Oregon Department of Transportation

Research Notes

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Monitoring Water Quality along Highways

The Oregon Department of Transportation (ODOT) manages more than 18,000 lane miles of impermeable roadway surface. Since Oregon's average annual precipitation is over 27 inches per year, this results in more than 20 billion gallons of runoff from Oregon highways every year, an average of over 54 million gallons per day. By comparison, the City of Salem's Willow Lake Water Pollution Control Facility has a capacity of 105 million gallons per day.

Check dams with pooled water along U.S. Route 26, west of Government Camp, Oregon.

Runoff from highways typically picks up a variety of pollutants from the roadway. These pollutants include sediment, trash, residue from petroleum products, and heavy metals. Depending on the highway and its geographic setting, highway runoff can evaporate, infiltrate into the ground, find its way to a storm sewer system that is treated, or flow untreated into a stream or lake.

As a public agency ODOT not only has an inherent interest in protecting water supplies in the state, it is also bound by regulations stemming for the Clean Water Act. These regulations include a requirement to monitor discharges of pollutants, basically encompassing everything solid, immiscible, and dissolved that is not water.

Because of the dispersed nature of a highway system, economical, small-scale methods to clean up highway runoff have been developed since the passage of the Clean Water Act.

West end of U.S. Route 20 project beside Pilot Butte in Bend, Oregon. Detention ponds can be seen at the left-center of the photo.

The Water Quality Facilities Investigation research project was undertaken to improve the ODOT's ability to protect water in Oregon from pollutants carried by highway storm water runoff. This research project consisted of several sequential tasks that built upon one another.

First, a bibliography of literature was assembled, dealing with methods for monitoring water quality and observations resulting from monitoring. Four publications were found to be most fundamentally useful as references.

Check dams and ditch covered in snow along U.S. Route 26.

A template for facility monitoring plans was then developed as a Microsoft Word template that included all the elements of a monitoring plan that is common to all facilities. It also included indications of where and what unique information needs to be provided to complete the plan.

The monitoring plan template was used to develop two full-fledged monitoring plans for two sites on Oregon highways. The first site was along U.S. Route 26, near Government Camp at Milepost 46. This site featured simple, rock rubble check-dams to remove suspended sediment from highway runoff.

The second sight was on U.S. Route 20 in the city of Bend, where it runs past Pilot Butte. This site consisted of a broad range of storm water treatment and handling methods including swales, detention ponds, oil-water separators and dry wells.

The research project included exercising the plans to monitor storm water. The U.S.26 site monitoring plan was followed with only a few difficulties. An example of a difficulty was the fact that the monitoring plan did not address what to do about precipitation at the site coming in the form of snow instead of rain.

The monitoring of the U.S.20 site did not proceed quite as well. Problems such as construction delays, the travel distance from Salem, and the traffic control requirements worked together to keep the actual plan from being implemented. Nonetheless, many lessons were learned from the attempt.

This research project has thus provided much useful information and tools to make it easier to comply with required monitoring. It also highlighted many obstacles and challenges that must be overcome as part of such an effort.

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To request a copy of the research report *"Water Quality Facilities Investigation,"* contact the ODOT Research Unit by phone, or view the report on the Research Unit web page listed below.

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