

Protect Your Home and Property

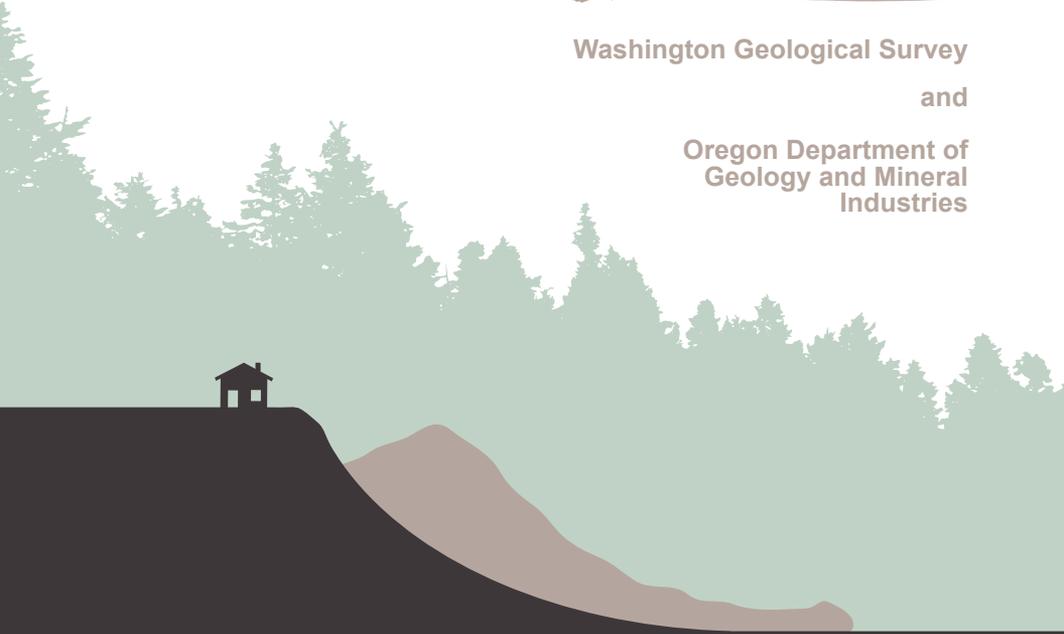
A Homeowner's Guide to Landslides

for Washington and Oregon

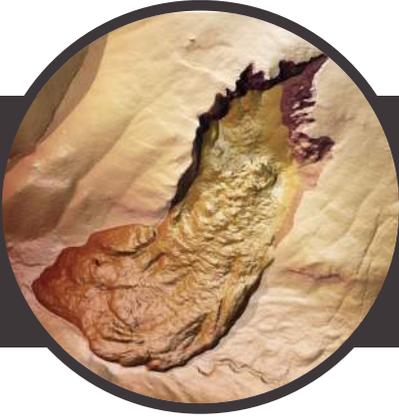


Washington Geological Survey
and

Oregon Department of
Geology and Mineral
Industries



**LANDSLIDES ARE ONE
OF THE MOST COMMON AND
DEVASTATING NATURAL HAZARDS IN
THE PACIFIC NORTHWEST. THE DAMAGE THEY
CAUSE IS ALMOST NEVER COVERED BY INSURANCE.**



WHAT IS A LANDSLIDE?

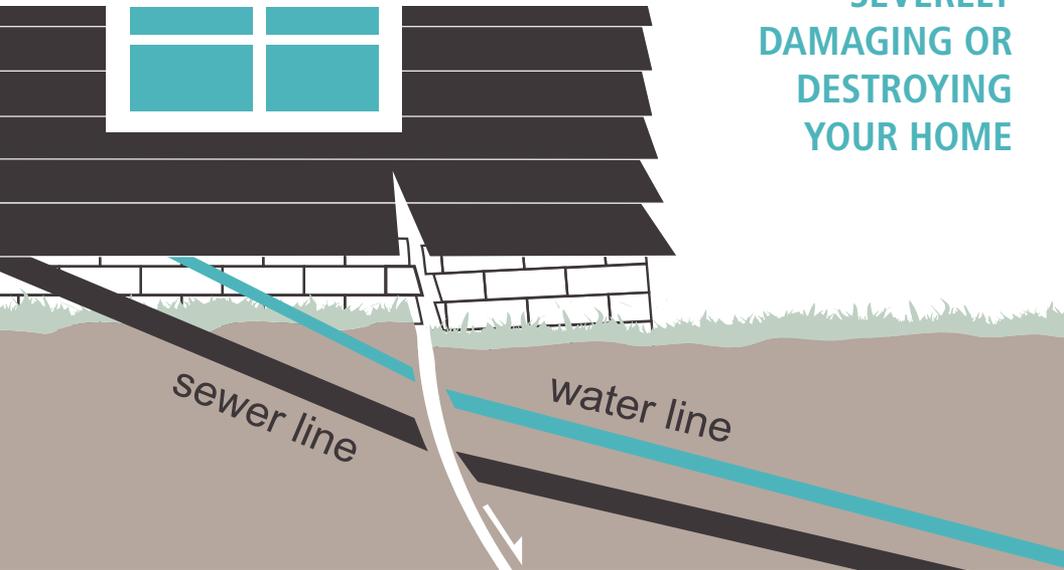
A landslide is the downward slope movement of rock, soil, or debris.

Debris flow, earth flow, rock fall, mudflow, mudslide, slide, and slump are also terms for landslide.

WHY SHOULD I CARE?

LANDSLIDES CAN TAKE HUMAN LIFE. HOWEVER, EVEN A FEW INCHES OF SLOPE MOVEMENT CAN DISRUPT SEPTIC, SEWER, AND WATER LINES AND CRACK FOUNDATIONS,

SEVERELY DAMAGING OR DESTROYING YOUR HOME



READ ON TO LEARN SEVERAL THINGS YOU CAN DO TO REDUCE YOUR RISK

COMMON TYPES OF LANDSLIDES



Rotational slides occur when rock or earth is transported downslope along a curved surface. This type of landslide can be large and damaging.



Earthflows and **debris flows** are usually rapid, downward movements of mixtures of water, soil, rock and (or) debris. Flows often occur in either water-saturated slopes or where vegetation has been removed by fire or humans.





LANDSLIDES
HAPPEN IN AREAS
WITH STEEP SLOPES,
AND ARE TYPICALLY
TRIGGERED BY
EVENTS LIKE THESE

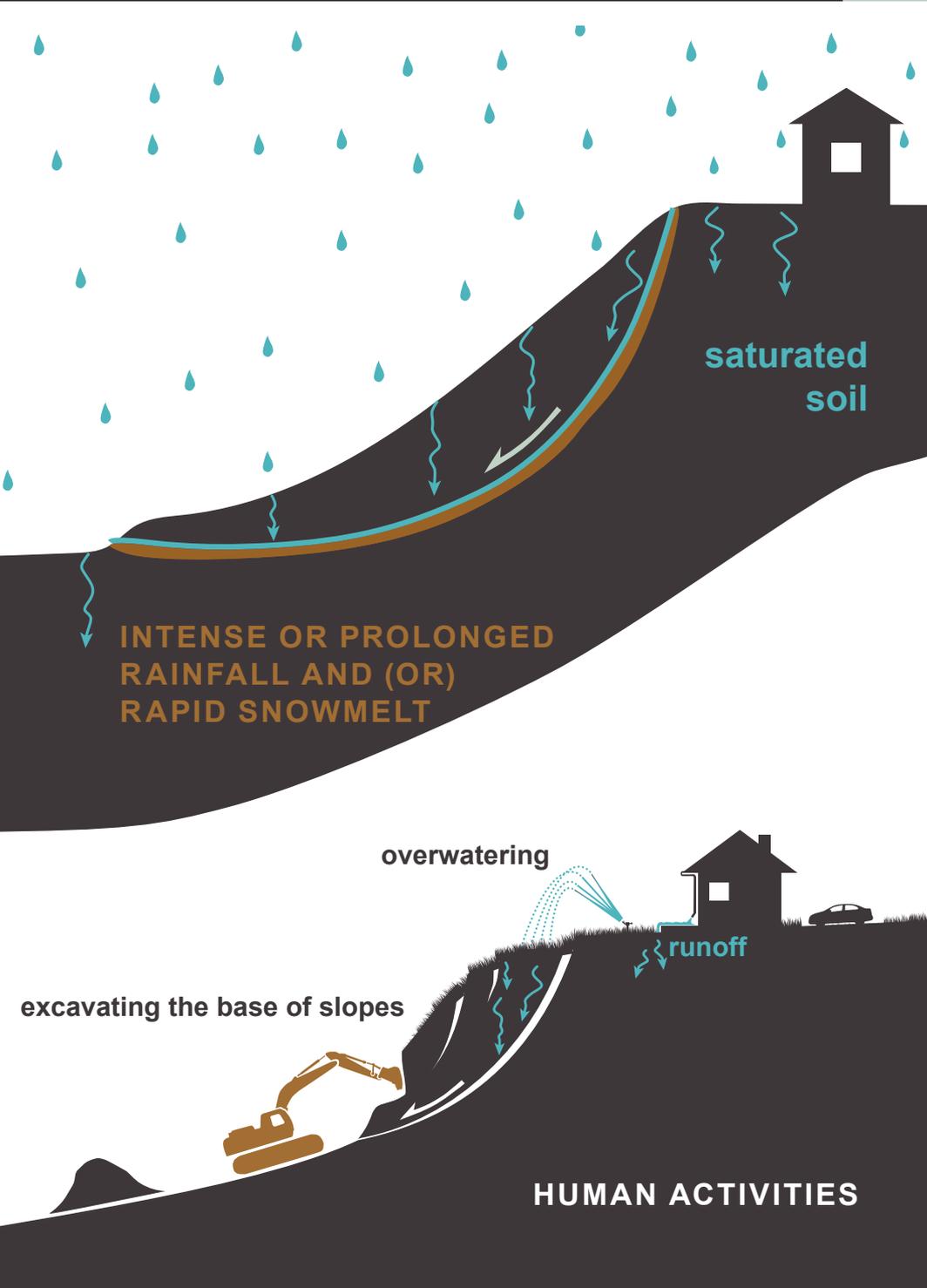


WAVE OR STREAM EROSION BELOW BLUFFS



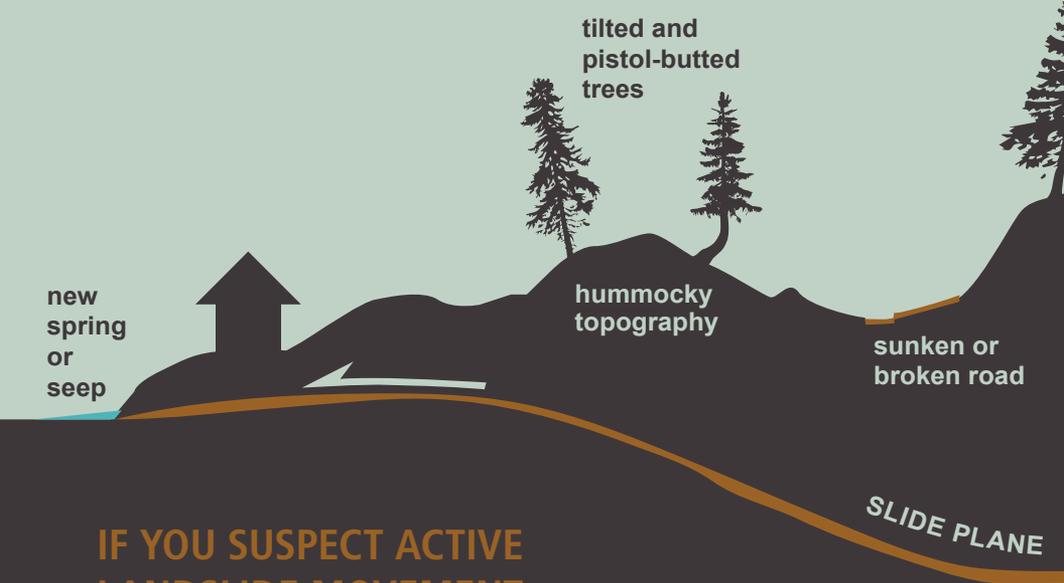
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EARTHQUAKES



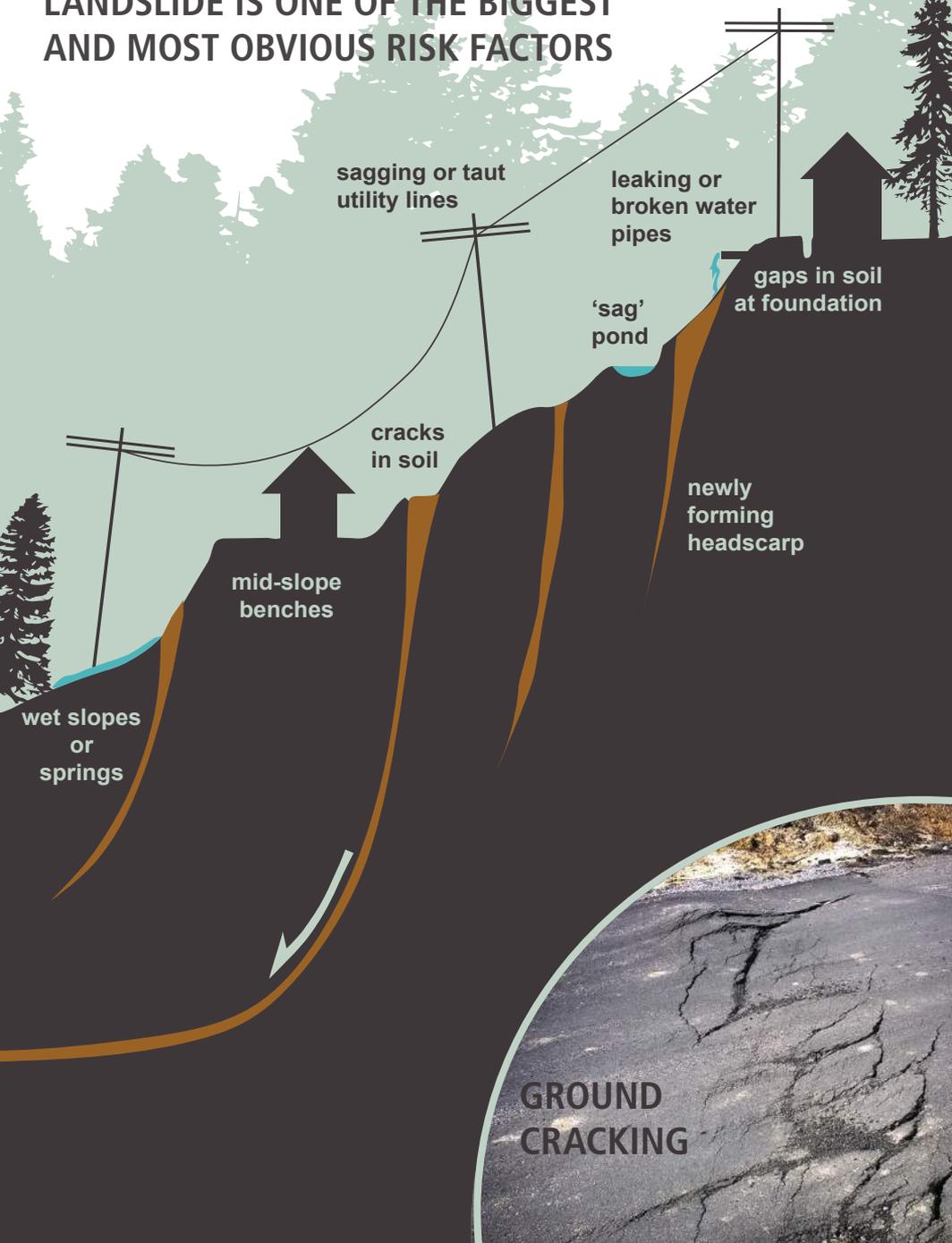
SIGNS OF LANDSLIDE ACTIVITY:

- Cracks in soil
- Tilted or bent trees
- Increased spring activity or newly wet ground
- Hummocky or uneven terrain
- Sagging or taut utility lines
- Sunken or broken road beds
- Movement of soil away from foundations
- Leaking or broken water pipes

**IF YOU SUSPECT ACTIVE
LANDSLIDE MOVEMENT:**

**EVACUATE AND CONTACT YOUR LOCAL FIRE,
POLICE, EMERGENCY MANAGER, OR
PUBLIC WORKS DEPARTMENT**

**THE PRESENCE OF A PREVIOUS
LANDSLIDE IS ONE OF THE BIGGEST
AND MOST OBVIOUS RISK FACTORS**



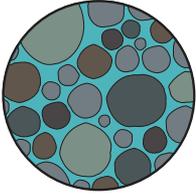


62.3 lbs

WHY IS WATER IMPORTANT?

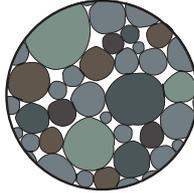
One cubic foot (7.5 gallons) of water weighs 62.3 lbs!

When water is added to a slope the weight increases the downward force, putting surrounding homes at risk



Wet soil

grains pushed apart
reducing soil strength



Dry soil

grains touch,
increasing soil strength

REDUCE WATER ON SLOPES:

- Maintain healthy vegetation
- Use drought-resistant plantings
- Fix leaking plumbing immediately
- Direct downspout runoff well away from slopes
- Plant trees and shrubs, which uptake water more efficiently than lawns

native



PLANT ROOTS ARE VITAL

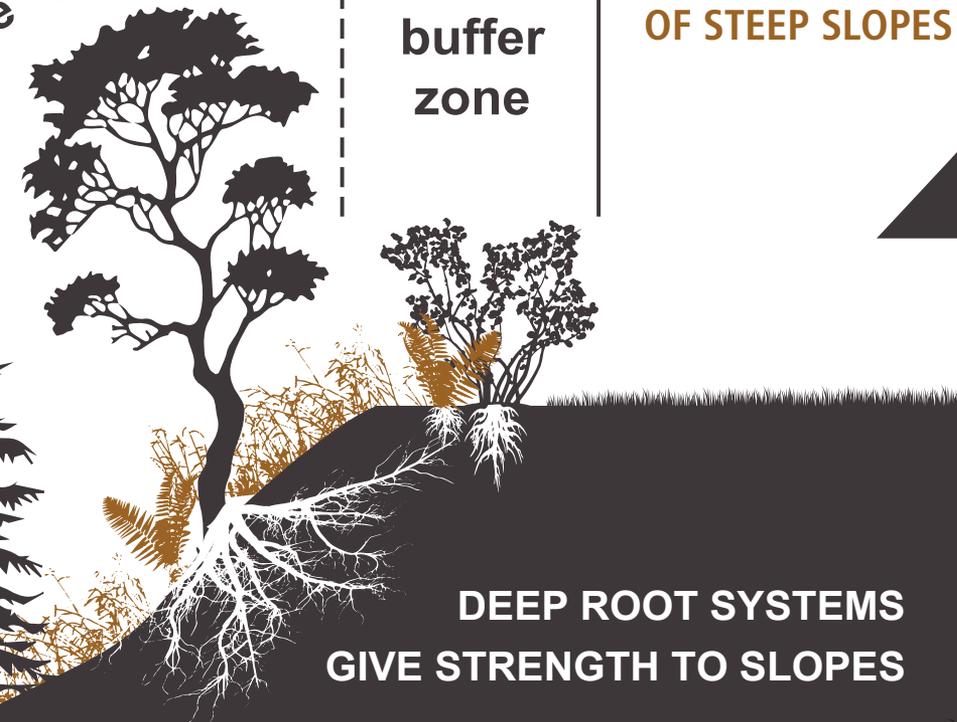
Live tree roots strengthen slopes. After a tree is cut down, it takes between 5 and 8 years for the roots below to lose their strength.



**MAINTAIN A
BUFFER OF NATIVE
PLANTS BETWEEN
YOUR HOUSE
AND THE EDGES
OF STEEP SLOPES**

trees and plants

buffer
zone



**DEEP ROOT SYSTEMS
GIVE STRENGTH TO SLOPES**

THERE ARE ACTIONS YOU CAN TAKE AS A HOMEOWNER TO REDUCE THE CHANCES OF A LANDSLIDE AFFECTING YOUR PROPERTY:



DO

- Drain water from surface runoff, downspouts, and driveways well away from slopes
 - Plant native ground cover on slopes
 - Consult with a professional before significantly altering existing slopes uphill or downslope of your home
 - If you suspect you are on a landslide, contact a licensed engineering geologist or a geotechnical engineer for an evaluation
 - Check online maps, such as SLIDO (Oregon) or the Washington Geologic Information Portal to see if you might live in a landslide area
- Do not add water to steep slopes
 - Avoid placing fill soil on or near steep slopes
 - Avoid placing yard waste or debris on steep slopes
 - Avoid excavating on or at the base of steep slopes



DO NOT



YOU AND YOUR NEIGHBORS SHARE MORE THAN FENCES. YOU ALL SHARE THE RESPONSIBILITY OF KEEPING YOUR SLOPES SAFE.

LOOK FOR WARNING SIGNS ON YOUR PROPERTY

If you live on or near a steep slope, evaluate your property for signs of landslide movement. Many (but not all) signs of landslide activity are listed below. A high score may indicate the presence of a landslide.

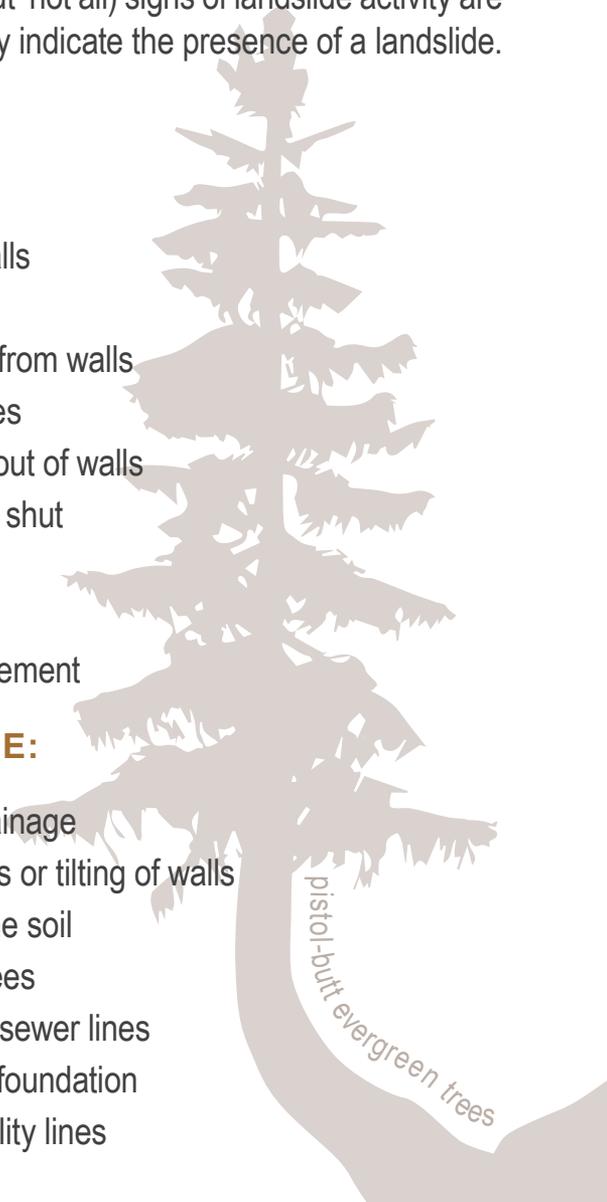
INSIDE YOUR HOME:

- Cracks in walls
- Nails popping out of walls
- Bulging walls
- Separation of chimney from walls
- Creaking/popping noises
- Light switches coming out of walls
- Doors/windows hard to shut
- Twisted beams
- Cracks in floors
- Water seeping into basement

OUTSIDE YOUR HOME:

- Changes in surface drainage
- Bulges in retaining walls or tilting of walls
- Cracks developing in the soil
- Pistol-butted or bent trees
- Broken water, utility, or sewer lines
- Cracks in sidewalks or foundation
- Stretched or leaning utility lines

**CONSULT A PROFESSIONAL BEFORE PURCHASING
PROPERTY IN SLOPING AREAS**



For More Information

IF YOU ARE IMPACTED BY OR SUSPECT AN ACTIVE LANDSLIDE:

- Evacuate
- Contact your local fire, police, emergency manager, or public works department
- Contact a licensed professional



LANDSLIDE RESOURCES

OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

SLIDO Landslide Information Database
www.oregongeology.org/sub/slido

U.S. GEOLOGICAL SURVEY

Landslide Hazards Program
landslides.usgs.gov

WASHINGTON GEOLOGICAL SURVEY

Washington Geologic Information Portal
www.dnr.wa.gov/geologyportal

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Slope Stabilization and Erosion Control Using Vegetation
www.ecy.wa.gov/programs/sea/pubs/93-30

THIS PAMPHLET WAS MADE IN COOPERATION WITH



Oregon Department of Geology and Mineral Industries



WASHINGTON STATE DEPT OF **NATURAL RESOURCES**

This pamphlet offers some general guidance a homeowner should consider regarding their home and property. Landslide conditions vary from site to site—if you are concerned about your property, it is always best to consult a professional.