

# **Vegetation Workshop for Shoreline Landowners**

**Presented by Ben Alexander, Sound Native Plants**

**March 22, 2018**



# Why are we here?



## NEW! Vegetation Workshop for Shoreline Landowners - March 22

Learn more about coastal geology and how best to manage your landscape for slope stability and wildlife habitat at this workshop on

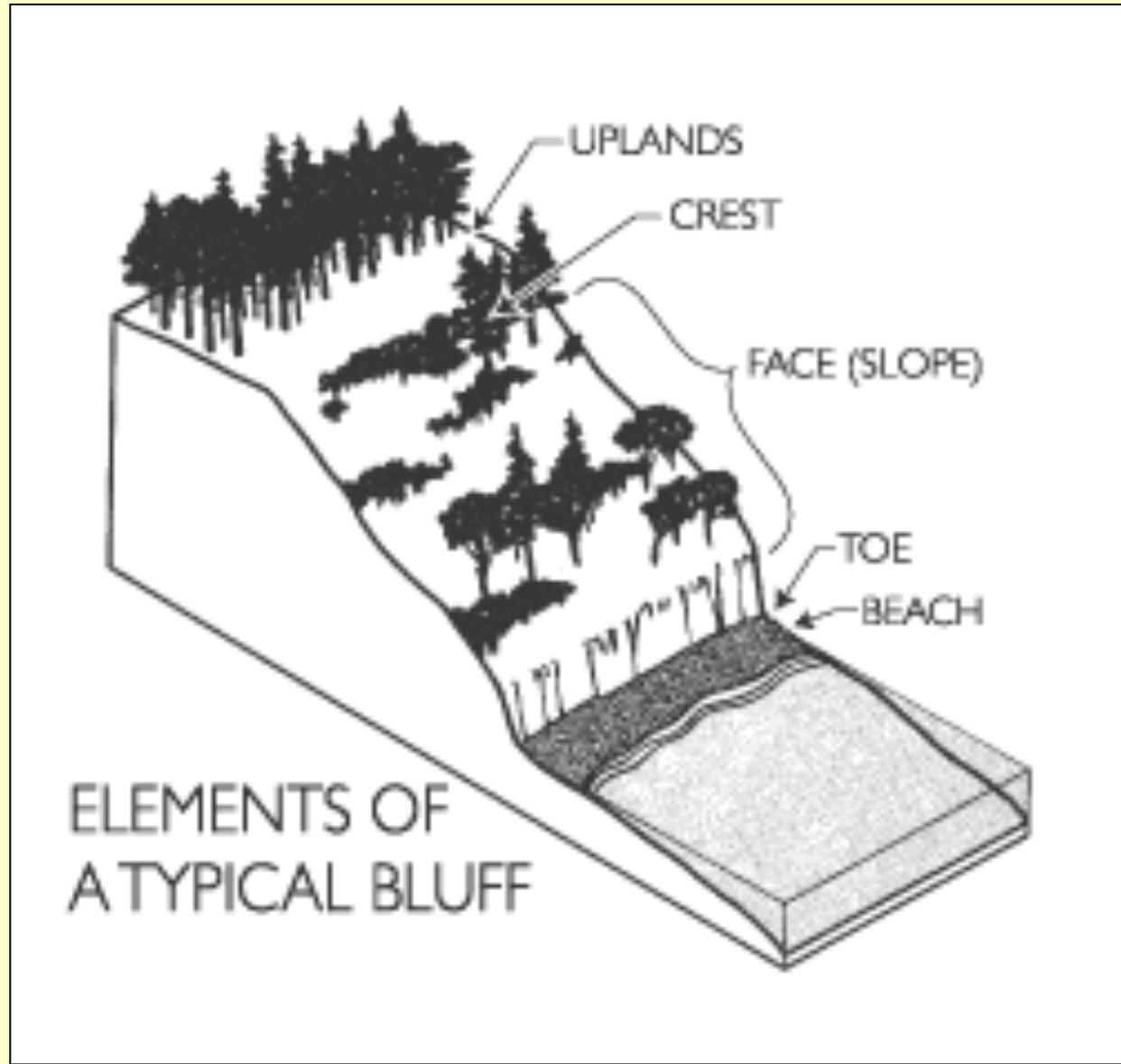
**Thursday March 22 from 6 - 8 pm** in Port Hadlock. The program is free, but **RSVP is required** due to limited seating. RSVP [here](#) or go to <https://jeffersonshorelines.bpt.me>.

Jefferson County's marine shorelines support marine food webs and the local economy. People who live and work on shoreline properties have a large role to play in their protection and restoration. **Ben Alexander from Sound Native Plants and Lisa Kaufman from the Northwest Straits Foundation** will highlight the why and how of effective landscape management at this workshop designed specifically for shoreline landowners.

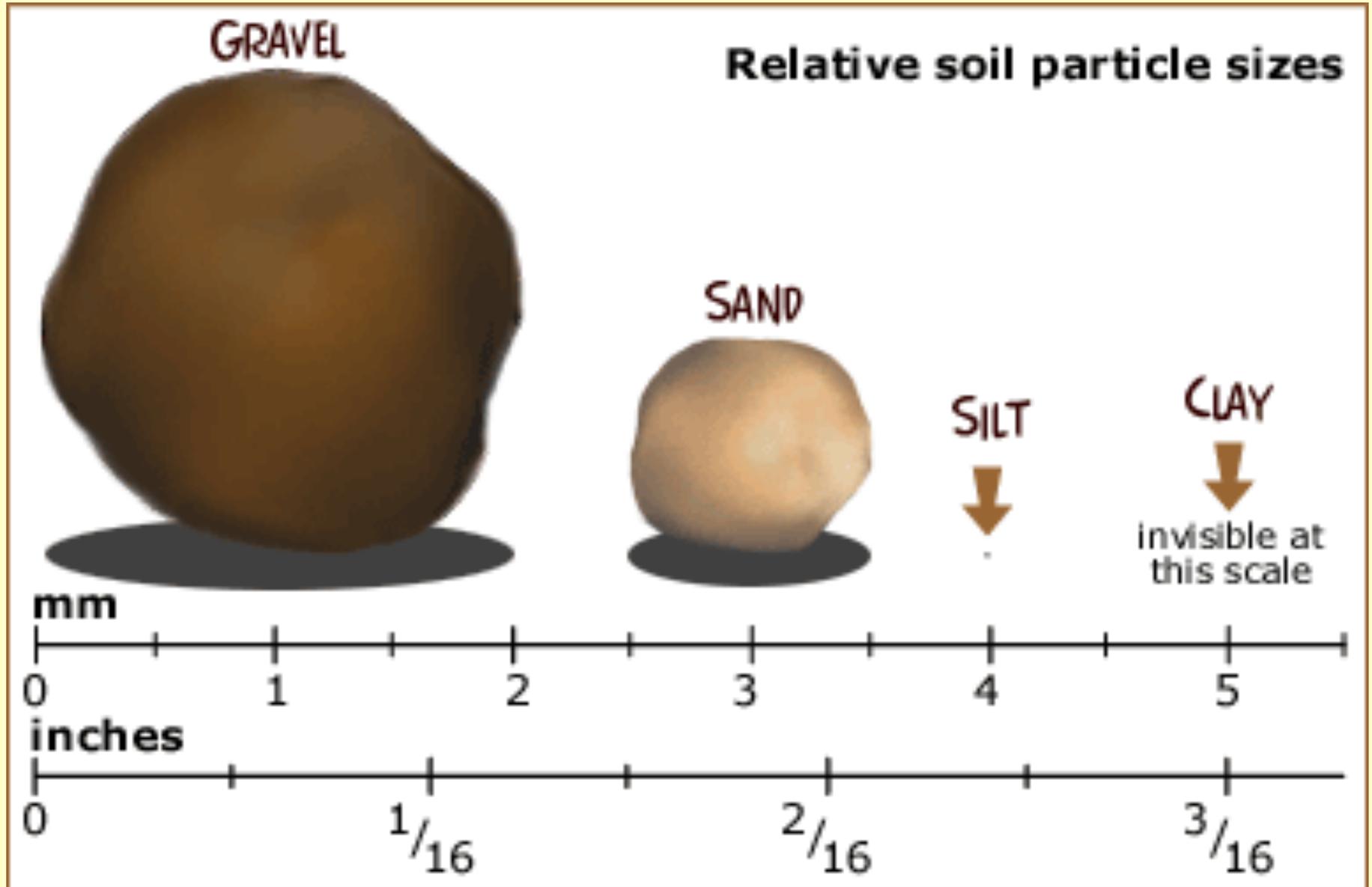
Funding for this program comes from the EPA -National Estuary Program through the Puget Sound Marine and Nearshore Grant Program.

# Part I: Shoreline Slope Stability Factors

- **Soils and geology**
- **Drainage**
- **Vegetation**

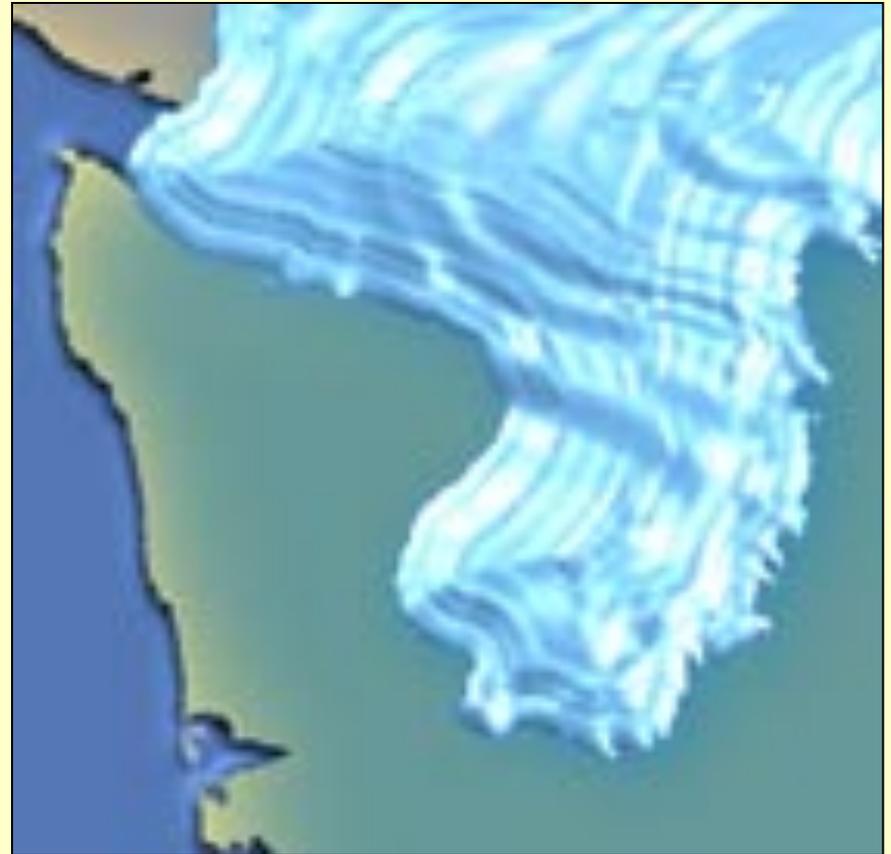


# Soils & Geology 101: What is soil?



# Where does soil come from?

- **Most soil formed from eroded rock (AKA “parent material”)**
- **Glaciers formed most soils in slopes around Puget Sound**



# Soil formation affects slope stability

- **Soil overrun by advancing glaciers became densely compacted**
- **Soil deposited by retreating glaciers remains loose and unconsolidated**
- **Slides often occur where loose layers meet compact layers**



# Why care about your soil?

- **Fine, compacted soil is fairly stable**
- **Coarse, uncompacted soil is fairly unstable**
- **Fine particles compact well but drain poorly**
- **Big particles drain freely but may be unstable**

# Rainwater drains rapidly through loose soil

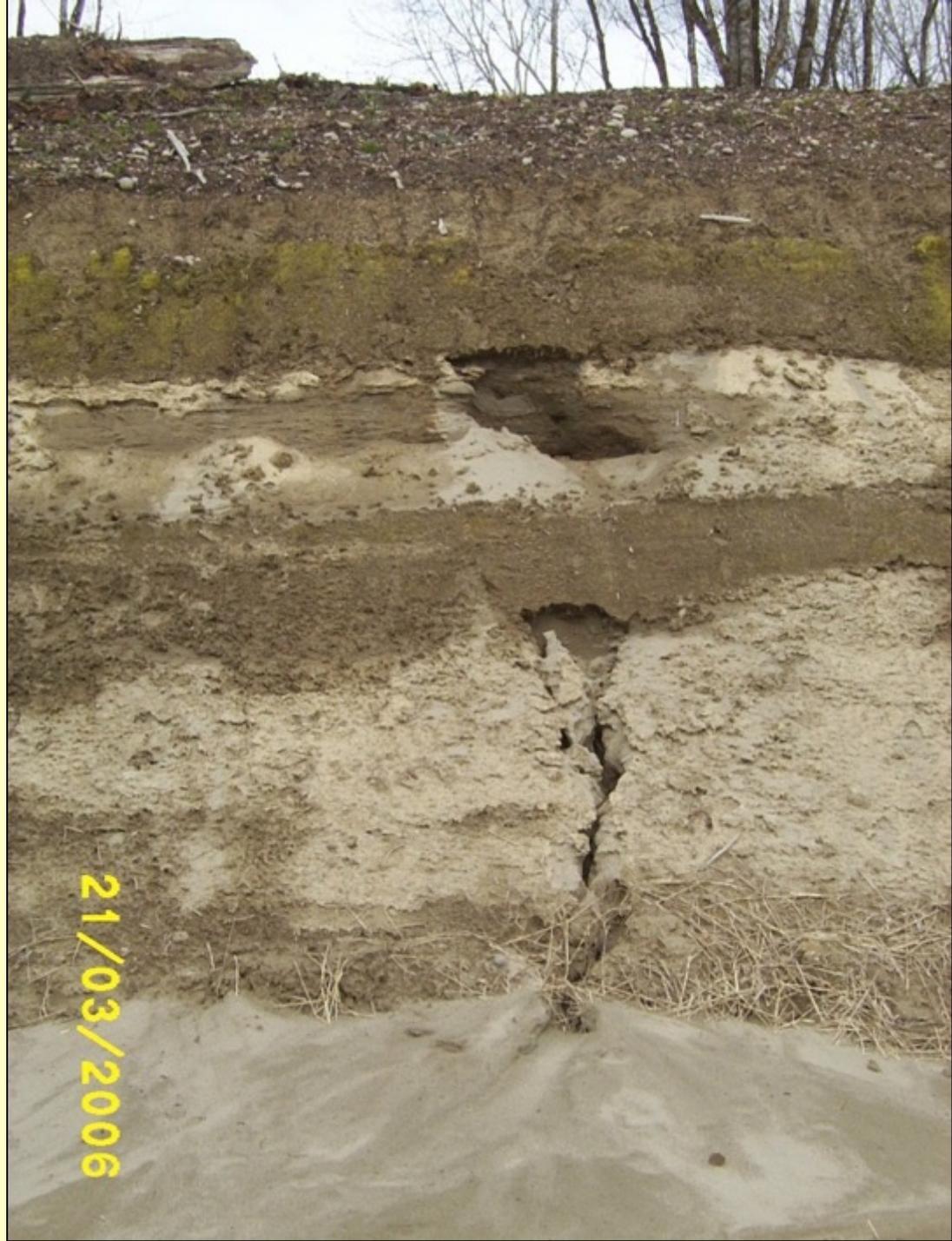


# Fine, compact soil layers prevent drainage



# Water above compact layers seeps out on slopes

- Fine particles wash out, destabilizing the slope above



# How can you tell what kind of soil you have?

## Feel a soil sample:

- Sand feels gritty
- Silt feels smooth
- Clay feels slimy

## Squeeze a ball of damp soil:

- Loam breaks up
- Clay loam forms a 1-2” ribbon
- Clay forms a >2” ribbon



## Other resources for soils information

- **View the USDA soil map of your area at [websoilsurvey.nrcs.usda.gov/app](http://websoilsurvey.nrcs.usda.gov/app) – click on “START WSS”**
- **Have Jefferson County Conservation District provide a soil test – call (360) 385-4105**
- **Find a list of soil testing labs at <http://analyticallabs.puyallup.wsu.edu/analyticallabs/services/>**
- **Contact NRCS at (360) 704-7740**

# Vegetation stabilizes slopes

Roots provide:

- **70% of a slope's shear strength (till soils)**
- **95% of a slope's shear strength (sandy soils)**



# Tree root reinforcement

## Deep roots:

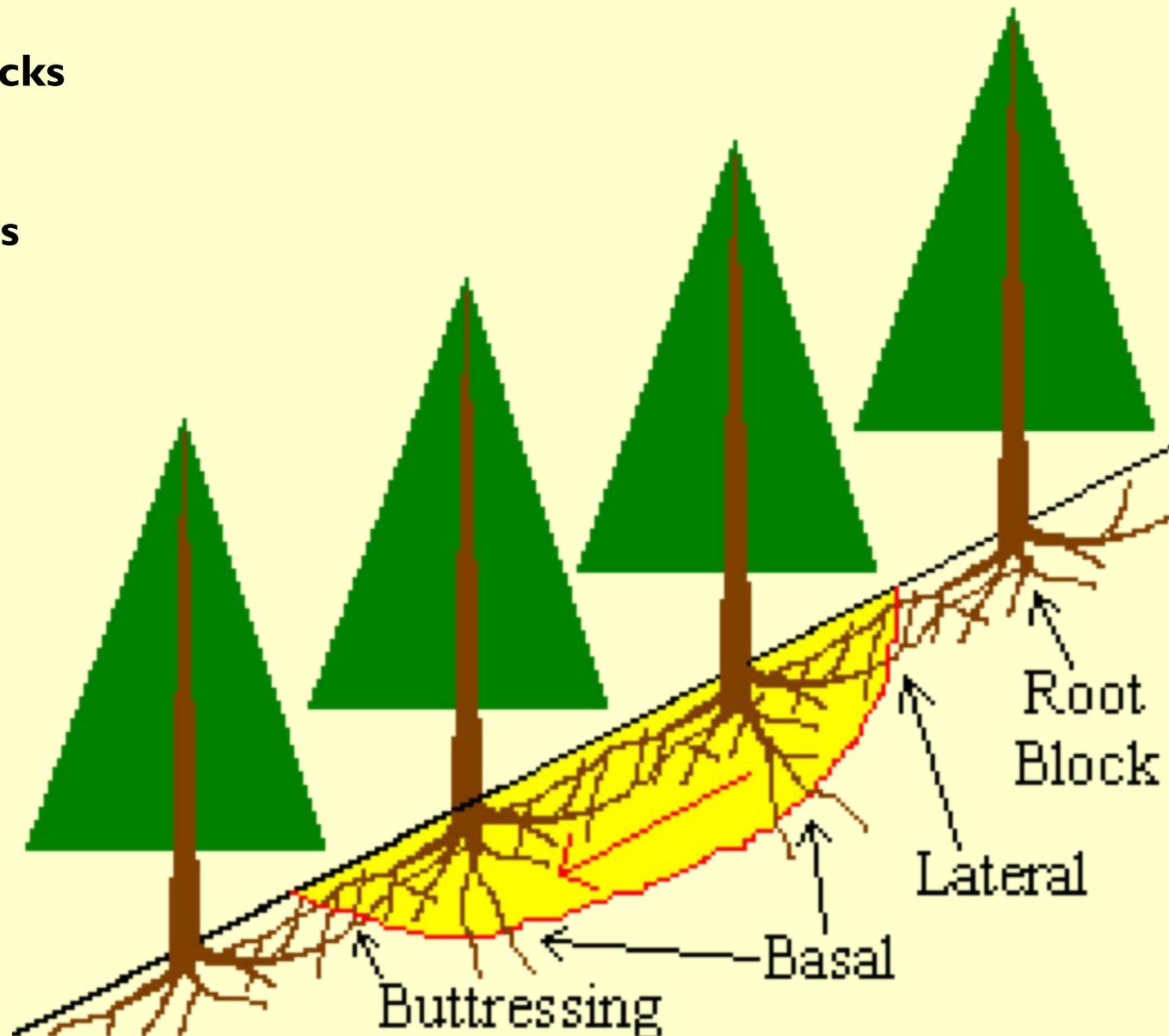
- Create soil blocks

## Lateral roots:

- Form buttresses
- Prevent sliding from above

## Interwoven roots:

- Connect trees together
- Span weak areas



# Tree roots at the top of slopes are critical



18/04/2006

# Tree roots at the top

- **Bluff slide occurred next to tree from previous photo**



**Tree roots at the top**

**Slide occurred here**



**This is the tree  
from the previous  
slide**

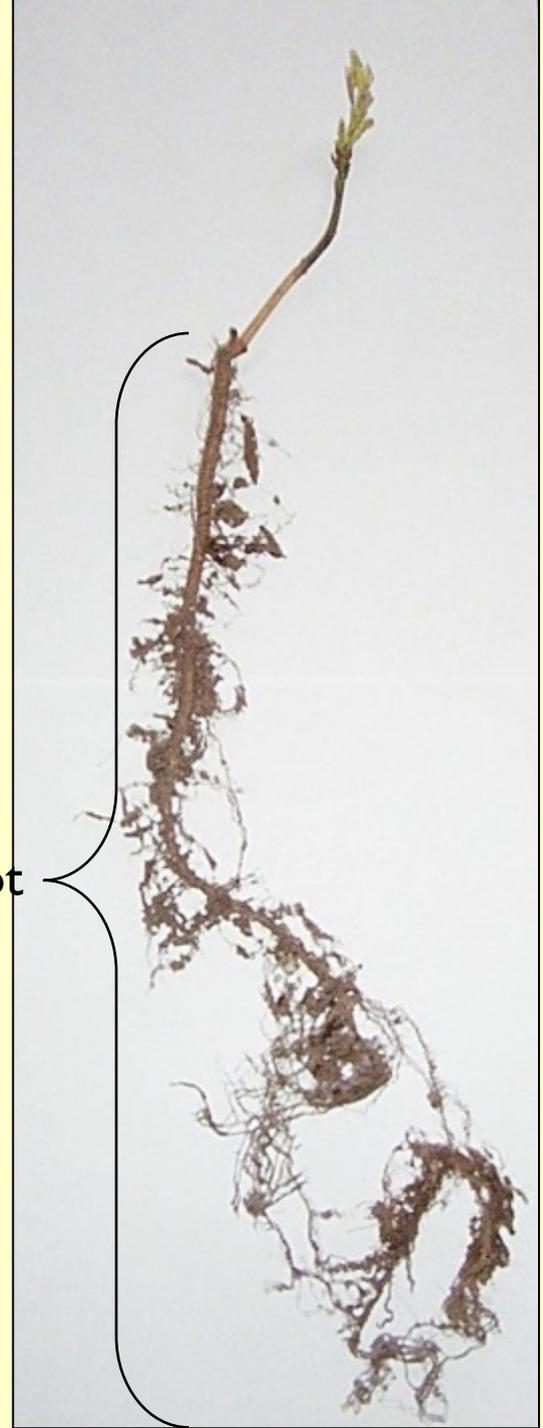


**18/04/2006**

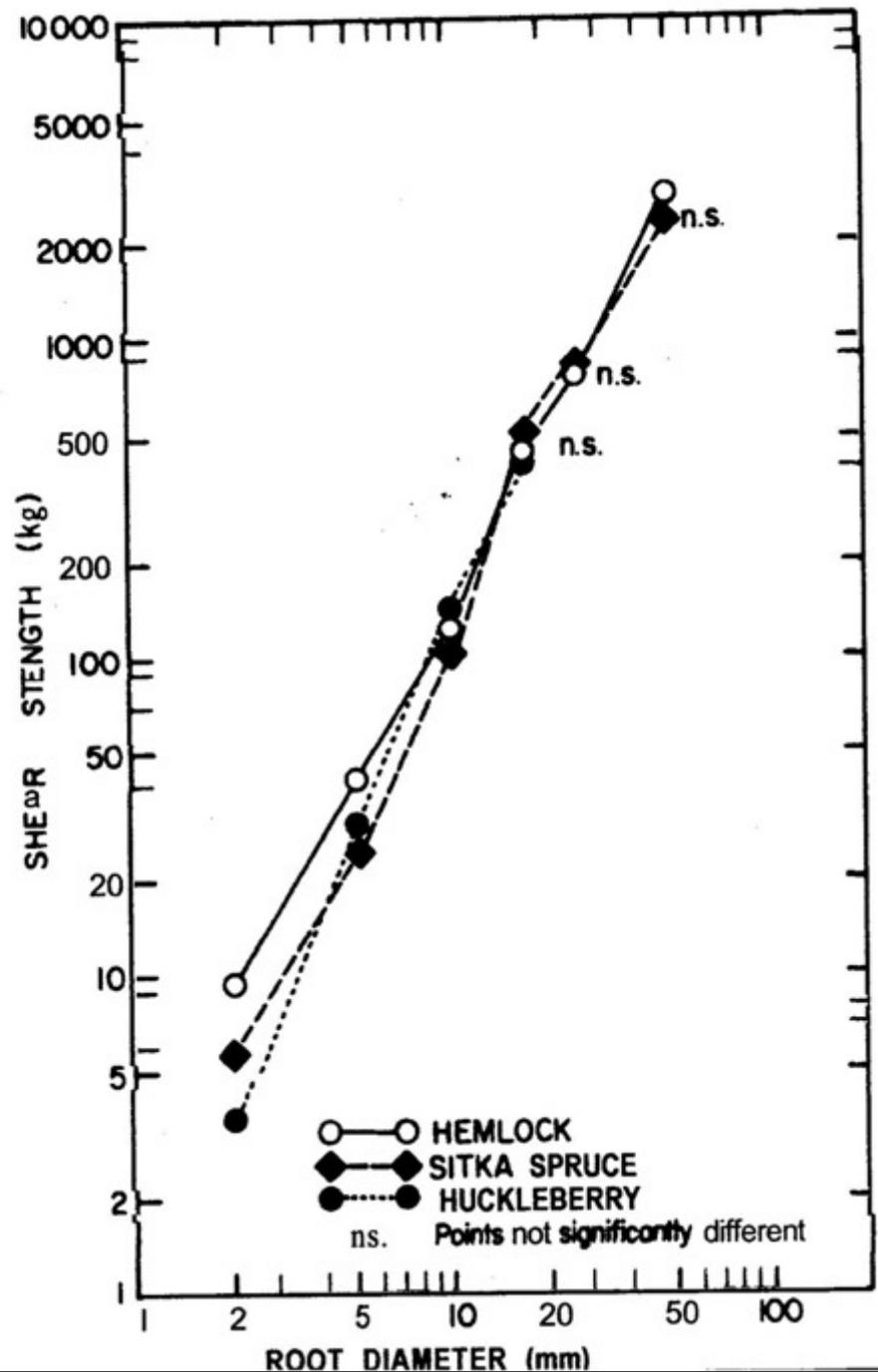
# Deep roots anchor soil layers together

- **Vertical (tap) root penetrate deeply**
- **Native trees with taproots include:**
  - **Pacific madrone**
  - **Oregon white oak**

Oak seedling taproot



Large diameter roots are stronger than small ones



## Shrub root reinforcement

- **Fibrous roots hold topsoil particles together**
- **Tough fibrous roots: strong, hard to break**
- **Fine, delicate roots: break easily**



## Roots also stabilize slopes by:

- **Dewatering slopes**
- **Hosting mycelial networks**



## Part 2: How development affects shorelines

- **Cleared vegetation**
- **Compacted soils**
- **Increased impervious surfaces**
- **Altered drainage**



# Soil compaction increases runoff



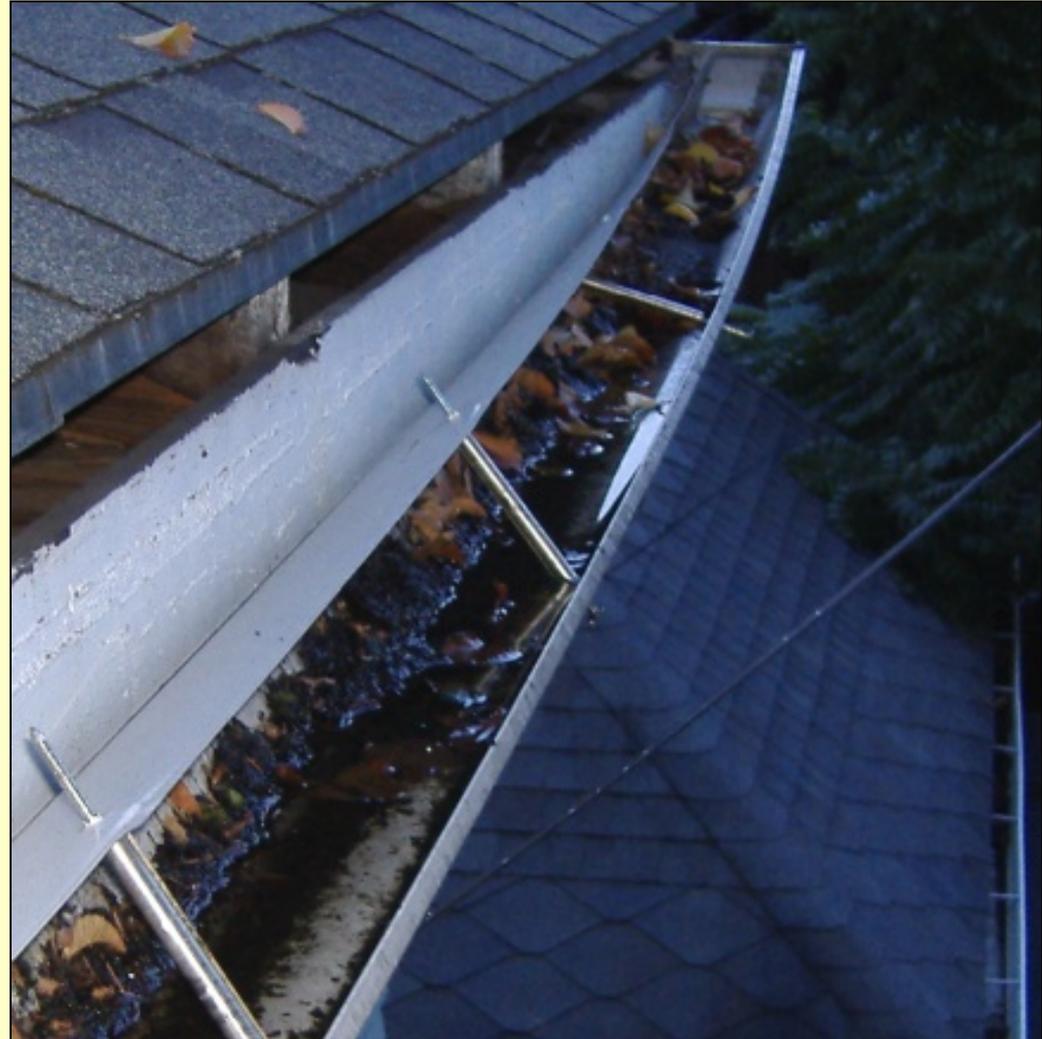
# Impervious surfaces increase runoff

- **Roofs and pavement shed rainfall**
- **Rainwater collects in drainage systems**
- **Drainage systems discharge to streams and bays**
- **Runoff from drainage systems triggers erosion**



# Top 6 ways that homeowners make things worse

- **Cutting down all the trees on a slope**
- **Topping trees**
- **Directing downspouts onto or above slopes**
- **Throwing yard waste on slopes**
- **Putting dead weight at the top of a slope**
- **Neglecting to clean out gutters**



# Cut maples sprout from the stump, causing long-term problems



# Topping trees sickens or kills them

- **Stresses roots**
- **Introduces rot**
- **Triggers slides**





**Discharge from the downspouts on the house at the top of the slope triggered this slide**

# Dumping yard waste on slopes smothers the vegetation



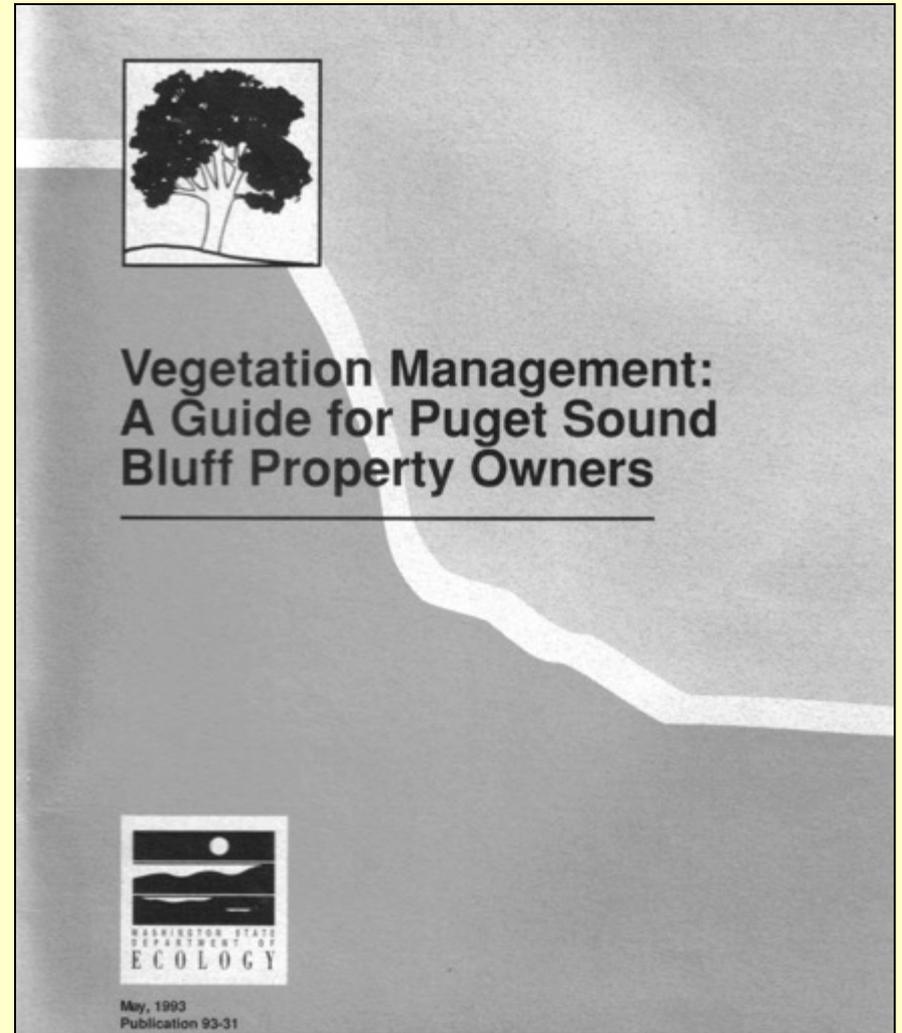
# Unsupported weight at the top of a slope can trigger slides



# Part 3: Preventing Damage to Shoreline

## Top 6 ways to prevent shoreline problems

- Retain trees and shrubs
- Redirect drainage
- Relocate heavy structures away from slopes
- Dispose yard waste properly
- Mulch bare ground
- Control invasive weeds



**This guidebook is free from Dept. of Ecology**



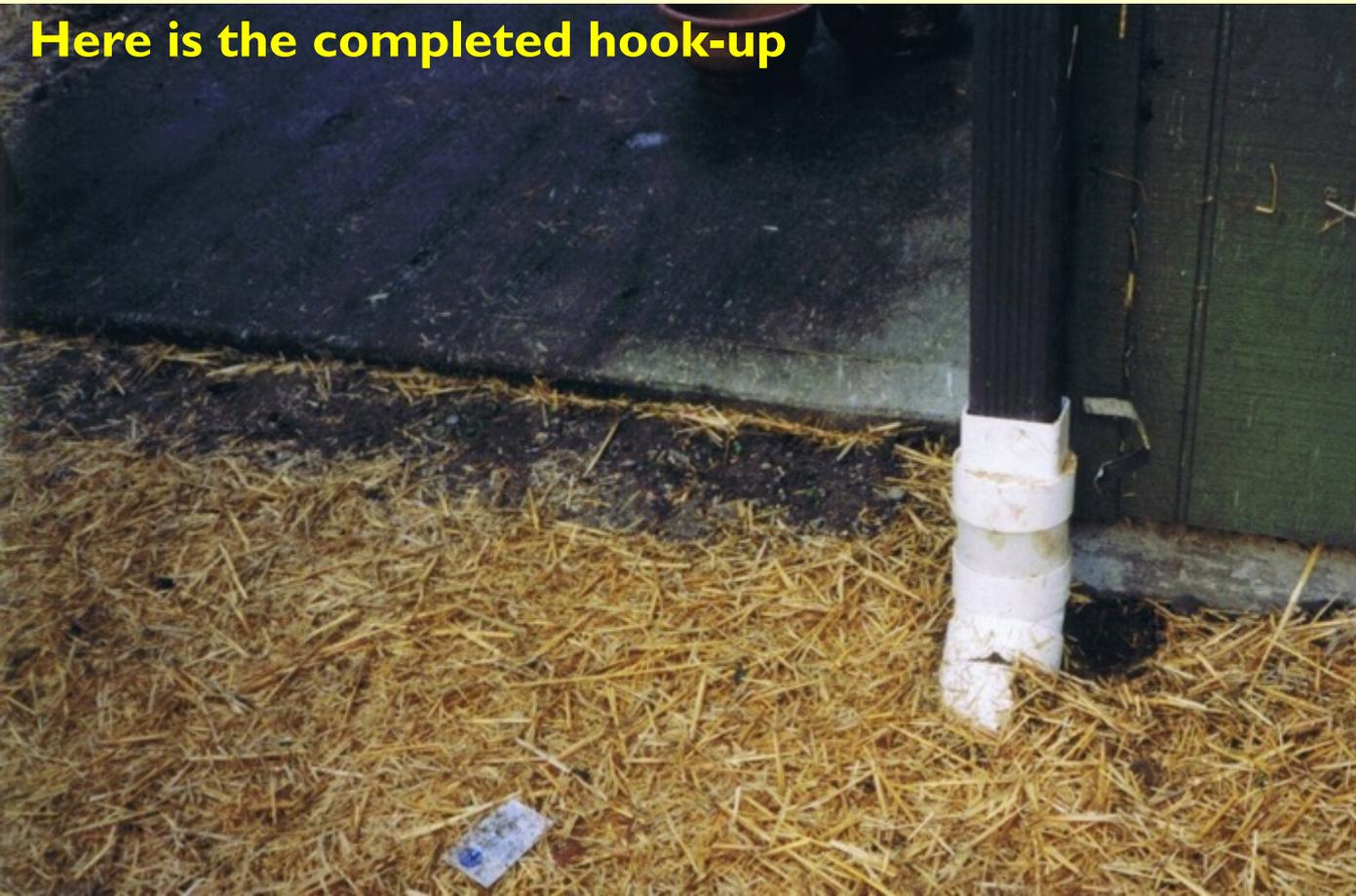
**Prune trees to create view windows while keeping the trees!**

# Connect downspouts to a non-perforated “tightline”



**Direct the tightline away from the slope, or down to the bottom**

**Here is the completed hook-up**



**Discharge point  
reinforced with rock**

# Bluff drainage systems

- **Corrugated drain pipe always fails**
- **Secure anchoring essential**
- **Solid wall metal pipe with energy dissipater at base is best**



# Yard waste should be composted

- **Use a compost bin**
- **Use curbside yard waste collection if available**
- **Drop yard waste at a composting facility**
- **For more information visit <https://jeffersoncountysolidwaste.com/11-alternatives-to-yard-debris-disposal/>**



# Mulch bare ground



# Weed control

- **Invasive weeds suppress beneficial plants**
- **Blackberries and English ivy do not stabilize slopes**
- **Weed control must be followed with replanting**
- **Herbicide use in a shoreline zone requires a free permit from Ecology**



## Part 4: Potential instability warning signs:



### Top of slope:

- All the trees have been removed
- Lawn extends to the edge of the bluff
- Little or woody shrubs

## Warning signs at the top:

- **Slumping soil surface  
near brow of slope**



# Warning signs at the top:

- **Overhanging vegetation**
- **Dangling roots**



## Warning signs at the top:

- Tension cracks in the soil parallel to slope
- Spongy-feeling depressions



# Warning signs at the top:

- “Terracing”



17/09/2003

# Warning signs on the face:

- Rills and gullies



# Warning signs on the face:

**Wet-loving herbaceous plant species:**

- **Spreading buttercup**
- **Waterleaf**
- **Coltsfoot**
- **Skunk cabbage**
- **Horsetails**



# Warning signs on the face:

**Wet-loving  
shrub  
species:**

- **Willows**
- **Salmon-  
berry**



# Warning signs on the face:

- **Algae**



# On the slope face look for:

- **Leaning trees or curved trunks**
- **Toppled and jack-strawed trees**



# At the toe of the slope look for:

- **Piles of soil at the toe of the slope**
- **Chunks of sod from above**



# Things to watch out for: English ivy

- Ivy can obscure underlying erosion



# Things to watch out for: English ivy



- **Ivy can place great weight on slopes**

# Part 5: Shoreline Stabilization Techniques



# Seeding grass is not good for slope stabilization

- **Shallow roots**
- **Heavy when wet**
- **Suppresses more desirable vegetation**



# Jute netting only controls surface erosion

- **Must be in contact with soil**
- **Proper installation critical**
- **Limited value on steep slopes**



# Planting native groundcovers

- **Surface erosion control only**



**Kinnikinnik - 2004**

14/09/2005



**Coastal strawberry - 2004**



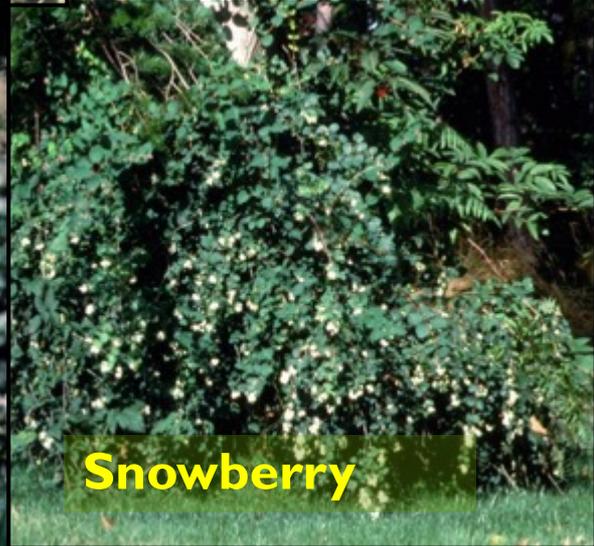
**Coastal strawberry - 2005** 14/09/2005

# Planting native trees

- **Bigleaf maple** – good bluff stabilization
- **Shore pine** – fast growing, small pine
- **Douglas fir** – tall, sun & drought tolerant
- **Black cottonwood** – takes up a lot of water, grows from a cutting (AKA “live stakes”)
- **Cedar** – shade tolerant, moist soils



# Planting native shrubs



# Low bank - deteriorating bulkhead



# Remove bulkhead, place gravel and plant

- **American dunegrass - *Leymus (Elymus) mollis***
- **Deep-rooted backshore species**
- **Marine shorelines only**



# Replanted shoreline after three years



# Collapsing bulkheads, weeds, degraded habitat



# Old bulkhead & weeds removed

- Weeds grubbed out
- Archeological concerns limited ground disturbance
- Follow-up herbicide treatment required

**Shoreline mulched,  
planted with  
natives**

**Just planted**



**1 year later**



**2 years later**



# Bioengineering

Using living plant materials in combination with other materials to construct living structures that stabilize soil.



- **Plants provide primary soil reinforcement**
- **Used for stabilization, erosion control, and habitat enhancement**
- **Bioengineered = “soft”  
Stone, concrete = “hard”**

# Live stake installation

**Unrooted woody stem cuttings with branches and leaves removed**

- **Perishable**
- **Late fall to late winter only**
- **Custom-collected**
- **Stored cool and damp**
- **Keep out of direct sunlight**
- **Plant within a 1-2 weeks of harvest**



# Live stake installation

- **Plant deep as possible**
- **Pound directly into the ground in soft soil**
- **In most soils, make a pilot hole first**
- **Then pound in with a hammer**
- **Tamp down loose soil around the live stake**
- **Prune off damaged ends**
- **Install close together**

Step 1



Step 2





# Live stake installation: before and after

## Before

Active erosion  
obvious, recent  
mass wasting



## After

Multiple levels of  
vegetation becoming  
established, very little  
bare soil visible

**Place logs anchored into beach and interplant with dune grass**



# Low-bank soft shore armoring

- Logs in beach for habitat and energy dissipation
- Sand-filled burlap bags protect upland
- Dune grass planted in backshore area
- Willow live stakes installed through burlap bags
- Native trees and shrubs planted in upland





**Undercut stump**

**Overhanging brow**

**Steep to vertical scarp**

# **Anatomy of a bluff slide**

**Gullies forming**

**Loose slide debris pile at base**

# Brow reshaping treatment

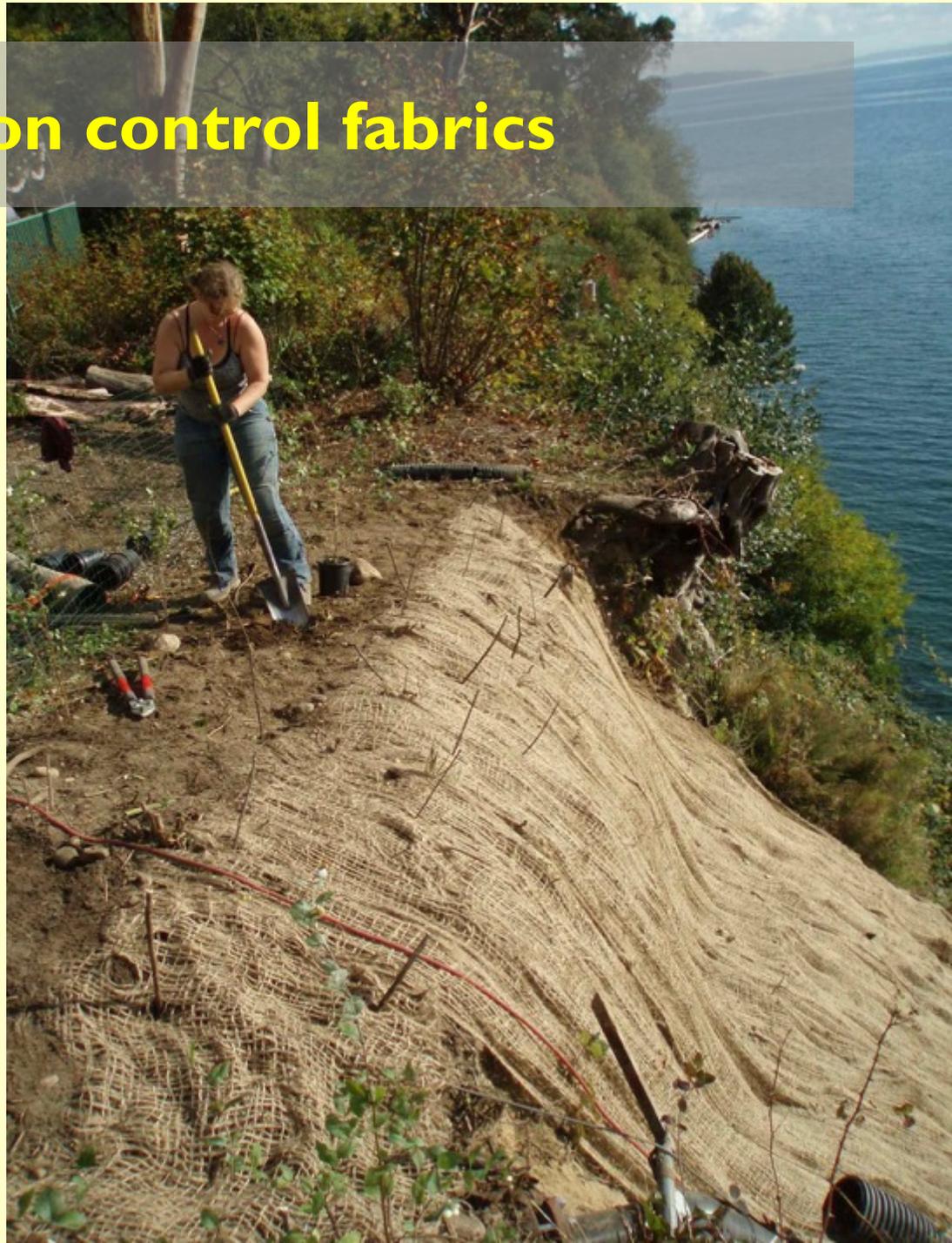


# Step I: cut back overhang



## Step 2: Install erosion control fabrics

- **Surface erosion only**
- **Must be in contact with soil**
- **Proper installation critical – key trench**
- **Limited value on steep slopes**
- **Useful on freshly regraded brow**



## Step 3: Install live stakes



## Step 4: Mulch and plant at top



**Summer after planting**



# Step 5: Plant lower slopes



**Please feel free to contact me for more info**

**Ben Alexander**  
**Sound Native Plants**  
**PO Box 7505**  
**Olympia, WA, 98507**  
[ben@soundnativeplants.com](mailto:ben@soundnativeplants.com)  
**(360) 352-4122**  
**www.soundnativeplants.com**

