

CITY OF BEND
STORMWATER QUALITY
STRATEGIC EDUCATION
OUTREACH CAMPAIGN

FY2013-14 through FY2018-19

Public Works Department
Utilities Division
62975 Boyd Acres Rd.
Bend, Oregon 97701
541-317-3000

Public Works Department

Stormwater Utility
November 2013

Table of Contents

Abbreviations and Acronyms

ACWA	Oregon Association of Clean Water Agencies
BMPs	Best Management Practices
BPRD	Bend Park and Recreation District
COBA	Central Oregon Builders Association
Compli	Training software used by Public Works Department
DAS	Brand of storm drain marker used by City
ESC	Erosion and Sediment Control
FY	Fiscal Year
Geoblade	Brand of GIS mapping viewer software used by the City
ISWMP	Integrated Stormwater Management Plan
LID	Low Impact Development
MgCl	Magnesium Chloride (winter care street deicer)
N	Number
NPDES	National Pollutant Discharge Elimination System
UIC	Underground Injection Control (e.g. drywell or drill hole)
US EPA	United States Environmental Protection Agency
SFR	Single Family Residential
SMART	Specific, Measurable, Action-oriented, Relevant, and Time-focused
Title 16	Bend Code Title 16 that focuses on Stomwater Management
WPCF	Water Pollution Control Facility

I. Introduction

This Stormwater Quality Strategic Education Outreach Campaign was developed based on the principles of the US EPA's *Getting In Step* guide. It was developed in conjunction and with extensive input of the City's Stormwater Quality Public Advisory Group, comprised of several stakeholder representatives. The campaign is designed to provide pollution prevention education about both the City's storm drains that flow to the Deschutes River as well as for those facilities that inject stormwater underground towards groundwater drinking water sources.

Community Characteristics and Effectiveness of Initial Stormwater Education Campaign. Existing educational efforts to date have focused on providing general education about the importance of preserving Bend's high water quality, and the interconnectedness of the City's storm drain system with our surface and groundwater quality through the "It's All Connected" campaign. To measure the effectiveness of the "It's All Connected" campaign, the City conducted a pre- and post-survey. The pre-survey was conducted prior to the start of the multi-year campaign and announced via email. The link to the post-survey was announced in both the City newsletter that was mailed to all customers with their utility bills, was posted on the City's Facebook page, was sent to all users via the City's internal social network program called "Yammerz," and was emailed via the Stormwater Stakeholders list serve.

Because the pre-survey was not distributed using a standard random sample method, and because only 16 people responded to the post-survey even though a link was sent to every household (compared to 121 who responded to the pre-survey), the City was not able to make statistically significant conclusions. However, the results of those responding to the post-survey suggested some improvements over the course of the campaign. Of those respondents that completed the post-survey, 56% had seen the "Its All Connected" advertisement (compared to 15% who indicated they had seen it in the pre-survey). In the pre-survey 40% of respondents felt that stormwater travels to the sanitary sewer treatment plant, whereas in the post survey, only 25% of respondents felt this way. The percentage of respondents who feel that preventing stormwater pollution is "very" and "somewhat important" remained consistent.

In the 2013 Bend Community Survey, which was performed with statistical rigor but did not focus specifically on stormwater, 68% of respondents believed that protecting drinking water sources was an urgent or high-funding priority for the City (DHM Research, January 2013). The study also found that residents get their information about City issues from the following categories (N=400):

- Newspaper 60%
- TV 53%
- Friends/family 28%
- Website 28%
- Radio 17%
- City Newsletter 15%
- City Council 4%
- Other/Don't know 4%

When asked if they have ever used any of the following to receive information about the City, 53% had used the City newsletter, 38% had used the website, 28% had used the City Edition and online City videos, 7% had used the Facebook page and 1% had used Twitter. Thirty-seven percent have children under the age of 18 at home and most people count driving in a car or truck as their main mode of transportation (63% alone and 24% with others). Two percent use a bus or public transportation, 3% bicycle most days and 5% walk (DHM Research, January 2013).

II. Driving Forces, Goals and Objectives

The City's driving forces for the stormwater quality education outreach campaign are to protect public and environmental health via protection of water quality by meeting regulatory requirements for stormwater in a manner that helps meet the community's Bend 2030 Vision elements to the degree possible (see Appendix A). Protecting environmental health via water quality improvements is important not only for public health but for the economic vitality of the City given the reputation for outdoor-based tourism and recreation.

To accomplish this, the City has developed the following public outreach goals as part of its strategy:

I. Continue to increase general knowledge of stormwater understanding and need for stormwater pollution prevention in both municipal staff and the public.

II. Minimize illegal dumping and spills, and improve reporting and response to minimize environmental impacts.

III. Maintain the environmental goals set for the City's Deschutes River and aquifer by the State of Oregon:
   1. Satisfy the NPDES and WPCF regulatory requirements by implementing the ISWMP 2022;
   2. Focus on reducing pollutants of concern that may be found in stormwater (e.g., lead, sediment, nutrients).

IV. Strengthen the linkage between land use activities and water quality and flooding issues:
    1. Reduce the potential for flooding as development occurs;
    2. Increase awareness about water quality problems and solutions to protect water quality.

The public outreach plan will strive towards meeting the following objectives. The objectives are designed to be Specific, Measurable, Action-oriented, Relevant, and Time-focused (SMART).

i. Use positive messages throughout the campaign.
ii. Continue watershed / stormwater awareness, but move more towards actions.
iii. Conduct evaluation surveys to research the level of awareness in the City and effectiveness of the programs. Review evaluation survey after first two to three years (midway) and refine strategy to provide for continuous improvement.
iv. Increase awareness of residential nitrogen runoff by at least 5 percent within 5 years. Encourage behaviors that will reduce nitrogen runoff to storm drains (and by extension to the Deschutes River and Tumalo Creek).
v. Increase awareness of sediment impacts to storm drainage facilities and the Deschutes River/Tumalo Creek by at least 5 percent within 5 years.
vi. Through approximately a 20-month media campaign, educate residents and businesses about the link between land use activities and water quality/flooding, as well as about the City's role in protecting water resources and managing stormwater.
vii. Increase awareness of potential pollutants from automotive vehicles and environmentally-friendly options to minimize these pollutants (e.g., lead wheel weights; battery disposal; fixing leaks; recycle car wash) by 5 percent within 2 years.
viii. Increase awareness of what constitutes an illicit discharge and how to prevent spills by 10 percent within 5 years, and encourage behaviors to reduce illicit discharges.
ix. Reduce runoff from private properties to public streets by offering incentives to increase maintenance rates of private facilities. Such runoff often results in localized flooding and the transport of landscape-related pollutants. The initial incentive programs will be marketed to private commercial/industrial properties within the drainages of at least five of the top ten flooding problem areas over 3 years. Evaluate initial results.

III. Evaluation And Adaptive Management

This plan is seen as a living document. Changes to this plan will occur based on program needs, evaluation survey feedback, and direction from the

Stormwater Quality Public Advisory Group or internal stormwater coordinators.

The City will conduct a baseline evaluation survey, and then another mid-term within two to three years to determine where modifications may improve effectiveness. The baseline survey will help inform and refine the best timeline for roll-out of various messages. Modifications will be made as necessary for continuous improvement. A final evaluation will be conducted by early FY19-20.

IV. Messages and Target Audience

The City must provide education to both City employees and to the public to be effective. The initial messages will target both general education as well as specific education related to improving understanding of the linkage between land use and stormwater quality and what specific best management practices may make a positive difference. Specific messages will be designed to target the specific audience, describe the direct benefit to that specific audience, and should be memorable. The messages will target the following areas and audiences:

- Pollution Prevention Training Fact Sheets
- "It's All Connected" General Education Program
- Improving Land Use and Stormwater Quality Linkages
- Incentive Programs
- Increasing Understanding through Best Management Practices.

Message I. Pollution Prevention Training Fact Sheets

Driving Force	**Regulatory Compliance: City Staff Education; Protect public health and welfare/quality of life.**				
Goal	**Maintain the environmental goals set for the City's river and aquifer by the state: Improve maintenance BMPs**				
Objective	**Series of Fact Sheets to Support Tail-Gate Meeting Trainings to both City Employees/Institutional/Private Contractors/Industry**				
Sub-Objective	**Target Audience**	**Message**	**Format**	**Distribution**	**Evaluation**
Paint Use and Disposal	Garage, Street and Utility Workers ~~ Related Public	How to note potential problems; how to prevent & fix	One page; illustrated; bulleted; easy to read	To manager with training for tail gate trainings	Number distributed; training sign-in sheet; changes in on-site inspections
Leaky Equipment	Garage, Street and Utility Workers ~~ Related Public	How to note potential problems; how to prevent & fix	One page; illustrated; bulleted; easy to read	To manager with training for tail gate trainings	Number distributed; training sign-in sheet; changes in on-site inspections

Driving Force	Regulatory Compliance: City Staff Education; Protect public health and welfare/quality of life.				
Goal	Maintain the environmental goals set for the City's river and aquifer by the state: Improve maintenance BMPs				
Objective	Series of Fact Sheets to Support Tail-Gate Meeting Trainings to both City Employees/Institutional/Private Contractors/Industry				
Sub-Objective	**Target Audience**	**Message**	**Format**	**Distribution**	**Evaluation**
Concrete Waste	Street and Utility Workers ~~ Related Public	How to note potential problems; how to prevent & fix	One page; illustrated; bulleted; easy to read	To manager with training for tail gate trainings	Number distributed; training sign-in sheet; changes in on-site inspections
Excess Materials/ Waste Disposal (e.g. MgCl, cinders, asphalt mix)	Garage, Street and Utility Workers ~~ Related Public	How to note potential problems; how to prevent & fix	One page; illustrated; bulleted; easy to read	To manager with training for tail gate trainings	Number distributed; training sign-in sheet; changes in on-site inspections
Illicit Discharge	Garage, Street and Utility Workers ~~ Related Public	How to note potential problems; how to prevent & fix	One page; illustrated; bulleted; easy to read	To manager with training for tail gate trainings. To public via training-in-a-box or other similar	Number distributed; training sign-in sheet; changes in on-site inspections
Landscaping Practices	Street/Cemetery/ Landscape Workers ~~ Related Public (e,g., local suppliers and customers)	How to note potential problems; how to prevent & fix	One page; illustrated; bulleted; easy to read	To manager with training for tail gate trainings. May be Training-in-a-box for public	Number distributed; training sign-in sheet; changes in on-site inspections

Scheduling. At least half of these fact sheets targeting city employees will be created during FY2013-14, with the other half in FY2014-15 along with a distribution approach and schedule. The fact sheets will focus on being accessible for tail-gate or other short trainings. Distribution will begin in late FY2013-14 internally to the municipality. After some use internally, the fact sheets will then be modified to appropriately address related public entities. Based on questions and feedback, modifications and potential incentive programs will be made prior to release to interested public entities, starting in FY2015-16 and extending into FY2016-17.

Message II. "It's All Connected" General Education Program

Driving Force	Regulatory Compliance; Protect public health and welfare/quality of life; Bend2030 vision –Quality environment				
Goal	**Increased Understanding Of Stormwater Pollution and Causes Thereof**				
Objective	**Increased understanding leading to increased care of watershed.**				
Sub-Objective	**Target Audience**	**Message**	**Format**	**Distribution**	**Evaluation**
Increase understanding of Acronyms and Abbreviations used	Public presentation attendees	Easy to use resource guide for technical terms and abbreviations	Speaking Stormwater – Abbreviation outreach on website	On the website; at meetings	-Number distributed. --Number of Website Hits --Number and type of requested clarifications/ additions
Hands on tool to increase understanding	Children and adults at outreach events	New diorama or interactive outreach piece— focusing on UICs	Interactive or free-standing model	Event use	Evaluation forms
It's All Connected – Banner Messages	Athletes and Spectators; General Public	Outdoor/athletic reminder	Banner hung at venues	Indoor Soccer Center; Circus Center; Little League Fields, Outdoor Recreational Fields, Roller Derby	Evaluation survey. Number of sites shown; number in attendance
It's All Connected Contest— Kid's SW Pollution Prevention Film Shorts or Written Shorts	Upper Elementary, Middle School and High School Children and viewers of finished products	Develop a pollution prevention message	Per Distributor requirements. Contest. Contestants on You Tube Channel. Winners get screened at Munch and Movies/ Bend Film	Munch and Movies (film); Bend Film (slide); Neighborhood Association Meeting; City You-Tube site	Number videos/slides submitted; of Votes; Number in attendance; number of shows. Evaluation form from teachers/students
It's All Connected – Print Advertising	Parks Recreational Enthusiasts, Contractors, General Public	It's All Connected Messages in BPRD Guides; COBA Buyer's Guide, etc.	One picture…different sayings playing off the animals in the picture, funny or whimsical	Print advertisements that are kept around for awhile	Number of BRPD/COBA/etc. guides distributed; survey if message is remembered

Scheduling. Print advertising distribution will be ongoing, with distribution of Acronyms and Abbreviations beginning in FY13-14. Research into new outreach (diorama) will occur in FY13-14 with a purchase and beginning use in FY14-15. Film advertising will occur as in the past in FY13-14, with outreach to Bend Film and other community partners to examine expanding

efforts to allow for children development of stormwater or watershed pollution prevention film shorts. Actual contest will be dependent on community support and timing. It's All Connected banner messages will be researched in FY13-14 and implementation will be slated to being in FY14-15.

Message III. Improving Land Use and Stormwater Quality Linkages

Driving Force	**Regulatory Compliance; Protect public health and welfare/quality of life**				
Goal	**Increase awareness about water quality problems and solution to protect water quality; Strengthen the linkage between land use activities and water quality and flooding issues.**				
Objective	**Water Quality Protection –General; Title 16 Compliance**				
Sub-Objective	**Target Audience**	**Message**	**Format**	**Distribution**	**Evaluation**
Increase understanding of how to keep stormwater on site and amount needed	Single family residential designers/ home builders	SFR Site Plan	Site plan example	Website; trainings; permit center	--Number Distributed --Number of website hits --Survey
Increase understanding of how to keep stormwater on site and amount needed	Commercial facility owners	Commercial Guidance	Example site plan	Trainings, front desk, distributed in the field, available on website	--Number Distributed -Number of website hits --Survey
Increase knowledge of need for and how to maintain facilities	Facility owners/ contractors	Stormwater Facility Maintenance Guidance	Online and booklet guidance by type of facility	Trainings, front desk, distributed in the field, available on website	--Number distributed. --Survey
Increase knowledge of effective ESC and long-term facility maintenance techniques and record keeping	Local construction industry; municipal construction staff; municipal and private inspectors	--Inspection Sheet improvements --Distribution of ACWA ESC Guide	Electronic and 1-2 page paper	Trainings, front desk, distributed in the field, available on website	--Number of ESC Guides distributed --Extent of updated inspection sheet use -- Improvements in field
Increase knowledge of regulatory needs	Local construction industry/ inspectors; municipal construction staff and inspectors	Flow Chart		Trainings, front desk, distributed in the field, available on website	--Number. of flow charts distributed -- Improvements in field

Driving Force	Regulatory Compliance; Protect public health and welfare/quality of life				
Goal	Increase awareness about water quality problems and solution to protect water quality; Strengthen the linkage between land use activities and water quality and flooding issues.				
Objective	Water Quality Protection –General; Title 16 Compliance				
Sub-Objective	Target Audience	Message	Format	Distribution	Evaluation
Reduce Illicit Discharge Potential	Business Owners	Develop/distribute Self Inspection Checklist for business owners	One page checklist	Mailout – perhaps in coordination with business license renewal or utility bills	Number of self inspection checklists distributed. -- Improvements in field --Survey
Knowledge of infiltration	Property owners/ renters with infiltration facilities on-site.	Why is this depression/ hole in my backyard? How to maintain.	Tri-fold or fact sheet. Website	Website; homeowners, Door Hanger. 1 sheet; work with property management or title companies to distribute	Number distributed. Number/type of follow-up questions. Survey
Storm Drain Markers	General Public	Don't Pollute Drains to Waterways markers and "Only Rain in the Storm Drain" permanent	DAS Marker together with permanent lids for new/ redevelopment	Volunteers and contractors for new/ redevelopment	Number marked. How long DAS markers are lasting. Number of illicit discharge calls.

Scheduling. SFR Site plan example distribution will occur in FY13-14, along with distribution of the ACWA ESC guide. Storm drain marker installation is ongoing. Development of an example site plan for commercial guidance will occur in FY13-14 and FY14-15, and development of inspection sheet improvement will begin in FY13-14 and continue through FY14-15. Stormwater facility maintenance guidance refinement will be developed in FY15-16 once initial input on existing forms is gathered and understood. Regulatory needs flow chart will be developed in FY16-17. Distribution of a Self-Inspection Checklist for business owners will occur by FY17-18, along with guidance on infiltration knowledge and how to maintain.

Message IV Incentive Programs

Driving Force	Regulatory Compliance; Protect Public health/welfare; Quality of Life; Economy				
Goal	**Strengthen the linkage between land use activities and water quality and flooding issues: Improve Maintenance of Private and Public Storm Drainage Facilities; Reduce Vehicle Pollutants; Increase Knowledge of Place Within Watershed**				
Objective	**Win-win compliance and Increased Knowledge Brings Increased Care**				
Sub-Objective	**Target Audience**	**Message**	**Format**	**Distribution**	**Evaluation**
Flood protection helps prevent pollutants from being carried off	Private stormwater facility owners (e.g. UIC Owners)	"Because if it is not maintained, it won't work"; "Because if your parking lot is flooding, your customers can't get to your business"	Incentive Program…maintenance discounts; Contract directly between customer and maintenance service company.	Newspaper. Website Newsletter	As part of contract with maintenance company—amount of material collected; summary of location/ status of facilities; number of participants
Reduce pollutants from car washing	Car owners	Make it easy on yourself and better on the environment —use a car wash that recycles water + save $	Discount card	Newspaper. Website Newsletter	Number of discount cards used. Survey of participating car washes
Increased knowledge, increased care	General Public	"You are in a drinking water protection area. (or "This area drains directly to the Deschutes River.") If you notice illicit dumping or discharges, call __.	Permanent Signs… work with businesses in protection area. "Only rain in the storm drain" –and reporting phone number	… work with businesses in protection areas. Two year time of travel (eventually extend to 10 year time of travel). And River Drainages.	--Number of signs placed --Number of calls received --Survey

Scheduling. A pilot incentive program will be developed during FY13-14 and will be targeted to occur in fall FY14-15. Lessons learned will be used to advance the program in future years, and a discount card for car washes will be examine and is scheduled for implementation by FY16-17. A permanent sign program will be visibly started in FY17-18, but pre-work regarding working with local businesses and the sign shop will occur beforehand.

Message V. Increasing Understanding Through Best Management Practices (BMPs)

Driving Force	Regulatory Compliance; Help meet Bend 2030 Vision: Well Planned City; Quality Environment; Strong Community				
Goal	**Strengthen the linkage between land use activities and water quality and flooding issues.; Minimize illicit dumping and spills**				
Objective	**Increase Stormwater BMP Knowledge**				
Sub-Objective	**Target Audience**	**Message**	**Format**	**Distribution**	**Evaluation**
LID Measures Requiring Little or No Maintenance	Planners/Developers of SFR Subdivisions	Protecting water quality in a sustainable manner....because if it isn't maintained, it doesn't work.	Outreach on how to meet Bend Code Title 16	Website; Trainings	Number of website hits. --Number of brochures distributed -- Evaluation Survey
BMPs that address pollutants of concern.	Developers and People who live within Drainages to the River	This BMP is effective in targeting this pollutant that is harming our river. Or threatens our drinking water. ~~ By location in City	Newsletter; brochures Geoblade	All; Presentation or Meeting in Box to Neighborhood Associations in areas draining to river.	Number of website hits.
Develop Illicit Discharge Reporting Meeting In a Box or similar	City Departments with Staff in Field; Neighborhood Association Meetings; Service Community Meetings; Volunteers	If you see storm drains that look like these pictures, contact Public Works (or in an emergency 9-11) to prevent illicit discharges.	Box containing training video/presentation; It's All Connected business cards with reporting numbers; if available, app information.	Compli, Meeting In a Box to Neighborhood Associations offered, and Service organizations and schools upon request.	Boxes created, Number requested.

Scheduling. Work to improve illicit discharge coordination and reporting internally will begin in FY13-14 and will develop to incorporate educational outreach internally by FY14-15. Development of advice on LID measures requiring little or no maintenance will begin in FY13-14 and be refined through FY14-15 for distribution given the need for interdepartmental coordination and feedback from baseline public input. Study of the best, most reliable best management practices and structural controls to address pollutants of concern specific to the Deschutes River through Bend as well potentially as for drinking water quality will begin in FY2013 and 14, and will develop into guidance to the public by FY15-16.

Appendices

Appendix A
Bend 2030 Vision Elements

This plan is also geared to help meet the community's Bend 2030 Vision elements, specifically those related to the following:

1. Well Planned City
   - a. (5) Funding for Infrastructure and Services
   - b. (10) Small Neighborhood Centers
2. Vibrant Economy
   - a. (1) Incentives for Healthy Economic Growth
   - b. (11) Tourism Benefits to Community
   - c. (12) 'Green' building Leader
3. Quality Environment
   - a. (4) Stormwater Treatment and Drainage
   - b. (7) Native Plants and Water conserving Landscaping
   - c. (9) Protection of Natural Resources by Developers
   - d. (13) City-Wide Waste Prevention and recycling
   - e. (14) Sustainable Bend
   - f. (15) Incentive-Based Sustainability
   - g. (17) Environmental Education
   - h. Accelerator: Deschutes River Reach Project
4. Safe, Healthy People
   - a. (4) Child Health, Safety, and Welfare
5. Strong Community
   - a. (3) Citizen-Government Dialogue
   - b. (5) Collaboration Among Community Groups
   - c. (7) Active Volunteer Network
   - d. (15) Community Gathering Places
   - e. Accelerator: Neighborhood Connections
   - f. Accelerator: Workforce Development through Volunteerism
   - g. Accelerator: Community 'Third Places'
6. A Creative Learning Culture
   - a. (3) Alternative Educational Models
   - b. (4) Integration of Technology and Sustainability in Education and Economy
   - c. Accelerator: Higher Education Innovation & Enterprise

The Bend 2030 Vision can be accessed at this website:
http://www.bend2030.org/

February 4, 2014

TO: Oregon Association of Clean Water Agencies (ACWA)
FROM: DHM Research
SUBJ: Research summary about stormwater behavior

1 | INTRODUCTION

This summary and observations document is a high-level analysis of public attitudes and priorities about stormwater in Oregon. The focus is on residential customers and the general population. A few national studies are included to add perspective on the issue. The objective of this summary is to provide added context and inform and/or validate existing information, especially as the Oregon Association of Clean Water Agencies (ACWA) interacts with the public.

Much of the information is developed from recent research conducted by ACWA members, related work by DHM Research, and select national studies conducted on relevant topics. Attempts were made to include a geographically diverse set of research to review. However, much of the existing research in Oregon has been conducted in the state's population centers and specifically the Portland Metro area. Thus, the results in this report have an urban bias, which should be taken into account. However, although water resources and quality are highly localized, much of the general public's knowledge and values about water are independent of geography.

The summary is grouped into five main areas:

1) **Values** – what do Oregonians value in general, and how does it relate to stormwater
2) **Behaviors** – what are the key behaviors of the public that impact stormwater; what are the emerging issues
3) **Barriers, motivations, messaging** – what are the barriers and motivations to behavior change
4) **Media review** – how is stormwater covered in the media
5) **Gaps in research** – where are the gaps, if any, in existing research

Any observations and recommendations are general guidelines and specific to Oregon; while much of the advice may apply outside of the state, it would be wise to conduct independent research to test their effectiveness in other areas.

Research sources include the list below. A more detailed listing of ACWA research is found at the end of this summary.

1. Bend Community Survey (2007)
2. Bend Environmental Issues Survey (1999)

3. Clackamas County Water Environment Services Survey (2006)
4. Clark County Stormwater Research (2012)
5. Clean Water Services Customer Service Surveys (2002, 2006, 2008, 2010, 2012)
6. Clean Water Services Stream Habits Survey (2002)
7. Clean Water Services Stormwater Survey (2012)
8. Clean Water Services Customer Values Survey (2013)
9. Earthfix Survey (2012)
10. Eugene Stormwater Management Survey (2013)
11. Gresham Lawn Care Pre and Post Surveys (2007, 2009)
12. Gresham Stormwater Survey (2008)
13. Hillsboro Water Supply Residential Customer Focus Groups (2010, 2011)
14. Keizer Community Survey (2011)
15. Lake Oswego-Tigard Water Partnership Focus Groups (2010)
16. Metro Household Hazardous Products Survey (2007)
17. Metro Toxic Reduction Focus Group (2009)
18. Metro Sustainable Living Survey (2012)
19. Oak Lodge Satisfaction Survey (2012)
20. Oregon Forests Research Institute/Oregon Department of Forestry Forest Values and Beliefs Survey (2010)
21. Oregon Values and Beliefs Study (2013)
22. Portland Bureau of Environmental Services Surveys (1999, 2005)
23. Portland City Community Surveys (2011, 2012)
24. Puget Sound Partnership Survey (2011)
25. Regional Coalition for Clean Rivers and Streams (2011)

National Sources used for Reference:

1. Environmental Protection Agency National Menu of Best Management Practices and website (http://cfpub.epa.gov/npdes/home.cfm?program_id=6)
2. American Veterinary Medical Association pet ownership statistics (https://www.avma.org/KB/Resources/Statistics/Pages/Market-research-statistics-US-Pet-Ownership-Demographics-Sourcebook.aspx)
3. Killmuss, Anja and Angyeman, Julian. 2002. Mind The Gap: Why Do People Act Environmentally And What Are The Barriers To Pro-Environmental Behavior? *Environmental Education Research.* 8(3): 240-260
4. 2012 Value of Water Index: Americans on the U.S. Water Crisis, Xylem Inc. (http://www.xyleminc.com/valueofwater/)
5. Stormwater Pollution Prevention Behavior of Corvallis Residents, Oregon State University, 2010 (http://www.corvallisoregon.gov/modules/showdocument.aspx?documentid=4617)
6. Stormwater Knowledge, Attitude and Behaviors: A 2005 Survey of North Carolina Residents, Chrystal Barlett (http://www.ncstormwater.org/pdfs/stormwater_survey_12506.pdf)
7. Universities Council on Water Resources Journal survey on public perception of stormwater, 2010 (http://ucowr.org/issue-146/survey-says-implications-of-a-public-perception-survey-on-stormwater-education-programming)
8. *Stormwater Monitoring and Resident Behavior in a Semi-Arid Region*, 2011. (http://www.joe.org/joe/2011april/a8.php)
9. Understanding Watershed Behavior, *Watershed Protection Techniques*, 3(3): 671-679. (http://www.northinlet.sc.edu/training/media/resources/Understanding%20Watershed%20Behavior.pdf)
10. Stormwater Runoff: Pierce County Public Attitudes, Awareness and Behavior, 2009. (http://www.ci.sumner.wa.us/Documents/Public%20Works/Stormwater/09_B.pdf)
11. Water Pollution in Puget Sound: A compilation of Public Opinion. 2004-2009. (http://www.mypugetsound.net/index.php?option=com_mtree&task=att_download&link_id=126&cf_id=24)
12. Residential Car Washwater Monitoring Study, 2009. (http://www.ecy.wa.gov/programs/wq/stormwater/municipal/MUNIdocs/2009FWCarWashwaterMonitoringStudyRev1.pdf)
13. Oregon Department of Environmental Quality Household Hazardous Waste Survey, 2008. Portland State University Survey Research Lab. http://www.deq.state.or.us/lq/pubs/docs/sw/hhw/HHWSurveyResultsCompleteReport.pdf

2 | SUMMARY AND OBSERVATIONS

Oregonians place a high value on the environment and natural beauty of the state, especially as it relates to water.

- DHM Research's 2013 Values and Beliefs study found the features that Oregonians most value about the state are its beauty and scenery, weather and climate, outdoor recreation, and its forest and trees.
- Other statewide surveys have consistently shown that Oregonians are concerned about, and prioritize, protecting water.

Protecting *drinking water* is the most paramount water issue for Oregonians.

- Other issues are important, but secondary. They include, water as a source of fish and wildlife habitat, irrigation for agricultural, and recreational opportunities.

Oregonians have limited knowledge and awareness of stormwater.

- Their low level of awareness means that the average person does not have a well-developed understanding of the relationship between drinking, sewer and stormwater.
- Nationally, more than three-fourths do not believe that stormwater runoff is the largest source of water pollution. Rather, a majority believe that industry is the largest source of water pollution.

Individual perceptions and behaviors related to stormwater are specific to the source, and need to be addressed as such. For example:

- Pet waste: while most pet owners pick up their pet waste when out in the community, just one-quarter pick it up on a daily basis at home and one-third pick it up once a week or less. Many simply don't believe it is impactful on water.
- Car washing: evidence suggests that most car owners wash their car at home rather than at a commercial carwash because they perceive it as cheaper, less likely to damage the car, and more effective.
- Lawn and garden care: decisions about lawn and garden care are strongly influenced by cultural values and community standards. There is also a common assumption that if a product sold at a local home and garden store, than it must be safe to use.

Motivations to change stormwater behavior should be connected to other important values. For example:

- Drinking water: draw a connection between stormwater runoff and the quality and safety of drinking water.
- Children and pets: survey and focus group research has consistently shown that the safety of children and pets ranks in the top tier of concern for the use of chemical products in lawns, gardens, and in the home. This is particularly true with women.
- Saving money and discounts: for a segment of consumers, saving money is strong motivator. To change behavior, however, consumers must feel that that they are not sacrificing effectiveness or convenience.
- Natural areas, wildlife habitats, green spaces and outdoor recreation: Oregonians place a high value on the environment and enjoying outdoor recreational opportunities. When possible, link stormwater projects to these key values.

Other considerations for messaging

- Consider mothers as messengers to target the strongest base of supporters – females, Democrats, and people with higher education/income. Other research also shows that women are strong messengers, often the most effective messengers, around improving the health of families.
- Partner with community organizations, small businesses, retailers, and university experts as spokespeople around preferred stormwater behaviors. They are often better messengers than government, environmental groups, and utilities that may be viewed by the public with skepticism.
- Use a positive tone and focus on outcomes. This is more easily understood and resonates with the public. It also communicates a message that there is a plan for the future.
- Suggest simple steps to behavior change and be specific.

3 | VALUES

3.1 | General values in Oregon

Oregonians place high value on the natural beauty of our state, outdoor recreation opportunities, and clean air and water. Residents across the state, whether living in Bend or Portland, place similar importance to the natural beauty of Oregon. DHM's recent study on Oregonian's Values & Beliefs (2013) found people value most about living in Oregon (in this order):

1. **Beauty and scenery**
2. **Weather and climate**
3. **Sense of community**
4. **Outdoors and outdoor activities**
5. **Forests and trees**
6. **Ocean and easy access**
7. **Nature**
8. **Mountains and easy access**

These values are consistent across all areas of the state. The order may vary slightly from one region to another – for instance, people in Central Oregon may place greater emphasis on outdoor activities – but the general list is the same across the Metro area, Valley, Central, Eastern, or Southern Oregon.

Water can be linked to almost all of these key values. ACWA has the rare opportunity to connect to what Oregonians value most about their state. Public outreach should include references to how water, particularly stormwater, connects people to these key values about Oregon.

During economic downturns, values around water and the environment in general can easily get lost with pressing issues facing the state and national concerns.

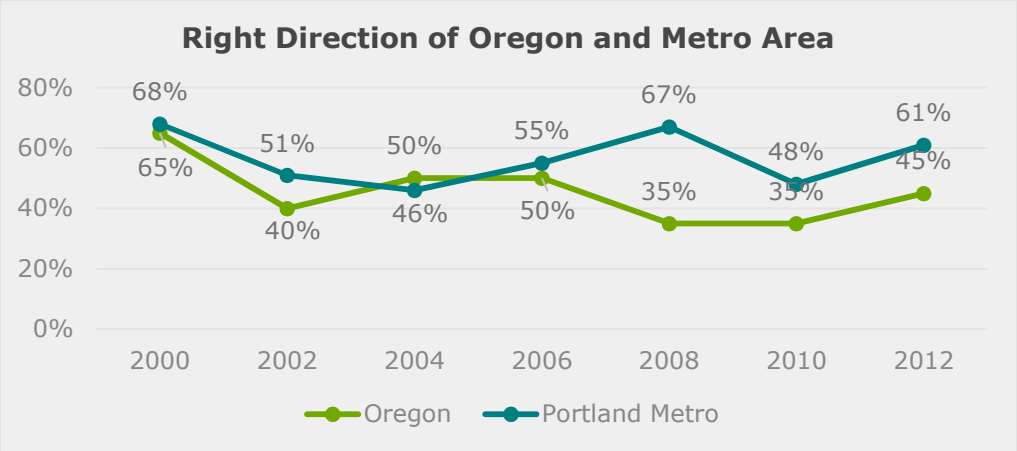
Most Important Issues in Oregon

Before recession (2007 and earlier)	During recession (2008 to today)
Public education	Jobs / economy
Healthcare	Public education
Taxes / government spending	Healthcare
Environment	Government waste

Environmental issues, including water quality, have taken a back seat to what residents consider higher priorities – the economy, unemployment, public education, healthcare, and government waste. However, Oregonians clearly value a healthy environment. In the Oregon Values and Beliefs Survey, Oregonians mention **environmental awareness** as the number one reason Oregon will be a better

place to live in 10 years (24%), even ahead of a stronger economy and economic growth (18%).

The public mood, as framed by whether people believe we are heading in the "right direction," shows that Oregonians continue to be pessimistic about the direction of the state, although recent numbers show some improvement.



Source: DHM Research

When right direction numbers are higher (60%+), the public expresses heightened awareness and concern for environmental issues, including water. In other words, when the public mood is more optimistic Oregonians care more about issues that affect the environment. Current right direction numbers hover around 45% across Oregon. As we would expect, then, residents express greater concern about the economy and less concern about the environment, and much less concern about stormwater issues. In the Portland Metro area, right direction numbers are closer to 60%. Residents in the Portland area are more likely to have a heightened awareness and sensitivity to environmental issues, including issues about stormwater. Portland residents are frequently more optimistic than other areas of the state, with lower unemployment, more job opportunities, and a larger population of younger residents who are generally more upbeat.

Public pessimism creates sensitivities for communications and public outreach. This applies particularly to the government or messengers that are linked to government. Many national and state surveys show that trust in government is declining and is at an all-time low. Thus, any outreach may be viewed with skepticism. Public outreach about stormwater would benefit from making the connection to what Oregonians value about their state – beauty, nature, outdoors – in order to resonate more strongly with the public.

3.2 | Top water values in Oregon

Water is highly valued by Oregonians. The quality of water is of high concern, especially in the context of drinking water.

90%+ are very and somewhat concerned about water quality (ODF, 2013)
75%+ believe it is very and somewhat important to fund protection of water and air quality (Oregon Values and Beliefs, 2013)
70% worry most about quality of drinking water and the health of rivers and streams, compared to 10% for industrial pollution and 5% for agricultural pollution (Earthfix, 2012)
47% value their local rivers most for a source for drinking water, followed by 19% who value rivers as a habitat for fish and wildlife (CWS, 2013)

Drinking water. People place a higher value on water issues that impact directly household activities, such as access to clean and good tasting tap water or sufficient supply of water for home and lawn use, than on overarching concerns for the water system or infrastructure. Water is most highly valued as a source for drinking water, as seen in a recent Clean Water Services study and across other local and national studies.

Water Values

Values about rivers and streams	Most important
Source for drinking water (current and future supply)	47%
Habitat for fish and wildlife	19%
Indicator of a healthy environment	14%
Natural beauty and open space	7%
Source of water for farming and agriculture	5%
Natural areas for recreation activities (fishing, hiking, swimming, paddling, bird watching, etc.)	5%
Drain away rain water	3%
Other	0%
Don't know	1%

Source: CWS, 2013

Women in particular have a tendency to rate water quality as a higher priority, which ultimately connects them to issues that impact drinking water. In general, women are consistently more concerned with environmental issues than men. People living near a river or stream also evidence greater connection and

awareness about water issues than those who are "non-streamside" residents (CWS, 2013).

Habitat for fish and wildlife. Another top-tier water value is the protection of habitat for fish and wildlife. Focus groups have shown that residents in the region link the well-being of fish and wildlife in rivers and streams to the quality of water – if fish and wildlife are thriving then rivers and streams must be clean and healthy. Not surprisingly, streamside residents rank the importance of habitat for fish and wildlife higher than non-streamside residents (CWS, 2013).

> **93%+** support improving flow of water to support fish, wildlife and water quality (CWS, 2013)
> **90%+** agree that native fish are an asset to Portland (Portland BES, 1999)
> **70%+** consider the Tualatin River important as a habitat for fish and wildlife (CWS, 2013)
> **7.9 mean** out of 10-point scale on importance of restoring healthy salmon runs (Clark County Environmental Issues, 1999)

Many residents have at least a basic understanding of the potential impact they have on water quality which impact habitat for fish and wildlife. In a recent survey of residents in Clackamas, Clark, Multnomah, and Washington counties, 54% feel "somewhat informed" about what they can do to maintain the health and water quality of local rivers and streams and 20% feel "very informed" (Regional Coalition of Clean Rivers and Streams, 2011). However, over 25% are not informed or report that they didn't know.

Little research examines public awareness about declines in number of fish and health of habitats. Residents seem to make a connection to less personal behaviors; when asked specifically about reasons for declines in salmon runs, 38% said it's due to overfishing and 36% said from water pollution. This is compared to 6% mention of runoff from homes and other human activities.

Other water values. Second tier water values that are important to residents include public health, recreation, and natural areas. Because this summary is focused on stormwater, our analysis will not explore these second tier values as related to water in general. Instead, these same values are linked to stormwater issues and are addressed later in this report under motivations for stormwater behavior change.

4 | STORMWATER

4.1 | Stormwater awareness

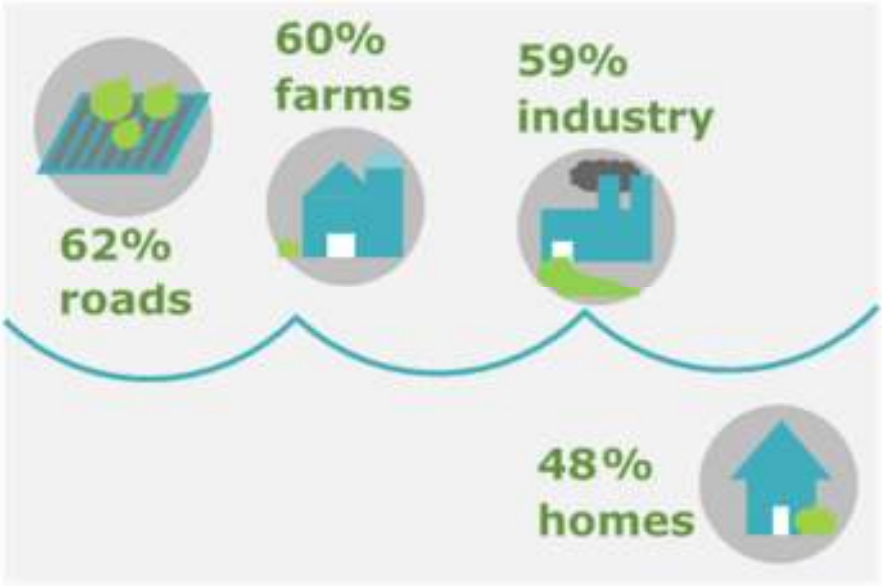
Residents in Oregon believe the greatest source of pollution in rivers and streams is:

a. Stormwater runoff from roads and hard surfaces
b. Factories and industry dumping waste
c. Farming and agricultural products from fields
d. Untreated sewage dumped into waterways
e. Discharge from sewage treatment plants

An EPA report shows 78% of the American public does not understand that stormwater runoff is now the most common source of water pollution and nearly half of Americans believe industry is the problem (EPA, 2009).

From a study conducted with residents in Oregon, Idaho, and Washington, at least 60% believe the most likely causes of water pollution are runoff from roads, pollution from industry, and chemicals from farms and agriculture (Earthfix, 2012). The perception of pollution from sewage is much higher in Oregon (60%) than in Washington (50%) or Idaho (30%). A majority of residents are uncertain or believe only a little pollution comes from households through the use of chemicals on lawns and gardens or from personal products like laundry detergent or prescription drugs.

Perceived Causes of Water Pollution in Pacific NW

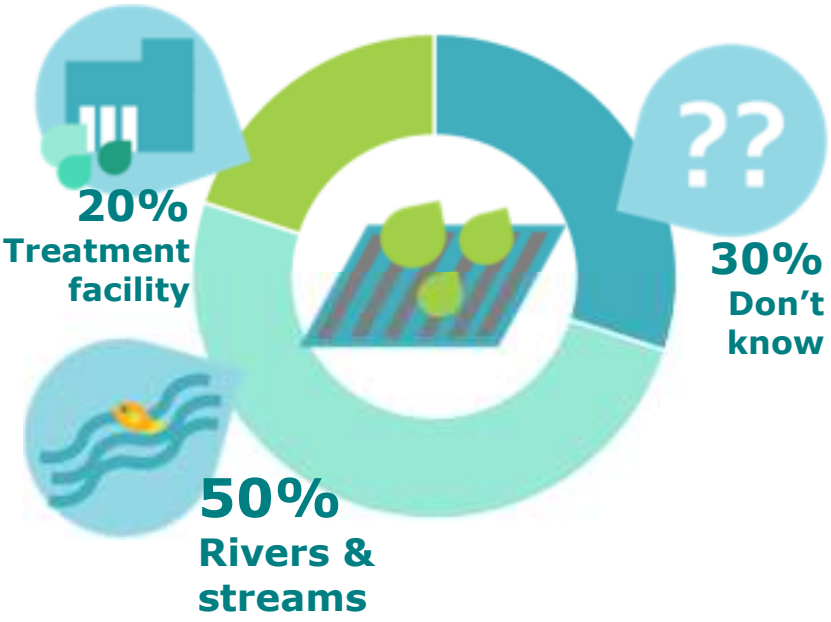


Source: Earthfix, 2012

In the Pacific Northwest, a recent Puget Sound study found 67% don't believe *fertilizers, oil, and other contaminants running off yards and streets* is the greatest source of water pollution in the sound. Instead, most cite industrial discharge, development, sewage treatment plants or other reasons, and about 25% report they don't know (Puget Sound Partnership, 2011).

People show high uncertainty or general lack of knowledge regarding what happens to stormwater when it enters storm drains. Roughly one half are aware that stormwater goes directly into a stream or river, about one fifth believe it is directed to a sewer treatment facility, and about one third aren't sure. These proportions are consistent with all major studies in Oregon. Inconsistent methodology across research studies makes it difficult to determine more detailed trends in awareness about stormwater.

Perceived Destination of Stormwater Runoff



Source: EPA, 2009, various studies

4.2 | Stormwater behaviors

We reviewed multiple regional, statewide, and national studies carried out from 1999 to 2013 in order to identify personal behavior related to stormwater runoff in Oregon. The specific stormwater behaviors can be grouped into four key areas:

1. Pet care
2. Car care
3. Lawn and garden care
4. Home care

Pet care

An EPA report in 2009 reported that residents do not recognize the extent to which pet waste is a major threat to water quality. According to the U.S. Pet Ownership & Demographics Sourcebook (2012), Oregon has one of the highest pet ownership rates in the country at 64%. While it is difficult to accurately report the local percentage, a 2011 Regional Coalition for Clean Rivers and Streams study found that 40%+ of respondents in Clackamas, Clark, Multnomah, and Washington counties own a dog. In Gresham, dog ownership ranges from 21% of streamside renters (Gresham Stormwater Survey, 2008) to 59% of lawn-owning individuals (Gresham Lawn Care Behavior Surveys, 2007, 2009).

People are more likely to immediately pick up their pet waste when walking their dogs compared to when dogs are let out in a yard. When walking their dog, upwards of 90% pick up pet waste immediately. Only 2% of dog owners in Gresham who take their dog to the park report not picking up after them (Gresham Stormwater Survey, 2008).

The rate of pick up drops when compared to what happens at home: only one quarter (26%) pick up pet waste in their yards regularly (daily), another quarter pick up every 2-3 days, and a third pick up once a week or a couple times each month (Regional Coalition of Clean Rivers and Streams, 2011). Overall, 21% of Gresham dog owners report never taking their dog on walks or to the park (Gresham Stormwater Survey, 2008).

A study in nearby Pierce County, Washington (2009) showed "proper behavior" (picking up droppings, bagging, and placing in the trash) was more common in cities than in unincorporated areas (44% vs. 26%).

Picking up Pet Waste in Oregon

Source: Regional Coalition of Clean Rivers and Streams, 2011

Top reasons for not picking up after pets include inconvenience and unpleasantness. Incentives for picking up more often were:

1) free collection device (scoopers or bags)
2) monetary fine
3) health of family and pets

In Gresham, 35% of dog owners going to the park use the available dog bag dispensers, suggesting that the convenience of city-provided dispensers plays an important role in whether pet owners pick up after pets. Usage varies widely across demographic groups, however, from over six in ten renters to four in ten non-streamside homeowners and two in ten streamside homeowners (Gresham Stormwater Survey, 2008).

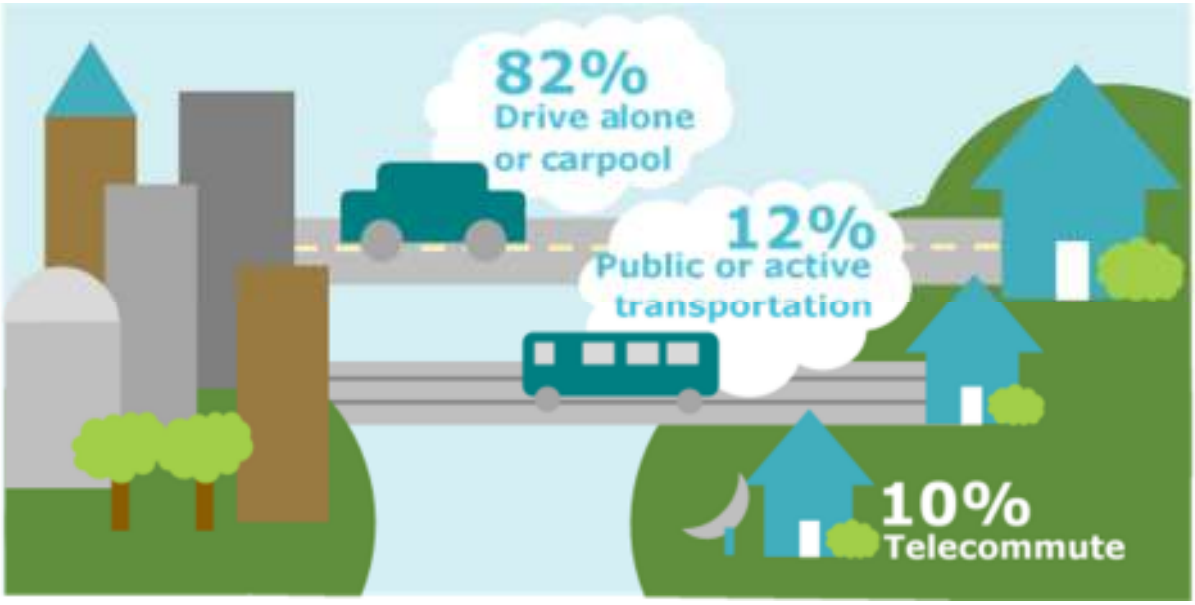
Residents do not automatically make the connection between improved water quality or household health and picking up pet waste. General values around water are not top of mind for this specific behavior (Regional Coalition of Clean Rivers and Streams, 2011). Any public outreach and communications to change behavior will require connecting the dots to water values, providing a clear message about picking up pet waste and the connection to improved water quality.

Car care

Most of the research on car care involves hazardous materials on impervious surfaces or materials washed directly into storm drains. Common activities that contribute to stormwater runoff include vehicle washing and maintenance. We discuss how these individual behaviors and general trends in car usage affect stormwater issues.

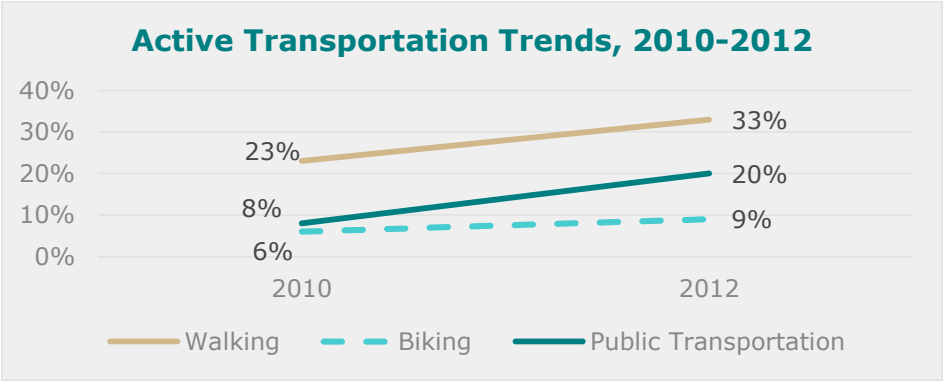
Cars are still the most frequent mode of transportation in Oregon with 82% driving alone or choosing carpool to get to work or school, and about 12% using alternative modes like public transportation.

Modes of Transportation in Oregon



Source: US Census, 2012

Transportation patterns are similar across the country and there is evidence that use of alternative modes of transportation is increasing. A recent telephone survey of Metro area residents conducted for Metro Regional Transportation Options showed an increase from 2010 figures in the number of people walking, using transit, and biking at least weekly as a form of transportation.



Source: Metro RTO, 2012

Vehicle washing. According to the EPA, "outdoor car washing has the potential to result in high loads of nutrients, metals, and hydrocarbons during dry weather

conditions in many watersheds, as the detergent-rich water used to wash the grime off our cars flows down the street and into the storm drain" (EPA, 2009). Commercial car washes are the preferred alternative, as most capture waste water which is subsequently treated before it goes into the sewer system. Another alternative option is washing vehicles on pervious surfaces such as a lawn or dirt in order to filter residue.

Across Oregon, upwards of three quarters of residents wash their vehicles at home, though this number varies depending on geography and demographics. In the Portland Metro area, 45% never wash at home while 32% wash their vehicle 1-3 times per year at home (Regional Coalition for Clean Rivers and Streams, 2011). In Eugene, 61% wash their vehicle at a commercial car wash, and 36% at home on a paved driveway or street (Eugene Stormwater Management Report, 2013). The Gresham Stormwater Survey (2008) found that about one third of home owners never wash their car at home, while the rate was about 50% for renters. However, one third of those washing their car at home reported a willingness to use a car wash.

Further afield, 31% of Puget Sound residents always use a commercial carwash facility and 69% wash their vehicles at home (Puget Sound Partnership, 2011). This high variability in behavior may be due to a combination of lifestyle factors including time of year, urban or rural locations, access to facilities, cost, and general knowledge of alternatives.

Those washing vehicles at home are most likely to be homeowners, those with children and/or dogs, and those who do not have a college degree (Gresham Stormwater Report, 2008; Eugene Stormwater Management Report, 2013). In Gresham, these same groups are also less willing to change their behavior and begin using a car wash facility (Gresham Stormwater Report, 2008).

The top reasons for washing their vehicle at home rather than a carwash facility typically include:

1) perceived expense or higher cost
2) perception that hand washing is better for vehicle care
3) perception that hand washing gets the car cleaner

A primary incentive for washing vehicles at a carwash and motivation for changing behavior is discounts or coupons (reducing the perception of higher cost). Messages about the environmental benefits of commercial car washing, such as *facility uses recycled water* or that it *protects water quality or wildlife*, can help to supplement

motivations but tend not to be primary drivers of behavior change (Regional Coalition for Clean Rivers and Streams, 2011).

Vehicle maintenance. Relevant behaviors related to home vehicle maintenance include changing oil and antifreeze, addressing leaks in a timely manner, and proper disposal of vehicle related chemicals such as oil, solvent, grease, and fuel.

In the Gresham Stormwater Survey (2008), about 25% of residents change their own oil or antifreeze. Of those, 86% report using an acceptable disposal[1] method. Although 7% reporting placing it in the trash, an undesired behavior, none reported pouring it on the ground or into a storm drain. In the Puget Sound area, roughly one half of residents perform maintenance on their cars at home and most say they properly dispose of hazardous materials (Puget Sound Partnership, 2011).

In the Metro Household Hazardous Products Survey (2007), very few people dump chemicals in storm drains (<1%) and the vast majority take leftover motor oil to a facility or recycle at curbside with their regular pick-up (31%-96% depending on product type). The survey also found that even if residents use a less preferred method to dispose of other household hazardous materials (throwing in trash, pouring down sink, or pouring into a storm drain), they seem to take extra care with vehicle materials like motor oil.

Addressing unintentional spills of hazardous materials on driveways or fixing vehicle leaks in order to prevent further spills or damage is another car maintenance issue. In the Puget Sound (2011), 74% of respondents report fixing oil and fluid leaks promptly either always or most of the time, 12% report doing so sometimes or rarely/never, and 14% weren't sure. Existing research does not speak clearly as to whether residents link prevention of vehicle leaks and spills to protection of water quality. More research may be needed to explore motivations around this behavior change.

Vehicle trends. National and local studies highlight changes in travel behavior that may ultimately impact the number of vehicles. A 2013 study by the Public Interest Research Group showed that "for eight years in a row, Americans have been driving less on a per person basis than the year before." Younger generations are driving less and are also less likely to have a driver's license than any generation before them. A study done this year by the Centers for Disease Control and Prevention found that the percentage of high school seniors who had a driver's license fell from 85% in 1996 to 73% in 2012. Furthermore, it appears that this generation is not

[1] Curbside recycling, take back center, or collection event.

merely postponing acquisition of a driver's license; rather, many of those without a license do not ever intend to get one.

Other studies also indicate that Millennials (people born between 1983 and 2000) are more multi-modal than previous generations. This group is quickly embracing newer alternatives such as car-sharing, bike-sharing and ride-sharing, modes of transportation that require less or better vehicle-related care. Another trend is foregoing a vehicle altogether, mostly in urban regions. Currently, about 15% of Portlanders and 8% of Oregonians do not own a vehicle (U.S. Census), and that trend will likely increase as more Millennials choose a no-car lifestyle.

High School Seniors without a Driver's License Nationally

Source: US Census, 2012

Lawn and garden care

Roughly 80% of residents have a lawn or garden in the Portland Metro area (Metro Sustainable Living, 2012). Lawn ownership increases with incomes greater than $75,000 (95%+).

Nationally, upwards of 75% of homeowners use at least some lawn and garden chemicals some of the time with roughly 25% classified as "heavy users." The exact rate of usage for each varies by geography and time of year. People in colder climates tend to use herbicide application to kill the weeds that arrive with the onset of spring whereas people in warmer climates use more pesticides where insect-control is a year-round problem (EPA Best Management Practices, 2009).

Lawn and Garden Behavior Nationwide

Source: Various Surveys Nationwide, EPA 2009

Similarly, in a statewide DEQ study (DEQ Household Hazardous Waste Survey, 2008), 70% of residents managing their lawns purchase lawn and garden chemicals. Half (52%) report using a spot spray or weed and feed product, another quarter (24%) report using both a chemical and a natural type product, and 18% report not knowing which type of product they apply (chemical or natural).

Specifically, when asked what products they apply to their entire lawn, the responses were as follows:

- Weed and feed: 43%
- Weed killer: 31%
- Fertilizer: 48%
- Insecticide: 18%
- Moss controller[2]: 20%

The DEQ survey (2008) also found that about 40% of Oregonians practice low-intensity turf management practices (less watering, setting the mowing blades higher, and grasscycling), whereas 64% report watering twice or more per week. Results also showed that use of lawn care products was lowest among households with less than $25,000 and highest among those earning $75,000 or more. The majority (51%) of those earning more than $50,000 reported using weed and feed and were significantly more likely than those earning less than $50,000 (only 33% use) to do so.

Many residents seem to have an awareness of the harmful effects of lawn and garden care products. Any resistance toward alternative products or methods stems primarily from the perceived inconvenience and cost (common barriers to behavior

[2] More information on Moss controllers included in the home care and maintenance section.

change). One of the largest barriers to reducing or eliminating the use of lawn care products is the perception that a "lush" green lawn is necessary (EPA Best Management Practices). Research shows that this cultural ideal may be more difficult to overcome than other barriers.

There is some difference in lawn care between rural and urban areas, with those in rural areas using more lawn and garden chemicals that those in urban areas. The statewide DEQ Household Hazardous Waste Survey (2008) found that those living in rural areas are more likely than urban residents to use high intensity turf management (lots of watering, mowing and fertilizing) as well as lawn chemicals. Roughly 15-20% more residents in Clackamas and Washington Counties report using chemical products in their lawn or garden compared to those in Multnomah County (Metro Sustainable Living Survey, 2012). In the Tri-County region, one third use chemical products, another third use organic products, and the remaining third use a combination or forego products altogether. When asked, close to 80% believe it's important to have a chemical-free lawn or garden.

Focus group research has shown residents are most concerned about the health of children and pets when considering the use of lawn and garden products, rather than about the impact on our waterways (Coalition for Clean Rivers and Streams, 2011). Messages around safety of children and pets were highly effective in focus group testing. Additionally, the Gresham Lawn Care Behavior Surveys (2007, 2009) found that 82% of women (and 74% of men) feel that weed and feed products are potentially harmful to children and pets.

Other findings from the statewide DEQ survey (2008) show that 7% of those using products on their lawn report using organic products, while 69% of those using products on their own lawn report not trying natural products because they do not know enough about them. More than 50% believe that chemicals are easier and more effective to use than natural products.

Research often shows demographic differences in lawn and garden care behaviors. Women, more than men, tend to have a greater awareness of harmful effects of lawn chemicals on water systems. Women also have significant influence over changing behavior in the household. Of the 80% of respondents who believe having a chemical-free lawn is at least somewhat important, the majority were women, living in Multnomah and Washington Counties, and under the age of 55. Those who use organic or less toxic products were primarily women, residents of Multnomah County, and those in the higher income brackets (Metro Sustainable Living Survey, 2012). In Gresham, a 2009 Lawn Care Survey found that younger residents, women, and those with children were more likely to let their lawn go brown during

the summer, while those preferring to keep a green lawn were male, older, and in households without children.

Demographics for Lawn and Garden Behavior

Chemical-free Lawn	Organic/Less Toxic Products	Let their Lawn "Go Brown"
Women	Women	Women
Multnomah County	Multnomah & Washington Counties	Households with children at home
Younger Ages	Higher incomes	Younger ages

Source: DHM Research, 2012

A smaller segment of the population uses outside companies to manage their lawn or have Home Owner Associations (HOA) that dictate the standards for the outward appearance of lawns and gardens. In the Gresham Stormwater Survey (2008), 15% report hiring a landscape service for all lawn care or just for fertilization. Statewide, the rate of landscape service use was 7% (DEQ Household Hazardous Waste Survey, 2008). The Gresham survey also found that 20% use organic options, but most (78%) do not use an organic option and do not know if their company offers that service.

Survey respondents in Gresham who use a landscape service report that they would select natural or organic products for their lawns if offered the choice (93%) (Gresham Stormwater Report, 2008). While landscape service users comprise a small portion of the population, the Gresham findings suggest that education of landscape firms or landscape service customers to use and/or request organic products could lead to fewer chemicals being used for lawn care.

In the Pacific Northwest, another consideration for lawn and garden care is proper application of product during our long rainy season. A recent survey in Clark County found that residents are split on whether it is best to water their lawn after applying fertilizer: 46% believe it is best to fertilize when rain is forecasted and 33% when no rain is forecasted (11% say it doesn't make a difference, and 10% don't know; Clark County Stormwater Report, 2011). This is an opportunity to further educate the public on smart application of lawn products.

Little research has examined the extent to which residents dump extra grass clippings in natural areas. The Gresham Stormwater Survey (2008) found that 25% of streamside homeowners and 16% of non-streamside homeowners put extra grass clippings and pruning in a nearby natural area. Only 5% of streamside renters dump extra clippings, but this rises to 20% for non-streamside renters. Groups most likely to perform this behavior include women and those with dogs.

Home care and maintenance

Existing research on home care behaviors that impact stormwater is minimal. The most relevant studies are from Metro (Sustainable Living 2012 and Household Hazardous Products 2007). For this report, home care includes:

1. Household chemicals and paint
2. Illegal burning/burying of trash
3. Septic systems and Recreational Vehicles
4. Home exterior care

Most research studies have focused on household chemical use, typically in the context of impacting treated water supplies. Dumping chemicals into storm drains is an extremely uncommon practice across the board; most residents opt to completely use the product. At least 20% of residents take products to recycle centers, while less than 10% place it in the garbage (Metro Household Hazardous Products, 2007). In Metro's Sustainable Living Survey (2012), when asked how they dispose of chemical products from their home such as solvents, cleaning supplies, old paint or pesticides, 37% either bring it to Metro or a recycling center. While "dumping" was not listed as an option, only 3% or less chose all other responses. There may be an opportunity to persuade residents to consider alternatives, as close to 80% express apprehension about the chemical products they use in their homes (Metro Household Hazardous Products, 2007).

Very few people bury or burn their trash. Nonetheless, like dumping chemicals, this is an area of research that could be expanded. In the Gresham Stormwater Survey (2008), one of the few surveys which mentions this practice, respondents clearly understand that burning garbage is illegal and very few use this method of waste management (5-10% depending on streamside location). Even fewer bury their garbage; fewer than one in twenty report this behavior.

Use and maintenance of septic tanks is another area under home care that impacts water issues. Among those who have septic tanks, regular maintenance appears to be uncommon. Most respondents in the Puget Sound (Water Pollution in Puget Sound, 2009) report that they would wait for a smell, wet ground, or a back-up to "know that they had a problem." Only half schedule maintenance checks every 2-3 years. In Gresham, septic tanks are most common among streamside residents, although relatively uncommon in the region as a whole (Gresham Stormwater Report, 2008). More research needs to be done on this correlation.

Proper disposal of septic waste by Recreational Vehicle (RV) owners also impacts water quality. RV ownership in the region is relatively uncommon and the few residents who do own RVs are very likely to be disposing of septic waste at a pump

station. The Gresham Stormwater Survey (2008) found that about 10% of homeowners own an RV and no renters report owning one. When asked about disposal practices for RV septic waste, 88% report disposing of the waste using an acceptable method, 5% do not know how it was disposed, and 5% report dumping waste onto the street or storm drain.

Few research studies address the application of fungicides on roofs to prevent moss. Use of fungicides may be more pertinent to regions west of the Cascades. Nonetheless, only a small portion of the population reports using fungicides. In a Clean Water Services Stream Habits Survey (2002), a majority of respondents indicate that they never treat their roofs (62%) and those who do, typically do so once a year or less. A similar number in Clark County (Stormwater Report, 2012) also report never applying a fungicide to their roof, walkway, or hard surface. A statewide DEQ survey (DEQ Household Hazardous Waste Survey, 2008) found that 20% of respondents apply moss controller on or around their home.

Future research should also consider issues related to downspouts, especially in conjunction with roof application of fungicides. Most houses have some sort of downspout. Downspouts can release runoff onto hard surfaces such as driveways rather than collection containers or pervious surfaces. More research needs to be done on local awareness of this issue and alternative approaches.

5 | MOTIVATIONS FOR BEHAVIOR CHANGE

People's motivations to change behavior around stormwater issues tend to be consistent across the nation. Although most of the research evaluated for this summary is in urban areas (specifically Portland Metro), there is little indication that primary motivations would differ between urban and nonurban residents. One area for further research is to examine motivations among communities of color – there is little to no research currently available in Oregon on ethnic differences in motivations for change.

Top motivations for stormwater behavior change include:

1) Safety of children and pets
2) Saving money or discounts
3) Protection of drinking water and public health
4) Fish and wildlife
5) Natural resource and recreation

Safety of children and pets. In both survey and focus group research, the safety of children and pets ranks in the top tier of concern for the use of chemical products in lawns, gardens, and in the home. Message testing in focus groups often shows that the presence of children and pets drives changes in behavior – households with these vulnerable groups are also more likely to use organic products or forego chemical use altogether in their home. Research also shows women are more likely to be concerned about chemical products (and water quality); they are often the best drivers of change in households.

> **Recommendation:** Link stormwater behaviors to the safety of children and pets, as appropriate. Consider mothers as messengers to target other females. Provide alternatives to chemical products in messaging – direct residents to safer and other effective alternatives.

Saving money or discounts. For some, saving money is the biggest motivation to change. With regards to car washing, this would be in the form of coupons to commercial car washes. For proper pet waste disposal, it could simply be free bags or scoopers. Saving money is a nuanced motivator when it comes to stormwater behaviors; it can be a key driver for some and not as effective for others. The perceived benefit of saving money will reach a cap if individuals feel any particular behavior is inconvenient or does not make much of a difference.

> **Recommendation:** Partner with organizations and businesses in the community to offer discounts for preferred behaviors. Communicate that saving money is an added benefit and not the first benefit.

Protection of drinking water and public health. Studies show that the public is more likely to change their behaviors if water conservation and preservation outreach includes a reference to the protection of drinking water. The impact is greater if residents know the source of their drinking water. Protection of drinking water is closely associated with Oregonians' values. Both focus groups and surveys show residents closely associate quality drinking water to good public health.

> **Recommendation:** Strengthen the connection between stormwater and drinking water. Inform the public about how clean rivers and streams equate to clean drinking water. Messages that make explicit the connection to drinking water will be more effective motivators than ones about general water pollution. Water pollution does not necessarily resonate with the public because a large portion of the population is unaware of the source of their drinking water.

Fish and wildlife. The value and importance of fish and wildlife habitat in Oregon remains high. Natural habitat is consistently in the top tier when ranking protection of water quality and natural areas across urban, rural, and suburban areas. Oregonians connect the health of fish and wildlife to the quality of water.

> **Recommendation:** Messages about stormwater should connect more directly to fish and wildlife habitat – stronger habitat means healthier rivers and streams, which are better for all of us.

Natural areas and recreation. Oregonians value the bounty and variety of natural areas and open spaces the state has to offer and they actively enjoy the outdoors. Natural beauty, scenery, and easy access to recreation and the outdoors are some of the strongest values for residents about Oregon. Though these values are generally high across the state, some communities may place greater importance on natural areas and access to recreation. Residents of Central Oregon and Bend, as an example, may emphasize access to recreation more highly than other motivators.

> **Recommendation:** Link stormwater projects to not only improving water quality but also creating natural areas and green spaces. As appropriate, make the connection to recreation and access to recreation, and how stormwater projects help to maintain a key value for Oregonians.

Note: People may mention **disincentives** as a motivation for behavior change. However, people are more likely to suggest disincentives as a way to change other peoples' behavior rather than as an effective method to modify their own behavior. As an example, dog owners would like to see fines for other dog owners who do not pick up after their pet. Disincentives or additional charges can be effective in some contexts but traditionally are not a major motivating factor and should be considered a last option.

6 | BARRIERS TO BEHAVIOR CHANGE

Barriers to behavior change related to stormwater can also be grouped into broader categories. Top barriers to behavior change include:

1) Inconvenience
2) Lack of knowledge
3) Higher cost
4) Perceived lack of impact
5) Perception that product is less effective
6) Mixed messages

Inconvenience. Behavioral changes that are perceived to be inconvenient or to take more time are difficult to effect. Cost savings alone provide insufficient motivation; residents report that saving money is not enough to change their behavior if the change is less convenient for them. It is worth noting that a portion of the population perceives any change in their current behavior to be inconvenient; this group is not a good target for behavior change.

> **Recommendation:** Provide easy resources, such as information on websites and through retailers, instruction stickers on recycle bins, and clear and simple instructions on products. Inform residents about alternative products or services; make it available and easy to find. Message around how simple steps can make a difference.

Lack of knowledge and awareness. A general lack of knowledge is a common barrier to behavior change, in particular as it relates to stormwater. A majority of residents are unaware of the source of their water, where runoff goes once it enters storm drains, the toxicity of household products, how pet waste is contributing to water pollution, or that carwash facilities are better for our waterways than washing vehicles at home. Many residents are simply unaware of the issues stormwater runoff poses to local rivers and streams.

> **Recommendation:** Connect common activities to their direct impact on local rivers and streams (and less on general waterways). Mention specific rivers and streams as much as possible; highlight rivers and streams as a source for drinking water.

Higher cost. A common perception is that alternative products or services cost more. Although cost is a key motivation for some, for most people it is not the primary driver of behavior change. However, because the perception of higher cost can easily prevent people from even considering alternatives, cost should be addressed in public outreach. Information and knowledge of resources and alternatives can overcome concerns over cost.

Recommendation: Do not lead behavior change messages with mentions of cost or arguments that some alternatives cost less. Other benefits in tandem with saving money are more effective to change behaviors; link to those benefits first before addressing perceptions around cost.

Perceived lack of impact. One of the easier barriers to overcome is the perception that individuals have little impact on improving water quality. Research consistently shows that the public perceives industry and farms to be the biggest contributors to water pollution and that they as individuals have less impact or are unable to make changes that count. Messages often link stormwater runoff to large bodies of water (global issue), and less on specific rivers and streams (local issue). In more recent years, a growing segment of the public is connecting runoff from roads and household behaviors as significant contributors to water quality.

Recommendation: Messaging should continue to connect how individual behaviors impact local rivers and streams (rather than general bodies of water). Name specific rivers or streams as much as possible to connect closer to "home." Be specific about the activity or preferred behavior, like picking up pet waste in the yard or reducing soapy water. Sometimes, simple suggestions that are easy enough to tackle are usually enough to persuade changes in behavior.

Perception that product is less effective. Some people believe that less toxic products will not be as effective as chemical products. This is especially the case for household products. Similar to perceptions of higher cost, outreach around the perception of a less effective product is better addressed with other benefits and more emotional motivations.

Recommendation: Do not lead behavior change messages by persuading residents of how alternative products and services are just as effective as products or services that use chemicals. Link to other benefits first, in particular ones that spark more emotion like the safety of children and pets.

Mixed or too many messages. We commonly hear in focus groups that messages around stormwater have too many instructions, aren't simple, sometimes conflict with product labels, or seem too big to tackle by one individual. Another barrier is mistrust in the messenger; government messengers are more effective around public health and less as a source for preferred behaviors, products, or services.

Recommendation: Give simple and easy suggestions around behavior change. Partner with local community organizations, small businesses, and university 'experts' as messengers. Save government messengers to message around improving the health of the community, or public health.

7 | MESSAGING FRAMEWORK

This framework for messaging is a general guideline for communications about stormwater in Oregon. Many of the recommendations are supported by focus group and survey research conducted for ACWA members, and the decades of past work by DHM Research on stormwater and related issues.

The framework is meant to present broad rules for communications, and may not apply uniformly to specific demographic groups such as communities of color or younger residents. Additional research is needed to determine if messages resonate differently among particular groups.

Messaging recommendations for stormwater communications:

- Connect to **Oregonians' values**, specifically to preserving the natural beauty of our state, the outdoors, water, trees, and nature. Water evokes strong emotions in people; this is an opportunity to engage Oregonians on something they care about.
- Use a **positive tone** and **focus on outcomes**. What are the benefits to individuals? How does it connect to their core values? Why change behaviors? Keep a focus on maintaining our quality of life, and specifically to improve our rivers and streams for future generations. This is more easily understood and resonates with the public. It also communicates a message that there is a plan for the future. Failed policies or consequences of bad behaviors are weak reasons for behavior change. Stick with a positive tone.
- Link stormwater more to **drinking water**. Protection of drinking water is one of the best motivations for changing behaviors. Mention and include **specific rivers and streams** to make a stronger "local" connection to a drinking water source. Relate how individuals' behaviors impact their community to more effectively address how individuals can make a difference in their own "backyard."
- Another top motivator is protecting the **health of children and pets**. Link stormwater behaviors to the safety of children and pets. This is highly effective in both focus groups and surveys, especially among women.
- Consider **mothers as messengers** to target the strongest base of supporters – females, Democrats, and people with higher education/income. Other research also shows that women are strong messengers, often the most effective messengers, around improving the health of families.
- Mention how stormwater projects create **natural areas and green spaces** and, when appropriate, improved recreation and access to recreation. This is another key reason why residents value living in Oregon – connect to values that resonate with the public.

- Suggest **simple steps** to behavior change. A large number of residents are uncertain or confused about what actions they can take. They are also unsure of where to find additional resources on alternatives. Provide simple changes and link those to outcomes. Be specific. "Use organic lawn and garden products to keep children and pets safe from chemicals." "Pick up pet waste to minimize bacteria in yards and parks, which may drain into our source for drinking water." "Consider carwash facilities to reduce soapy water in our rivers and streams."
- **Partner** with community organizations, small businesses, retailers, and university experts as spokespeople around preferred stormwater behaviors. They are often better messengers than government, environmental groups, and utilities that may be viewed by the public with skepticism. A better angle for government and utilities is around public health. Protecting water quality, clean drinking water, and maintaining water and sewer systems are seen as good public services.

Other considerations for stormwater communications:

DO NOT lead with saving money as the key motivation for behavior change. Instead, lead with other values and include saving money as an added benefit.
DO NOT get bogged down in too many details and instructions. Keep it simple and easy.
DO NOT start with government messengers. They evoke a high sense of skepticism due to increasing distrust in government generally.
DO NOT talk about water pollution in general terms. It's too broad and global, and leaves people with a sense that their behavior won't make a difference. Link to local rivers and streams. Name them.
DO NOT persuade residents that alternative products are just as effective as chemical ones. Let them come to that conclusion. Instead, move people with other values like the safety of children and pets.
DO NOT use words like infrastructure, sustainable, herbicides, pesticides, etc. Use words that express benefits for the individual.

Words to use	Words to avoid
Water	Waste water, stormwater
Quality of life, communities	Sustainability, livability
Nature, maintain our water source	Infrastructure
Natural, organic, compost, native plants	Sustainable, green
Kills weeds	Herbicides
Kills insects	Pesticides

8 | MEDIA REVIEW

In order to gain a more comprehensive overview of stormwater issues, a simple media search was conducted to analyze how media approached stormwater, individual contributing behaviors, and related news in Oregon during the past year (January 2013 – November 2013). Newspapers with archives available online and with an adequate amount of content were searched for stories relating to stormwater runoff; this included The Oregonian, Oregon Public Broadcasting, The Portland Tribune, and The Bulletin (The Salem Statesman Journal was not included due to subscription requirements when viewing archives. A national search for stormwater issues during the same time was also conducted to provide additional context. This summary is intended to offer a broad overview of how the media is approaching stormwater related issues.

National coverage. Nationally, stormwater issues are covered infrequently by major news networks. Stories are often a 'side effect' of other issues, such as a court case or policy change. Two recent national stories exemplify this kind of reporting. One involves Senator Tom Udall (D-NM) proposing a bill to reduce pollution caused by stormwater runoff. The second story involves a successful appeal by a West Virginia chicken farmer who was threatened with fees by the EPA if the farm did not comply with stormwater permits. These stories were covered by several news agencies. News coverage on stormwater is more often linked to conflict versus education or general public knowledge.

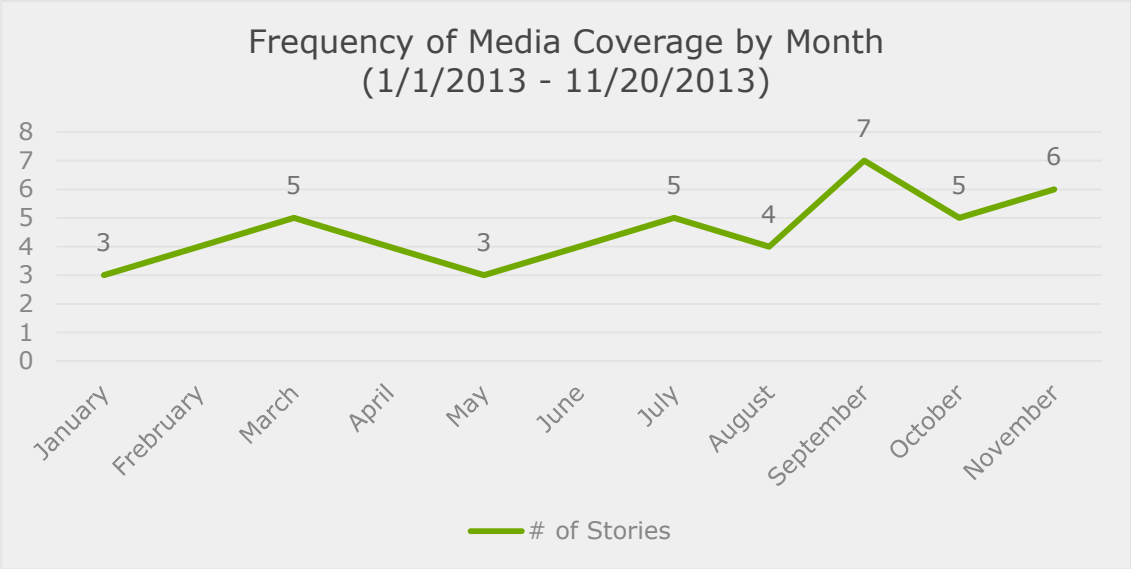
Local coverage. Statewide, individual news agencies were searched online for the terms "stormwater", "runoff", and "stormwater pollution". Relevant news stories were grouped into categories based on their major topic area:

- Environmental concerns: Pollution
- Infrastructure construction: Completed or planned projects regarding stormwater construction, bioswales, riparian growth, technology
- Court case: Court rulings, lawsuits, fines, etc.
- Development details: Master plans, open houses, updates
- Policy: Proposals, bills, city government decisions
- Stormwater advocacy: Information on stormwater as primary topic

Topic of Media Coverage	No. Stories
Infrastructure construction	**27**
Court case	8
Development details	7
Environmental concerns	3
Stormwater advocacy	3
Policy	2
Total	**50**

Type of Media Coverage	No. Stories
News	**40**
Public announcement	5
Photo/video feature	3
Editorial	2
Total	**50**

More often, local news highlights a local stormwater infrastructure related project, lawsuit, or development plan that also involves stormwater systems. Individuals relevant to the individual story are cited either as the source of a city project to help prevent stormwater runoff (city official) or as a specialist who can provide background information on why stormwater runoff is important to address (environmental advocacy group, for instance). Infrastructure is a common topic but often emphasizes threats of flooding or complying with regulations rather than pollution. Generally, detailed descriptions of stormwater pollution are brief unless highlighted in a feature article.



The Oregonian is by far the leading source of stormwater news, followed by OPB. Story frequency did not seem to be affected by any significant events. Significant stormwater related events occurring in recent months, including a conference on the topic, received no news coverage.

The tone of the news stories also varies. Most stories depict straight news in a neutral tone, closely followed by stories with a positive tone. Negative stories tend to have stormwater as a side issue, and not necessarily as the main story.

Source of Media Coverage	No. Stories
The Oregonian	**24**
OPB	17
Portland Tribune	8
The Bulletin	1
Total	**50**

Tone of Media Coverage	No. Stories
Neutral	**24**
Positive	21
Negative	5
Total	**50**

Messengers named in stormwater stories are most frequently city officials. This reflects the nature of the stories found: most relate to infrastructure plans and projects where stormwater is not the primary issue. A city official related to the project or topic is often cited in these cases. At times, larger environmental or water related advocacy groups are also cited.

Messengers in Media Coverage	Frequency
City officials (water, BES, environment)	**18**
City officials (planner, engineer, council, etc.)	**11**
Environment/water advocacy group	8
Tualatin Riverkeepers	5
State/regional officials	5
Attorney	3
Citizens	3
Project/construction member	2
Professor/expert	2
Water utility management	1
Other advocacy group	1
Author	1
Private stormwater management company	1
Private investment firm	1
Company CEO	1
HOA board member	1

9 | FUTURE RESEARCH

Oregon is fortunate to have a great number of nationally recognized leaders in stormwater services. We have also benefited from the depth and breadth of research that has been conducted across the state, as demonstrated in this review. Yet many opportunities exist to expand on this research to help guide our leaders and policy makers. The following are some suggestions for future research, and approximate costs to keep in mind for budgeting purposes.

Community research in rural communities
Unfortunately, much of the existing research has been conducted in Portland Metro Area. While there is reason to believe that Oregonians broadly share many values – particularly about the state's natural environment – it should not be assumed that knowledge and behaviors about stormwater are the same in every community. Not only may values differ across the state, but water issues are also varied. Concerns about the impact and causes of stormwater pollution are likely to be different in communities in the high desert, Willamette Valley, and along the coast. To learn how, and to what degree, it will be necessary to conduct research in those communities.

Methods: surveys, focus groups, and in-depth interview

Message testing
At a high level, this review has provided good guidance on the motivations and barriers to stormwater behavior. We know less about what specific messages are most effective, with which audiences, and using which communication mediums. More refined research that could demonstrate how to target key audiences could be an important line of research.

Methods: surveys and focus groups

Benchmark studies
While values are slow to change, awareness of issues and prioritization of those issues can change relatively quickly. The organizations most effective at maintaining public opinion in their favor regularly conduct benchmark studies. These are studies that are repeated over time, often once every one to three years, to measure changes in attitudes, behaviors, and responses to key messages.

Methods: surveys

Stakeholder and opinion leader studies
Key stakeholders and opinion leaders often shape the perspectives of the general public and are instrumental in driving public policy. It is advisable to conduct research with these individuals to better understand their specific concerns.

Method: in-depth interviews

Costs

The following are cost estimates for telephone surveys, focus groups, and in-depth interviews. The high dollar range is assuming a full service project including reporting and analysis. The low dollar range would provide less support in the research design, implementation and level of analysis.

Telephone surveys

N-size	Margin of Error	Length	*Cost*
300	±5.7%	5 minutes (~15 questions)	*~$9,000 - $11,000*
400	±4.9%	10 minutes (~30 questions)	*~$15,000 - $18,000*
500	±4.4%	15 minutes (~45 questions)	*~$23,000 - $28,000*

Focus groups

Focus groups are structured conversations with 8-10 people who are recruited from the population of interest. Often the participants are recruited at random from customer and voter registration lists. Quotas are established by key demographics (e.g., age, gender, household size) to ensure a representative sample. Multiple groups are recommended for group-to-group validation. Full service would include topic guide development, participant recruitment and honorariums, facility and hosting, moderation, professional videography, transcribed written exercises, and full reporting and analysis.

Cost: $6,000 - $8,000 per group

In-depth stakeholder interviews

In-depth stakeholder interviews are one-on-one structured conversations with key decision-makers and opinion leaders. They are typically 30-45 minutes in length. Full service would include interview guide development, participant recruitment and honorariums, interviews, and full reporting and analysis.

Cost: $200 - $400 per interview

10 | EXISTING ACWA RESEARCH

Year	Study	Sample Size	Method	Stormwater Awareness	Water Values	Household Hazardous Materials	Lawn and Garden Care	Car Care	Pet Care	Illegal Dumping	RV Waste
2013	Clean Water Services Customer Values Survey	944	Online		x						
2013	Eugene Stormwater Management Survey	400	Phone	x			x	x			
2012 2011	Portland Community Surveys	3,400 3,731	Mail	x	x						
2012 2010 2008 2006 2002	Clean Water Services Customer Service Surveys	400-1500	Phone Online	x	x	x					
2012	Clean Water Services Stormwater Survey	1696	Online	x	x	x	x				
2012	Metro/DHM Sustainable Living Survey	300	Phone			x	x				
2012	Oak Lodge Sanitary District Satisfaction Survey	907	Phone	x							
2011	Keizer Community Survey	838	Mail	x							
2011	Regional Coalition for Clean Rivers and Streams, Community Survey	1,090	Online	x	x	x		x	x		
2010	Lake Oswego-Tigard Water Partnership Focus Groups	20	Focus Groups		x						
2009	Metro Toxic Reduction Focus Group	31	Focus Group	x			x		x		

Year	Study	Sample Size	Method	Stormwater Awareness	Water Values	Household Hazardous Materials	Lawn and Garden Care	Car Care	Pet Care	Illegal Dumping	RV Waste
2009 2007	Gresham Lawn Care Pre and Post Surveys	400	Phone				x				
2008	Gresham Stormwater Report	400	Phone		x	x	x	x	x	x	x
2007	Metro Household Hazardous Products Survey	412	Phone			x	x	x		x	
2006	Clackamas County Water Environment Services Survey	505	Phone	x	x						
2005 1999	Portland Bureau of Environmental Services Surveys	500	Phone	x	x		x	x	x		
2002	Clean Water Services Stream Habits Survey	430	Phone		x	x	x	x	x		
1999	Bend Environmental Issues Survey	415	Phone	x	x	x	x			x	