Oregon Department of Transportation

FACT SHEET

Climate Change Impacts and Inland Flooding in Oregon

Hazard Overview

Inland flooding is a widespread and common occurrence across Oregon, with locations in all 36 counties identified by the National Flood Insurance Program as "flood prone." Floods can cause temporary travel disruptions, damage the roads, and also bring safety risks to passengers. Flood events are expected to increase in frequency and intensity due to more intense rainfall events and the shifting of precipitation from snow to rain.

Flood Highlight: February 2020 Pendleton Floods (Region 5)

6 Days

Length of time long stretches of I-84 were closed

3-6 inches

Amount of rain that fell in days preceding the floods. This rain was on top of previous snow and snow melt, and occurred during a period already experiencing more than average precipitation

$17 Million

Funds requested by ODOT from FHWA to cover costs of flood-related damage in the region

Impacts and Consequences on Transportation

- Multiple flood events can occur simultaneously, complicating detours and repairs
- Significant costs related to: debris removal, levee repair, guardrail and post repair, culvert clearing, shoulder repair, vertical wall repair, bridge replacements, and reinforcements where highway structural integrity compromised
- Floods can be small, affecting small areas for a few hours; or large, affecting multiple large areas for days or weeks
- Short- or longer-term traffic disruptions for passengers and freight
- Potential accessibility issues for a community if sufficient alternative routes are not available
- Impacts on local economy if tourism or freight is greatly disrupted

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How will climate change affect inland flooding in Oregon?

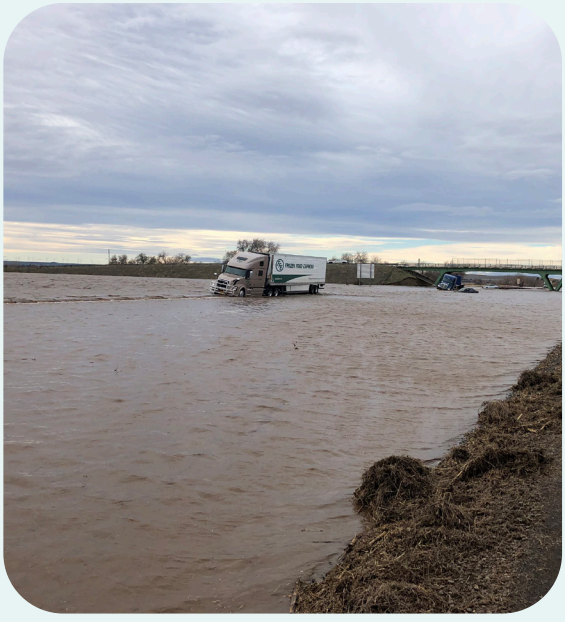
Flood risk in all ODOT regions will likely increase in the future, due to an increase in intense precipitation events and shifting rainfall patterns that will make winter months wetter.

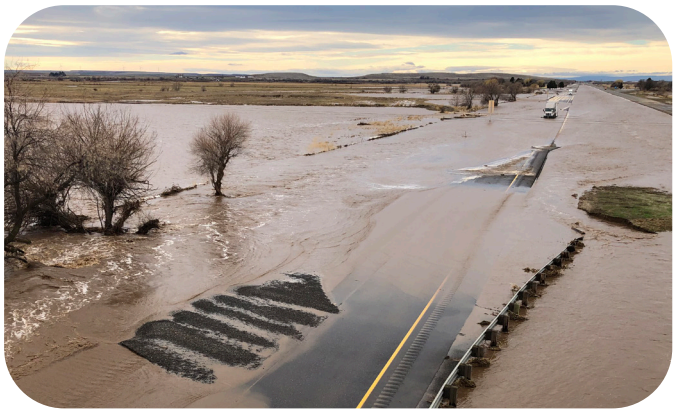
Moreover, due to increasing temperatures, more winter precipitation may fall as rain rather than snow. Since snow takes time to melt, runoff is more gradual. A shift toward more rain could contribute to flooding conditions in some areas.

The anticipated increase in wildfire events may also contribute to more flood events, as burn scars can allow for faster runoff of precipitation, and also contribute to debris flows that can clog culverts.

Flooding may increase in intensity or frequency in areas already prone to flooding. Flooding may also occur in areas that historically have not experienced much flood activity.

Currently, "high water" incidents on ODOT highways occur most frequently in Regions 1, 2, and 3, but events occur to some extent across almost all highways in all Regions.





Making Oregon's Highway System More Resilient to Flooding

Site-specific Strategies

- Improved drainage in problem areas.
- Designing new infrastructure based on projected future rainfall patterns, instead of based on historical rainfall.
- Immediately after wildfire events, develop strategy for reducing runoff and debris-flow risks. Actions could range from upsizing specific culverts, increased cleaning of culverts, or enhanced flood-response planning.
- Ensuring effective monitoring, communication, and response plans for floods are in place, particularly for areas where flood events may become a new threat in the future.
- Incorporating flexible design in physical structures, so that retrofits can be easily done if/when needed.

System-wide Strategies

- Ensuring funding and repair policies can accommodate adaptive upgrades, rather than just repairing to status quo.
- Prioritizing critical, at-risk flood areas for proactive upgrades.
- Improved/additional funding strategies to allow for more upgrades in problem areas.
- Seizing opportunities for upgrades, such as when a culvert needs to be replaced anyway, or when a new structure is being built.

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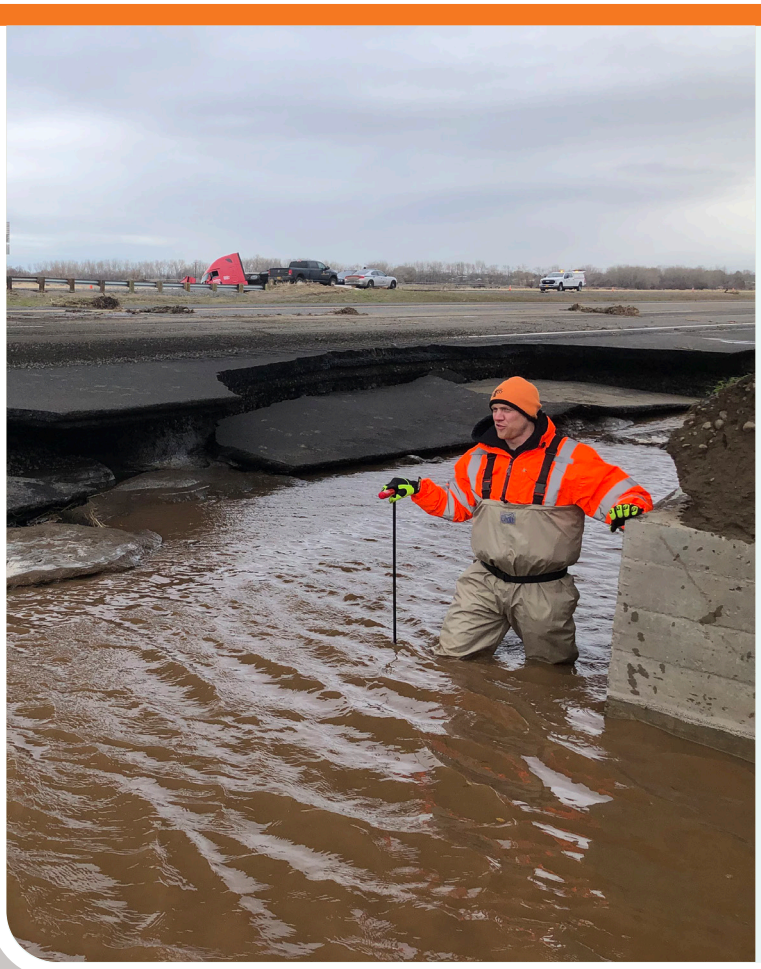

Adaptation Barriers to Overcome

- Multiple flood events often happen at once, straining the ability to effectively respond.
- Funding mechanisms do not always encourage proactive adaptation, but rather focus on repairs.
- Costs to adapt a given culvert/ bridge/drainage area may be feasible, but may become prohibitive when looking across a large area.
- Designing for future rainfall events can be difficult, since there are not established best practices for doing so.

Sources Cited

The information in this fact sheet was primarily drawn from:

Stoelb, D. (2020). 2020 February Flooding Spotlight: Documenting impacts and support provided for the February 2020 flooding event. Oregon.

Mote, P.W., J. Abatzoglou, K.D. Dello, K. Hegewisch, and D.E. Rupp, editors. 2019. Fourth Oregon climate assessment report. Oregon Climate Change Research Institute, Oregon State University, Corvallis, Oregon.

ODOT-sponsored analysis of climate change projections and interviews with ODOT staff