B-

Willamette River Report Card 2015

Connecting water, wildlife, and people

Oregon's big river

Drinking water, fish and wildlife, irrigation, recreation, water for commerce and industry—the Willamette River is all of these and more. It threads Oregon's largest cities together. It reminds us of our history. In the rapidly growing Willamette Valley, the river remains one of our most visible and accessible connections to nature.

We will demand more from the Willamette as Oregon's population grows and freshwater supplies diminish across the West. Now is the time to assess the health of the river and take the actions needed to ensure it serves and connects our communities for generations to come.

Protecting the Willamette River will become even more critical as Oregon's population grows and freshwater supplies diminish across the West.

A report card for the Willamette River

Assessing the health of a river as large and complex as the Willamette is a big task. In 2014, the Meyer Memorial Trust, a Portland-based foundation with a strong interest in the river, brought together more than 20 university, agency, and technical experts to help create the first Willamette River report card. With support from the University of Maryland Center for Environmental Science, the team of experts identified key indicators of river health and the data needed to measure the status of each indicator.

Report card goals

- Capture a current picture of river health against which to measure future changes;
- Identify and analyze key indicators of river health;
- Share the story of the Willamette River's health with stakeholders and the public;
- Explain how societal, community, and personal choices affect the river.

Measuring river health

This report card focuses on the mainstem Willamette River divided into three distinct reaches:

- Lower Willamette—Newberg to the Columbia River
- Middle Willamette—Albany to Newberg
- Upper Willamette—Eugene to Albany

The Willamette changes as it flows from south to north—fast and braided in the upper reach, slow and meandering in the middle, wide and tidally influenced as it approaches the Columbia River.

Five categories of river health were assessed, as shown in the table below. Important values and indicators of health were identified for each of these categories and analyzed by university and agency experts. Scores are based on the current status of each indicator as compared to a science-based goal or benchmark.

Individual indicator scores were added together to calculate total scores and grades for the upper, middle, and lower Willamette. The overall grade for the river is the average of these three reach scores.

Categories	Indicators
Water quality	**Temperature** required for salmon and steelhead health. How often **toxics** are detected at unsafe levels. **Water quality index** (includes 8 water quality variables).
Fish & wildlife	Number of **native fish** species present. Ratio of native to **non-native fish** species. Number of **juvenile Chinook** salmon. **Bald eagles** active during breeding season.
Habitat	Extent of intact **floodplain forest**. In-stream habitat as measured by **channel complexity**.
Flow	Difference between current and historic **peak flows**. Stream **flow targets** for salmon and steelhead.
People & the river	Resident **fish consumption advisories**. **Tribal fisheries** for wild Chinook, steelhead, and lamprey. Presence of **fecal bacteria** in the river. Occurrence of **harmful algal blooms**.

B-

How healthy is your Willamette River?

Overall health

Overall, the Willamette River scored a B+. The health of the river declines as it flows downstream, with both the upper and middle Willamette scoring a B and the lower Willamette scoring a C+.

Water quality is assessed according to the Oregon Water Quality Index (OWQI), temperature, and toxics.

- According to the OWQI, overall water quality is very good in the upper Willamette and declines as the river flows downstream.
- Elevated water temperatures harm the river's chemical and biological health and can be lethal to aquatic life, including salmon. All three reaches received poor scores for temperature.
- Toxics include a wide variety of substances that may be harmful to human health and the environment. An analysis of 38 toxic substances resulted in an A and A- for the upper and middle reach respectively. The lower reach achieved an overall toxics grade of C, with very poor scores for PCBs and legacy pesticides in Portland Harbor.

Fish and wildlife scores are based on the ratio of native to non-native fish species, native fish diversity, and the presence and abundance of bald eagles and juvenile Chinook salmon. The upper and middle Willamette received much higher scores than the lower reach, primarily due to low numbers of juvenile Chinook and native fish species in the Portland metropolitan area.

Habitat scores are based on two river features known to be very important to the health of a wide variety of fish and wildlife—floodplain forests and complex, changing river channels. The upper Willamette scored the highest for habitat, followed by the middle and lower reaches.

Flow is a measure of how much water is moving through the river channel and is important because human and non-human communities along the Willamette evolved based on different flow patterns than those that exist today. Data suggest that flows are well below ideal levels for threatened fish species.

People and the river reflects the health of the Willamette from the perspective of human safety and cultural values. The score is based on harmful bacteria and algal bloom occurrences, the status of tribal fisheries, and suggested limits on consuming resident fish (e.g. carp, bass). All three reaches scored similarly in this category overall.

Report card grades

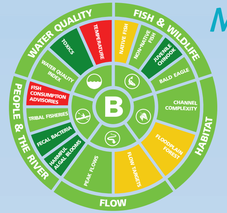
A	B	C	D	F	NA
80 to 100%	60 to <80%	40 to <60%	20 to <40%	0 to <20%	Not applicable

Diagram legend

- Cooler water temperature
- Warmer water temperature
- Floodplain–river interaction
- Freshwater use
- Warm water inputs
- Former side channel
- Drinking water treatment
- Wastewater treatment
- Fish consumption advisory

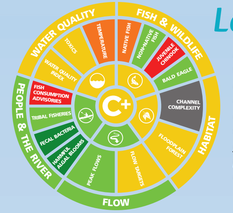
Upper Willamette

The upper Willamette stretches from Eugene to Albany. This reach holds some of the highest quality habitats in the basin, but also contains three of Oregon's ten largest cities—Eugene, Springfield, and Corvallis. With good water quality, diverse instream habitats, and strong fish and wildlife numbers, the upper Willamette scored a B. Key concerns include warm water temperatures and fish consumption advisories for resident fish.



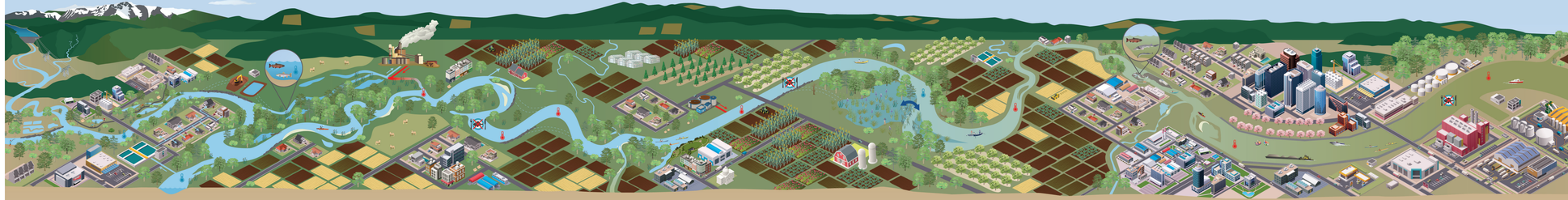
Middle Willamette

Between Albany and Newberg, the Willamette meanders through a mixed landscape of rich farmland, parks, natural areas, and small cities and towns. The middle Willamette has good overall ecosystem health, with a grade of B. Water quality is comparable to the upper Willamette, and the middle reach has the largest number of juvenile Chinook salmon compared to other reaches. Concerns include failing grades for water temperature and fish consumption advisories, and C scores for the diversity of native fish species and amount of floodplain forest.



Lower Willamette

From Newberg north, farmland gradually shifts to suburbs, waterfront homes, and a string of small cities at the edge of the Portland metro area. Portland's vibrant mix of buildings and bridges gives way quickly to industrial and marine facilities in Portland Harbor. The lower Willamette has the poorest health of all three reaches, with a C+ grade. Key concerns are poor juvenile Chinook populations, fish consumption advisories, and poor water quality, including toxic contamination in the Portland Harbor Superfund site.



Headwaters

On maps, the Willamette River begins just south of Eugene. But the river's true headwaters lie in the watersheds of the Coast Fork, Middle Fork, and McKenzie rivers. The McKenzie and Middle Fork are especially important to the upper Willamette. Fed by melting snow that emerges from porous volcanic rock in the high Cascades, they provide clean drinking water to Eugene and Springfield and help moderate water temperatures in this reach. Warmer winters and predicted lower snowpacks threaten this natural cooling system.

Managing floods and flows

Dams located on upper Willamette tributaries provide many benefits—reduced flood damage downstream, improved summer flows, electricity, and reservoir-based recreation. At the same time, they alter water temperatures and natural flow patterns, reduce and simplify habitat, and block fish access to more than 400 miles of spawning streams, threatening the survival of salmon and steelhead populations. Federal and state agencies are working to address these issues, but solutions are expensive and will take many years to implement.

Habitats worth saving

The upper Willamette contains side channels, sloughs, and islands created by powerful currents that shape the river channel and surrounding floodplain. Water flowing beneath the river periodically resurfaces to create coldwater refuges for temperature-sensitive fish like salmon and trout. Over the past 150 years, these critically important habitats have been significantly reduced through flood management, erosion control projects, and urban and agricultural development.

One river, many uses

The Willamette River floodplain—the flat land directly adjacent to the river—contains highly productive farmland and many of Oregon's largest cities. Naturally occurring gravel deposits, a valuable source of building material, are also critical for salmon habitat and water quality. Finding a balance between river health and the needs of important economic sectors is challenging everywhere along the Willamette, but especially here in the middle reach, where all play a prominent role in the area's quality of life.

The temperature story

The middle Willamette received the poorest temperature score. Historically, cold tributary inflows and the movement of water through gravel bars and floodplain soils moderated the summer river temperatures. Today, these features have been greatly reduced, while warm water sources—from reservoirs, municipal and industrial discharges, paved surface run-off, and removal of vegetation that shades the river—have increased. Remaining areas of cold water have become havens for temperature-sensitive fish like trout and salmon.

Vanishing floodplain forests

Forests of cottonwood, alder, cedar, willow and fir once covered much of the Willamette River floodplain. Vital contributors to river health, these forests absorb floodwaters, remove sediments and pollution, reduce water temperatures, and provide important food and shelter for many species of fish and wildlife. Some of the best remaining examples of mature floodplain forest are found in the middle Willamette, but they occupy less than half their original footprint.

More people, more connections

Human connections to the Willamette multiply in the lower reach. Wilsonville and Sherwood draw their drinking water from the river and other communities have plans to do the same. The tribal lamprey harvest at Willamette Falls is one of the most important in the Columbia Basin. Fishing boats are a common sight in downtown Portland, and many people walk, jog, and bike along riverside paths. Throughout the lower Willamette, people flock to the river on sunny summer weekends.

The working river

Sand and gravel operations, pulp mills, and other commercial and industrial activities dot the length of the Willamette, but the river has a distinctly industrial feel moving through Portland. Dry docks, port terminals, and manufacturing facilities line the banks. Fishing boats and kayaks share the river with barges and cargo vessels. In 2000, the lower 11 miles of the river were designated a federal Superfund site, and authorities warn against eating resident fish more than once a month due to toxic contamination.

Within our reach

Approaching its confluence with the Columbia, the Willamette still carries water from far-off tributaries like the McKenzie and Santiam. It also carries the sediments, contaminants, and run-off of upstream cities, farms, and industrial facilities—but not as much as it once did. Significant and successful efforts have been made to improve the health of the river, by everyone from governors to a legion of dedicated volunteers. As a result, the Willamette is relatively healthy overall, deserving of our care and attention.

You can help

The Willamette is a big, complex river, and solving some of its problems will take years of hard work and investment by all levels of government and many non-government groups. But achieving a clean, healthy Willamette takes individual action, too. Here are some things you can do.

Know your river

It's easy and fun to show how much you care about the Willamette. Paddling, fishing, bird watching, picnicking—enjoying this amazing resource is one of the best ways to show your support.

Make a change

Protecting the Willamette River is a daily exercise. At home, choose non-toxic household products that don't carry harmful chemicals into our waters. Clean up after your pets to help keep fecal bacteria out of the river. Use less water to create better stream conditions and temperatures for sensitive species like salmon. Everyone can make a difference.

Join the movement

Find out who's working for clean water and healthy habitats in your neighborhood or community. Become a member, attend an event, or make a donation to show your support.

Celebrate success

There's good news, too. Upgrades to Portland's stormwater system have reduced sewage overflows by 94%. In 2012, the Willamette won the Thiess International River*prize*, a prestigious award for excellence in river management. And the Oregon chub, found only in the Willamette Valley, became the first freshwater fish to be removed from the Endangered Species List in 2015.

For more information, visit
www.willamettereportcard.org

The following organizations contributed significantly to the development of the Willamette River report card:

Meyer Memorial Trust, University of Oregon, Oregon State University, Oregon Institute for Natural Resources, Oregon Health Authority, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Oregon Watershed Enhancement Board, Oregon Water Resources Department, Oregon Department of Agriculture, Oregon Department of Geology and Mineral Industries, National Oceanic and Atmospheric Administration (NOAA) Fisheries, US Army Corps of Engineers, U.S. Geological Survey, Confederated Tribes of Grand Ronde, Confederated Tribes of Warm Springs, City of Portland, City of Eugene, City of Albany, Clean Water Services, Eugene Water and Electric Board, City of Hillsboro, The Nature Conservancy Oregon, Willamette Partnership, Bonneville Environmental Foundation, and the University of Maryland Center for Environmental Science.

Photo credits:

Dave Herasimischuk (Freshwaters Illustrated), Rick Bowmer (AP), Human Access Project, Eric Vance (US EPA), Tracey Saxby (IAN/UMCES), Marty Nill, and Willamette Riverkeeper.

meyer MEMORIAL TRUST

University of Maryland CENTER FOR ENVIRONMENTAL SCIENCE

These organizations provided data used in the report card:

OSU Oregon State UNIVERSITY

OREGON Fish & Wildlife

DEQ

UNIVERSITY OF OREGON

INSTITUTE FOR NATURAL RESOURCES

Oregon Health Authority

USGS science for a changing world

CONFEDERATED TRIBES OF WARM SPRINGS