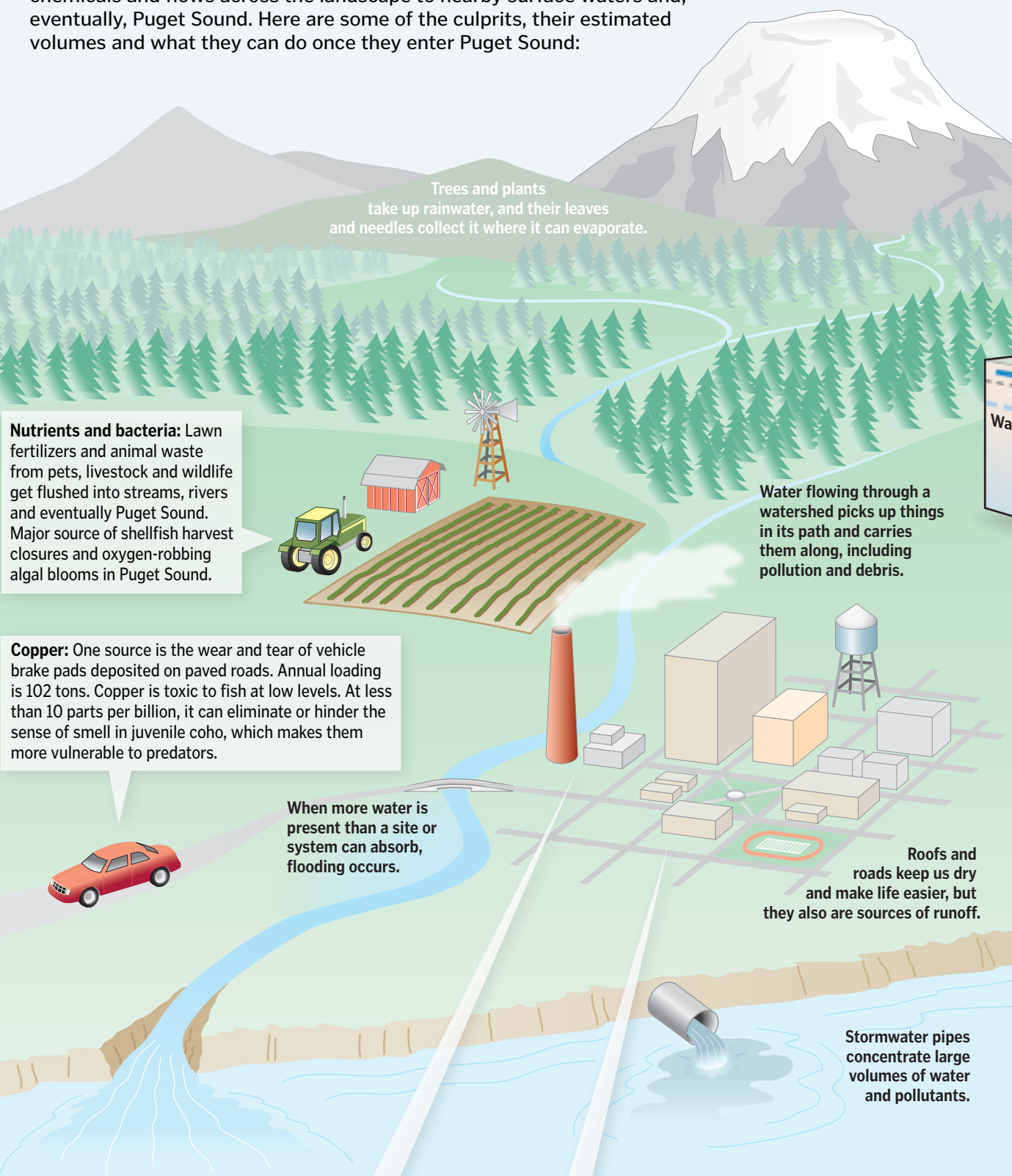


STORMWATER RUNOFF and Puget Sound

One of the greatest threats to the health of Puget Sound is from stormwater runoff generated in the urban areas of our state. Stormwater transports a toxic mixture of pollutants from roads, roofs and parking lots to the Sound, adversely affecting the quality of its waters and the species that live in it.

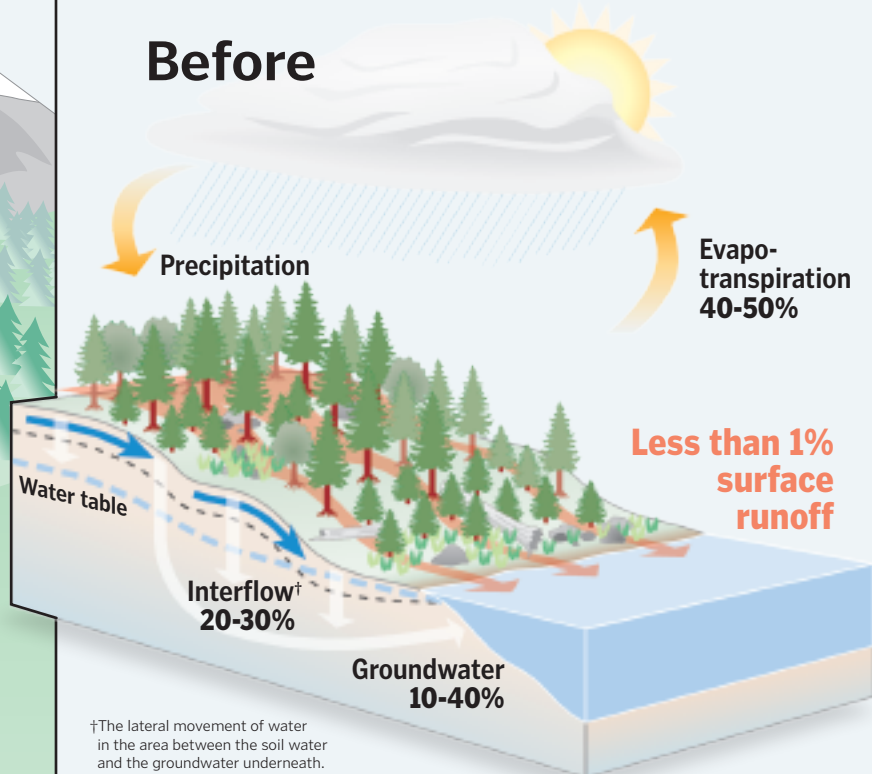
A pollution delivery system

Rainfall switches from a natural resource to a pathway for pollution when it hits the ground and picks up fertilizers, bacteria, herbicides, heavy metals and toxic chemicals and flows across the landscape to nearby surface waters and, eventually, Puget Sound. Here are some of the culprits, their estimated volumes and what they can do once they enter Puget Sound:



Forests soak up rainfall, reducing runoff

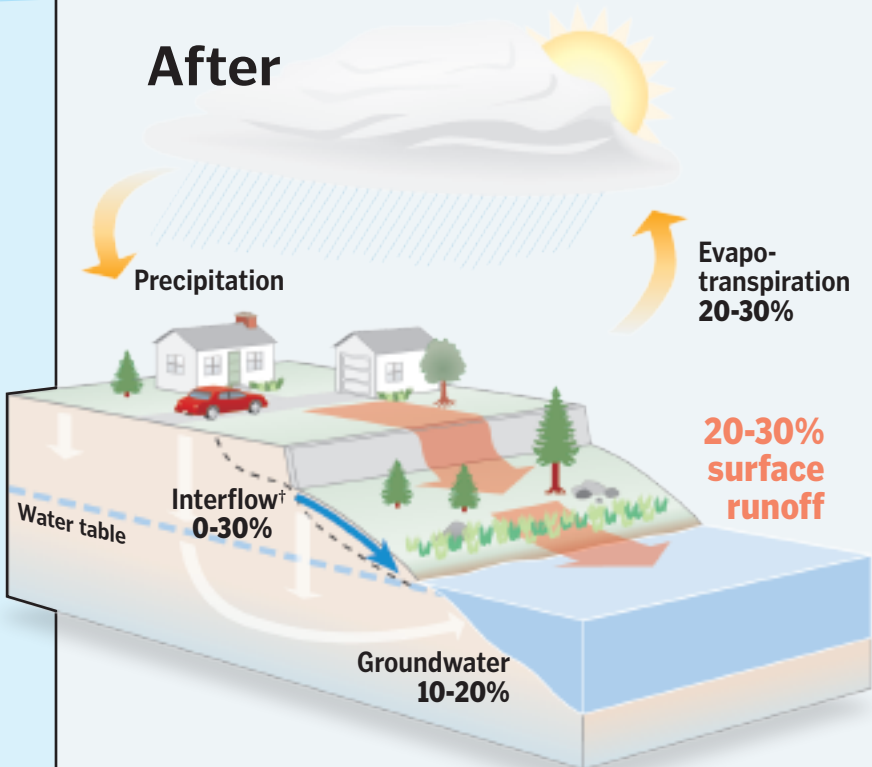
About 40 percent to 50 percent of the annual rainfall in a forested setting in Western Washington never hits the ground. It is absorbed by tree foliage and evaporated into the air.



Removal of forest cover changes the stormwater runoff equation

Suburban developments in the Puget Sound region have about 90 percent less stormwater storage than native forested land.

Between 1985 and 2000, Thurston County lost almost 5 percent of forest land while around 7 percent of its total land area was converted to residential subdivisions and other urban uses.



Sources: City of Olympia, Thurston Regional Planning Council, Department of Ecology, NOAA Fisheries, Puget Sound Partnership

By John Dodge and Alan Kenaga/The Olympian

How much stormwater?

For every inch of rainfall, one acre of paved surface can generate 27,150 gallons of runoff. Based on this formula, combined with the average annual precipitation totals for areas in Washington state, we can calculate the following:

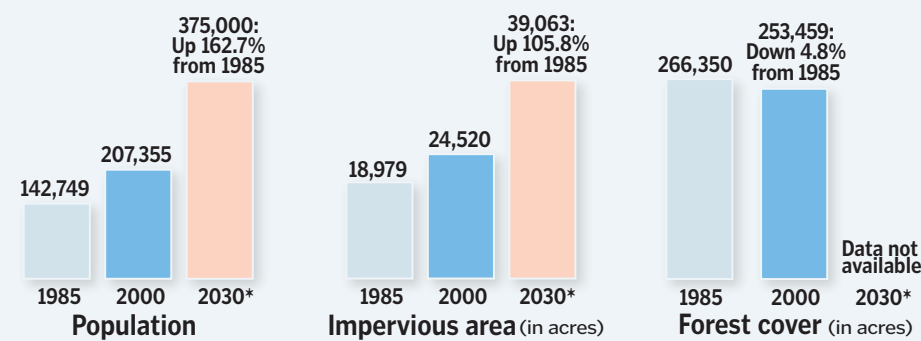
Area	Avg. annual precipitation	Runoff per acre of pavement per year*
Spokane	17 inches/year	0.46 million gallons
Seattle	37 inches/year	1 million gallons
Olympia	51 inches/year	1.4 million gallons

Note: Based on NOAA precipitation data from 1971-2000. *Figures have been rounded

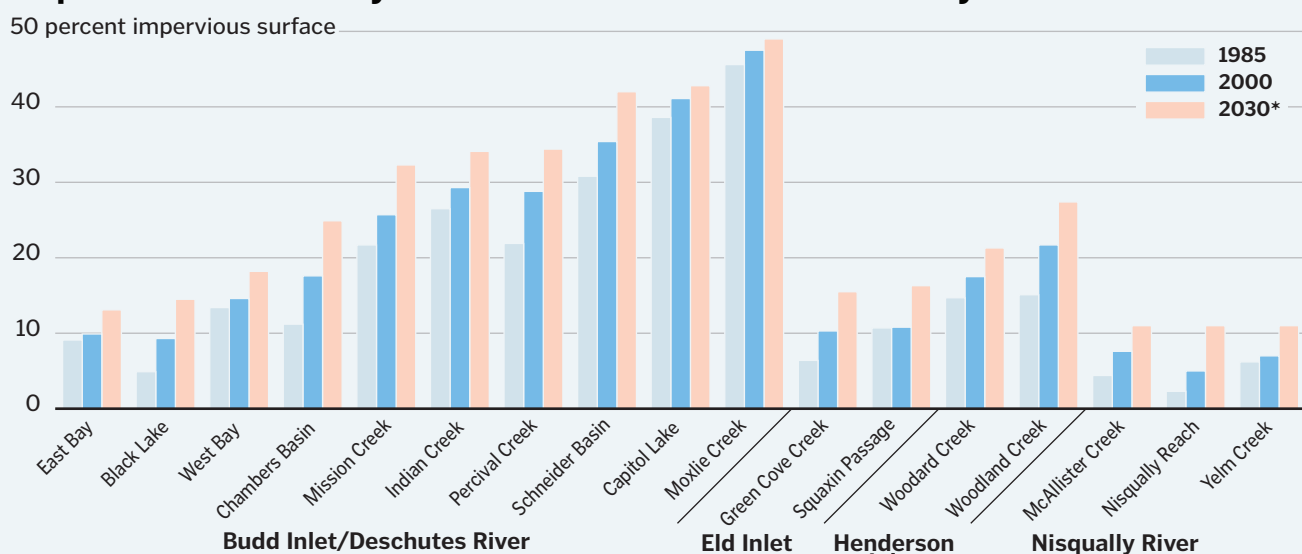
Parking lots, streets and rooftops are hard on streams

Stream habitat and the health of aquatic life decline and flooding increases once a watershed starts to be paved over. Troubles with pollution, sediment buildup, or scouring of stream beds from stormwater runoff begin at 10 percent impervious surface. Water quality and species diversity continue to decline as the percentage of hard surfaces grows.

Thurston County by the numbers



Impervious surface by selected basin in Thurston County



Did you know ...?

- One deposit of dog feces contains enough harmful bacteria to close 15 acres of shellfish beds.
- Copper from brake pads and zinc and cadmium from tires account for 50 percent of these metals found in lower San Francisco Bay.
- One study of the economic costs related to stormwater in the Puget Sound region puts the price tag at more than \$1 billion over the next decade.
- A study by the state Department of Ecology found 14 different pesticides in Indian Creek and nine in Moxlie Creek, two Olympia urban streams that flow into lower Budd Inlet.

Photo by Tony Overman/The Olympian

