DO YOU LIVE NEAR THE BLUFF'S EDGE?

A FEW DO'S AND DON'TS
TO HELP PROTECT YOUR PROPERTY

DO

- Do research into the property (soils, living vegetation, history, building plans)
- Do get advice from licensed geologist or engineering geologist
- Do leave a safe setback from steep slopes / bluffs
- Do keep plants on slopes between your house and the bluff
- Do plant native trees and shrubs on the slope for multiple canopy-height layers
- Do reduce surface erosion – avoid discharge onto slope
- Do reduce ponding and infiltration
- Do maintain and improve vegetation, especially trees
- Do maintain drainage
- Do remove all portions of a tree from the slope if you must cut a tree down on the slope

DON'T

- Don't use automatic sprinkler systems or put drainfields at the top of the slope / bluff
- Don't dump grass clippings or leaves on the slope
- Don't excessively top trees on the slope
- Don't remove living native vegetation from the slope (except invasives such as blackberry or ivy)
- Don't leave unnecessary heavy weight on the slope (downed trees, stairways, etc)
- Don't cut into the toe of the slope
- Don't overlook slide hazards
- Don't let English ivy or Himalayan blackberry get out of control- they don't stabilize the soil well, and they hide cracks that can warn you of an impending slide

GETTING HELP

- Local Planning and Public Works Office
- County Emergency Management Division
- Department of Natural Resources- Division of Geology
- Consultants
    - Geologist
    - Engineering Geologist
    - Geotechnical Engineer/ Civil Engineer

HELPFUL WEBSITES

Learning about Landslides

- Dept. of Natural Resources, Div. of Geology & Earth Resources
  http://www.dnr.wa.gov/AboutDNR/Divisions/GER/Pages/home.aspx /

- Washington State Dept. of Ecology – Puget Sound Landslides
  http://www.ecy.wa.gov/programs/sea/landslides/index.html

- Washington State Dept. of Ecology – Slope Stability Maps
  http://www.ecy.wa.gov/programs/sea/landslides/maps/maps/html

- U.S. Geological Survey
  http://landslides.usgs.gov/

Minimizing Landslide Threats

- Controlling erosion using vegetation – Washington Department of Ecology:
  http://www.ecy.wa.gov/programs/sea/pubs/93-30/index.html

- Managing drainage on coastal bluffs – Washington Department of Ecology:
  http://www.ecy.wa.gov/programs/sea/pubs/95-107/intro.html

- Managing vegetation on coastal slopes – Washington Department of Ecology:
  http://www.ecy.wa.gov/programs/sea/pubs/93-31/intro.html

Researching Your Area

- Washington State Coastal Atlas – Washington Department of Ecology
  http://www.ecy.wa.gov/programs/sea/sma/atlas_home.html

- Area Maps and Property Information – Snohomish County Development Services
  http://www.snoco.org/County_Services/Developer_Services/DevelopersMaps.htm

- Low Impact Development Guide – Puget Sound Partnership
  http://www.psp.wa.gov/LID_manual.php

- PSNERP (Puget Sound Nearshore Ecosystem Restoration Project) Technical Reports
  http://www.pugetsoundnearshore.org/technical_reports.htm

Coastal Property Owner Slope Drainage Checklist

Because of the impact to coastal slopes, it is important that you understand your specific slope drainage conditions and identify the sources contributing water into and onto your slope. If you can identify the sources of slope surface and groundwater, you can then take steps to control some of these sources. This checklist can help you organize the observation of surface water and groundwater conditions on your property. You may also share your checklist observations with other professionals who assist you in your drainage control efforts.

This checklist is provided by the Washington Department of Ecology, Shorelands and Environmental Assistance Program (http://www.ecy.wa.gov/programs/sea/pubs/95-107/checklist.html).

Slope Characteristics

Slope Height:

- o less than 10 feet
- o 10 to 50 feet
- o greater than 50 feet

Slope Angle:

____ degrees (see discussion in *Slope Stabilization and Erosion Control Using Vegetation*)

Slope Vegetation:

- o bare soil areas
- o vegetation cut, removed or cleared
- o mature vegetation (trees, shrubs and ground cover)
- o water loving plants (horsetail, skunk cabbage, willow, salmonberry, etc.)
- o Curved Trees

Slope Geology:

- o sand or sand and gravel
- o glacial till
- o silt/clay
- o rock

Landslide Indicators:

- o recent slide
- o bowl-shaped slope configuration
- o hummocky ground
- o leaning trees or bowed trunks
- o areas of low brush (blackberry)/bare areas

Surface Water/Storm Water Flows

- Sheet flow from:
  - o driveway
  - o parking area
  - o lawn
  - o other
- Roof downspouts empty:
  - o onto ground
  - o into buried pipe
  - o other
- Outlet for downspout pipe:
  - o into soil or on surface of slope
  - o tightlined down slope
  - o unknown (test with hose)
- Other pipe/culvert discharges:
  - o onto slope
  - o tightlined down slope
  - o other
- Areas where surface water disappears into ground?
  - o Yes
  - o No
- Seepage/water noticed along beach access path?
  - o Yes
  - o No

Coastal Zone Atlas:

- o landslide area
- o unstable
- o intermediate stability
- o stable

Beach Access:

- o stairs
- o wide path/road
- o tram
- o narrow path

Site Groundwater

Groundwater Observation:

- o seepage on slope: crest, face, or toe?
- o wet soil zone: crest, face, or toe?
- o vegetation indications of wet soil: crest, face, or toe?

Location of observed groundwater:

- o Near-surface soil seepage 1 to 3 feet below crest of slope
- o Groundwater seepage 5 to 10 feet below crest of slope
- o Groundwater seepage on slope face more than 10 feet below crest or at slope toe

Surface Water Features:

- o stream channel
- o ponds/wetlands
  how far from crest of slope?_____
- o flows down/over the slope
- o tightline down slope
- o erosion evidence: rills, gulleys, etc.

Other Site Features

- Septic system
  - o between house and slope
  - o behind house
  - o N/A
- Irrigation system
  - o any leaks
  - o summer use only
  - o control valve off and lines drained in winter
- Downspout infiltration system
  - o between house and slope
  - o behind house
  - o not applicable
- Landscape yard drains
  - o tightline down slope
  - o discharge onto slope
  - o unknown (test to find out)
- Landscape pools/ponds/fountains
  - o between house and slope
  - o behind house
  - o not applicable
- Hot tub(s)/swimming pool(s)
  - o between house and slope
  - o behind house
  - o not applicable
- Where are tub/pool/pond/fountains drained?
  - o Into a tightline drainage system
  - o onto slope
  - o below slope
  - o onto ground
  - o unknown (test to find out)

Distance of site features from slope crest: