PLANTS, STORMWATER, EROSION & SLOPE STABILITY
role & benefits of native vegetation
& management tips for folks living on the edge

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SHORELINES ARE TEMPORARY PLACES
poor management practices can make them even MORE temporary
or you can make your property less temporary by improving management practices.

vegetation management is a key aspect of good management.

Forests protect land from stormwater, erosion & landslides in two basic ways:

1. Hydrologic Benefits
   - ‘Meters’ rainfall
   - Minimizes stormwater
   - Reduces surface water runoff, soil saturation & flooding

A more elegant solution than stormwater retention.
2. Structural Soil Reinforcement

• SHRUB & TREE ROOTS HOLD SOIL PARTICLES

• SHRUB & TREE ROOTS ANCHOR SOIL BLOCKS

• VEGETATION MAINTAINS SOIL STRUCTURE

• TREES ROOTS RESIST SHALLOW LANDSLIDES
Coarse tree roots permeate the soil, maintain soil structure & reinforce marginally stable slopes. The structural engineering properties of roots are remarkable.
TREE ROOTS ALONE MAY NOT DEFEND AGAINST SURFACE SOIL EROSION

MOSS, DUFF, HUMUS & ORGANIC-RICH SOILS

MINERAL SOILS

soil erosion under tree roots

Benefits of *Organic* Forest Soils

*leaf litter + duff + humus = NATURAL MULCH*

organic-rich soil holds water like a sponge & protects underlying mineral soil from surface erosion
NATIVE GROUNDCOVERS & SHRUBS
fibrous roots hold & reinforce erodible surface soils

salal

sword fern

evergreen foliage protects soil surface

erodible mineral soils

TREES ON SLOPES GROW DIFFERENTLY THAN UPLAND TREES
adapted to the influences of gravity, exposure, geologic conditions & slope processes

FORT TOWNSEND, JEFFERESON COUNTY
DOWN-SLOPE ROOTS
(deep & vertical)

LEDGEMOOD BEACH, WHIDBEY ISLAND, MARCH 2013

UP-SLOPE ROOTS
(long & lateral)

✓ LATERAL ROOTS
HOLD SOIL & VEGETATION
✓ VERTICAL ROOTS
ANCHOR TREES
TREE ROOTS MAINTAIN SLOPE CREST

TREE ROOTS CAN SUPPORT ENTIRE PLANT COMMUNITIES

anchor roots

lateral roots
TREES ARREST LANDSLIDES & HOLD SLIDE DEBRIS ON THE SLOPE

LUMMI MARINE PARK, WHATCOM COUNTY

LARGE DRIFTLOGS AND FALLEN TREES ON THE BEACH BUTTRESS SLOPES

natural bulkhead

SARATOCA PASSAGE, WHIDBEY ISLAND
TREES ADAPT TO CHANGING CONDITIONS

FOR THOUSANDS OF YEARS OLD-GROWTH SHORELINE FORESTS PROTECTED PUGET SOUND

12 ft diameter Red-Cedar stump

Clinton, Whidbey Is. Douglas-Fir Ebey’s Landing
OLD-GROWTH SHORELINE FORESTS LOGGED BY 1870 CAUSED PROFOUND CHANGES IN FOREST COVER

Coniferous

Deciduous

Reduced hydrologic benefits in winter

2nd-GROWTH FORESTS STILL PROVIDED BENEFITS

Less than 1% surface water run-off from forested land

30% run-off

Logging impacts can be temporary

Development impacts are permanent
poor development practices cause stormwater run-off & landslides
IF YOU LIVE BELOW A STEEP SLOPE PAY SPECIAL ATTENTION TO UP-SLOPE DEVELOPMENT & MANAGEMENT

the impacts can be DISASTROUS

OLD CLINTON BEACH, WHIDBEY ISLAND

when we build & live near the edge we must keep a sense of proportion

WHAT IS IMPORTANT? WHAT IS NOT?

CAUTION

THIS SIGN HAS SHARP EDGES

DO NOT TOUCH THE EDGES OF THIS SIGN

(ALSO, THE BRIDGE IS OUT AHEAD)
VIEWS ARE IMPORTANT TO PEOPLE

Gig Harbor, Pierce County

the cost of a view may be too high
BEACH ACCESS IS IMPORTANT TO PEOPLE
but beach stairs can cause landslides

LAWNS ARE IMPORTANT TO PEOPLE
lawns can also cause serious problems

soil saturation & high run-off

compacted soil & lawns contribute to soil saturation, stormwater run-off, erosion & landslides

CHUCANUT BAY, BELLINGHAM, WA
Slope Stability Is Important To People but that may not be apparent until it is too late

SO WHAT CAN WE DO NOW?

we can replace some lost functions through improved management practices
Unique Site Characteristics

- Topography
- Geology
- Soils (unconsolidated fill?)
- Hydrology
- Drainage Patterns
- Vegetation
- Shore Processes
- Signs of Erosion or slope instability
- Off-Site Influences

1st thing – know your site!

evaluate your property

Map Your Property Landscape & Environmental Characteristics

CREDIT: Kathy Settevendemie and Madeline Mazursk
IDENTIFY & ASSESS POTENTIAL PROBLEMS

Upland - Slope - Shore

▪ stormwater?
▪ impervious surfaces?
▪ drainage control?
▪ soil erosion?
▪ hydrology?
▪ slope instability?
▪ landslides?
▪ wave attack?
▪ invasive plants?
▪ off-site influences?

WHICH ISSUES ARE THE MOST IMPORTANT?

SOME MANAGEMENT TIPS TO MAKE YOUR PROPERTY LESS TEMPORARY
RETAIN TREES & OTHER NATIVE VEGETATION ON UPLANDS & SLOPES

PRESERVE & ENCOURAGE NATIVE VEGETATION AT BASE OF MARINE SLOPES

overhanging trees

backshore vegetation & drift logs
UNNECESSARY TREE CUTTING CAN CONTRIBUTE TO LANDSLIDES

cut trees provide no benefits

Root Strength Deterioration

DON'T TOP TREES FOR VIEW ON STEEP SLOPES

DECIDUOUS TREES

CONIFER TREES

DECIDUOUS TREES

CONIFER TREES
Topping trees impairs rooting
Topping trees on slopes reduces stability

Tree topping
Root die-back

Explore alternatives to topping for improving views

Alternative pruning for conifers
Pruning broad-leaved trees
prune no more than 20% of the live crown

A WELL-PRUNED TREE CAN PROVIDE BOTH VIEWS & STABILIZE SLOPES

FROM LUMMI ISLAND

photo: JOE ROCCHIO
BAD NEWS FOR SLOPES!

INVASIVE PLANTS PROVIDE INFERIOR STORMWATER & EROSION CONTROL

CONTROL INVASIVE PLANTS

Scot's Broom
Himalayan Blackberry
Butterfly Bush
Thistle

English Ivy

BAD NEWS FOR SLOPES!

INVASIVE PLANTS PROVIDE INFERIOR STORMWATER & EROSION CONTROL

BAMBOO: A GROWING CONCERN

300 species sold in the Pacific NW
‘Running’ varieties are fast spreading
Roots 18-24 inches deep

can create severe problems for shoreline landowners

DON'T PLANT BAMBOO WITHIN 150 MILES OF A STEEP SLOPE

Vashon Island, King County, WA
eradicating English ivy & other invasive plants can be difficult, complicated, & expensive

more desirable native vegetation can’t be restored without effectively controlling or eradicating invasive plants

City of Shoreline, King County

AVOID USE OF HERBICIDES NEAR SHORELINES protect water quality, wildlife & slope stability

KILL-JOY

Liquid Super Concentrate

Kills Trees, Stumps, brambles, nettles, deep rooted and woody weeds

DISHWASHER SAFE

sensitive plant roots
**PLANT BUFFERS**
- Reduce areas of bare soil
- Shrink the lawn
- Control invasive plants
- Control drainage

**IMPROVE PROPERTY MANAGEMENT**
- Replace the functions & values of native forests lost during development
- Restore slope vegetation & improve view management

**AVOID EXTENSIVE LAWNS TO THE EDGE OF YOUR BLUFF**
- No trees
- No buffer
- No good

Edgecliff Drive, Langley, Whidbey Island
**ESTABLISH VEGETATED BUFFERS**

- **reduce storm water run-off**
- **increase rainwater interception & evapotranspiration**

**swordfern & Oregon grape**

DINES POINT, WHIDBEY ISLAND

**salal**

OAK HARBOR, WHIDBEY ISLAND

**PLANTING ISLANDS TO REDUCE EXTENT OF LAWN AND MANAGE STORMWATER RUNOFF**

LANGLEY, WHIDBEY ISLAND
USE NATIVE PLANTS in YOUR LANDSCAPING
WHENEVER & WHEREVER POSSIBLE

ADJUST YOUR AESTHETIC

▪ Better stormwater & erosion control
▪ More drought-hardy than ornamentals
▪ Resistant to climate change
▪ Requires less water & pesticides than lawns or ornamentals

create a regionally distinctive landscape style

LANGLEY, WHIDBEY ISLAND

keep in mind that replacing the lost functions of vegetation takes time to become effective

Groundcovers: 3 to 5 years
Shrubs: 4 to 10 years
Trees: 7 to 15 years

vegetation becomes more effective over time, unlike conventional engineered structures

so plan ahead, BEFORE problems occur!