EXECUTIVE SUMMARY

Cities in Oregon and throughout the United States were engineered to keep stormwater out of sight and out of mind. Unfortunately, that approach has turned a potential resource into a waste product and created new environmental hazards. The Stormwater Solutions Team, convened by the Oregon Environmental Council, studied the issue and developed a set of recommendations to protect human health, natural resources and public infrastructure from the impacts of urban runoff.

Rain gone wrong

Once rain falls onto the hard surfaces of streets, sidewalks, parking lots and rooftops, it picks up any and all pollutants that are in its path, gathering volume and speed until it enters a stormdrain and is piped underground or directly into a stream. The two primary consequences of poorly managed stormwater are water pollution and altered hydrology.

Most urban stormwater systems send polluted runoff into Oregon's rivers, streams and groundwater untreated – carrying a vast array of pollutants such as petroleum byproducts from motor vehicles, fertilizers and pesticides from lawns, bacteria from animal waste, and heavy metals such as copper, lead, zinc, and mercury from multiple sources. Anything that's on the land eventually ends up in the water.

In addition to polluting our rivers, streams and groundwater, conventional urban stormwater systems disrupt the natural hydrologic cycle. While the great majority of rainwater and snowmelt soaks into the ground or is absorbed by plants in a natural system, the hard (impervious) surfaces of urbanized areas prevent infiltration. There are also fewer trees and plants to absorb water. A one-acre paved parking lot generates 16 times more runoff than a meadow of the same size.[1] The unnaturally high volume and rate of overland runoff in urbanized areas increases peak flows and the risk of flooding during storms, scours out streambanks, reduces groundwater recharge and reduces base flows, thereby increasing summer water temperatures that harm endangered salmon.

The pollution and hydrologic disruption caused by poorly managed stormwater create serious problems for the environment, our economy, and public health. These are primarily human-caused problems – raindrops are mostly clean when they fall from the sky and they generate very little runoff when they land in a natural environment.

- **Water pollution.** As more stormwater runoff enters our waterways, it contributes to the build up of pollution in those waters. The Oregon Department of Environmental Quality (DEQ) is asking cities to reduce runoff pollution because it contributes to numerous water quality impairments, including the high mercury levels in resident fish in the Willamette River that make them unsafe for human consumption.

- **Health advisories.** The Oregon Department of Human Services cites stormwater runoff as a common source of the fecal bacteria that causes coastal beach health advisories.[2] In 2006 the department issued 13 such advisories, warning the public against swimming at beaches with high levels of fecal bacteria in ocean waters.[3]

- **Property damage.** Increases in stormwater runoff can damage or degrade private and public infrastructure, such as property that is lost or damaged due to widening stream channels and unnatural flooding, and washed-out roads, bridges, culverts and sewer lines.

- **Endangered salmon.** Our society continues to urbanize, degrade and pollute the watersheds that pro-

vide precious fish habitat while at the same time we spend hundreds of millions of dollars in an attempt to restore endangered salmon species. Scientific studies show that as little as 4% - 15% impervious area in a watershed significantly impairs aquatic life. A typical residential neighborhood has more than 30% impervious area, and a city center may be covered by more than 75% impervious surface, making it difficult to provide healthy fish habitat in nearby streams.[4,5]

- Wasted water. The water rights in most of Oregon's water basins are fully allocated, and groundwater is scarce in many parts of the state. Harvesting rainwater or letting it recharge groundwater could reduce stress on our over-committed water systems, but we continue to treat rainwater as a waste. The rain that lands on a 2,000 square-foot roof of a home in the Rogue Valley (20 inches average annual rainfall) generates more than 24,000 gallons of relatively pure water per year.[6]

Fortunately, there is a better way

The two keys to reducing urban runoff's impacts are preventing pollutants from entering stormwater in the first place and improving stormwater management. Individuals, government agencies, and businesses can all take steps to reduce their contribution to stormwater pollution. Changing the way we manage stormwater will clean out the remaining pollutants and restore natural hydrology. Modern stormwater management techniques either harvest rainwater for potable or non-potable uses, or utilize the natural abilities of plants and soil to capture and filter runoff and allow the cleaned water to recharge groundwater supplies, mimicking a natural hydrological system. By either harvesting rainwater or allowing it to recharge groundwater, raindrops become a valuable resource rather than a problem. Low Impact Development (LID) is a term used to describe a suite of development practices that reduce stormwater runoff by preserving existing natural site features and installing distributed, small-scale stormwater technologies that mimic the way nature manages rainfall. One example of an LID practice is a rain garden, which helps slow, capture, filter, and infiltrate stormwater that runs off of impervious surfaces.

A rain garden is a shallow, landscaped depression that collects and manages stormwater.

When combined with efforts to prevent the contamination of rainwater by vehicle fluid leaks, pesticides and fertilizers, heavy metals, erosion from construction sites, industrial runoff and other sources, LID practices can reduce the negative impacts of urban stormwater and turn Oregon's rain back into the natural resource that it is. Oregon should work toward the goal that all development strives to mimic natural hydrology and urban runoff no longer contributes to water quality problems.

The state's demographic forecasters expect there will be another 1.8 million people in Oregon by the year 2040.[7] As Oregon grows and more development occurs, we need to shift to more sustainable stormwater management methods before additional damage is done to our waterways. Ensuring that development manages stormwater runoff in a way that protects natural hydrology and natural hydrology is much less costly and more beneficial to the environment than allowing urban runoff to degrade streams and then spending significant resources in an attempt to restore them later. By using LID extensively in all new developments and in re-development projects in already urbanized areas, Oregon has the opportunity to do things right and protect clean water before we reach the point of no return.

Expanding the use of LID practices presents an incredible economic opportunity for the state, as we position ourselves as a leader in the sustainability and green building movements. Sustainable stormwater lies at the intersection of green building, landscape architecture and engineering, and it represents a growing industry in Oregon. As LID is introduced around the state, the public is responding positively to its functionality, attractiveness, and the way it reflects the value the public places on clean

water. For example, now that the City of Portland has installed a few green street facilities, they have received more than a hundred calls from residents requesting one in their neighborhood.[8] The demand for sustainable stormwater management is growing, but Oregon's cities are having a hard time keeping up with that demand.

Obstacles slow progress

While excellent work is already being done in many cities, several barriers currently prevent sustainable stormwater management from becoming standard practice around the state.

- Local governments and developers lack information about how to implement LID in their unique climate and geography and on sites with special characteristics.
- Delays in designing and permitting LID projects can prove costly for developers.
- Obstacles embedded in codes and rules impede of innovation.
- Local governments and state agencies often lack the financial resources, staff time and expertise to implement sustainable stormwater management and pollution prevention programs.
- Communities are unsure about how to provide for the proper maintenance of modern stormwater facilities over time.
- Resistance to change is often encountered when trying to shift to a new way of doing things.

Developing solutions

In order to overcome these barriers, build on what's already being done, protect our waterways from urban runoff and turn rainwater into a resource, the Oregon Environmental Council convened a broad group of stakeholders to form Oregon's Stormwater Solutions Team. The team included representatives from local governments, sewerage agencies, DEQ, Oregon Department of Transportation, homebuilders, green developers, higher education institutions, stormwater engineers, public outreach professionals, and conservation groups. They spent eleven months examining the issue and developing recommendations in a spirit of collaboration and constructive problem-solving. The team developed more than 60 recommendations, which are described in the full report, available at www.oeconline.org/rivers. The recommendations include strategies for improving stormwater management and reducing sources of pollution via policy changes, education and information-sharing, and technical research. The team's top two recommendations are:

- Greater state support, including funding sources, for local efforts to to develop stormwater programs, remove barriers from local development codes, and implement and monitor LID projects. While many jurisdictions have already developed stormwater programs and updated their development codes, most need funding and technical assistance to accomplish this task. Increasing the capacity of local jurisdictions will advance many of the Stormwater Solutions Team's other recommendations.Washington's legislature recently appropriated $20 million for municipal stormwater projects; no such program exists in Oregon. One potential source of funding could be a tax or fee on the pollutants commonly found in stormwater, such as motor oil. In addition to generating funds to improve stormwater management, the fee would provide an incentive for reducing the use of these materials.
- Develop a comprehensive education and training program promoting sustainable stormwater management and LID in growing communities. Audiences include public officials, agency staff, developers and builders, and designers. The training program should be adaptable to the individual needs of local communities.

By implementing the recommendations of the Stormwater Solutions Team, Oregon has a unique opportunity to protect water quality and stream health, harness an under-utilized supply of fresh water, and support the burgeoning green development industry. OEC and the team members are eager to work with additional partners to create a shift so that sustainable stormwater management, rainwater harvesting and pollution prevention become standard practice throughout Oregon.

References

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6. 2,000 square feet = 288,000 square inches. 288,000 x 20 inches rainfall = 5,760,000 cubic inches of water = 24,935 gallons.
7. (1 cubic inch = .00432900431 gallons).
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About the Oregon Environmental Council

The Oregon Environmental Council safeguards what Oregonians love about Oregon – clean air and water, an unpolluted landscape and healthy food produced by local farmers. For nearly 40 years we've been a champion for solutions to protect the health of every Oregonian and the health of the place we call home. We work to create innovative change on three levels: we help individuals live green; we help businesses, farmers and health providers thrive with sustainable practices; and we help elected officials create practical policy. Our vision for Oregon includes solving global warming, protecting kids from toxins, cleaning up our rivers, building sustainable economies, and ensuring healthy food and local farms. *It's your Oregon.*

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