CERTIFIED EROSION AND SEDIMENT CONTROL LEAD

PRESENTED BY:

NATHAN HARDEBECK, CWT, LLC

PURPOSE OF TRAINING

Began October 1, 2006, construction sites one acre or larger that discharge stormwater to surface waters shall have site inspections conducted by a Certified Erosion and Sediment Control Lead (CESCL).

CESCL Responsibilities:

- Erosion and sediment control (ESC), and water quality protection.
- Ensure compliance with all local, state and federal ESC and water quality requirements.
- Monitoring, Reporting and Recordkeeping

TOPICS TO BE COVERED

- Section 1 – Intro to the Problem
- Section 2 – Regulations
- Section 3 – CESCL Responsibilities
- Section 4 – Source Control BMPs
- Section 5 – Runoff Conveyance BMPs
- Section 6 – Treatment BMPs
- Section 7 – Spill Control & Countermeasures
- Section 8 – Case Studies
- Section 9 – In-field

STORMWATER

What is it?

- Water that does not infiltrate during or after a storm event, which flows over the land and into adjacent water bodies. Transports sediment and other pollutants.

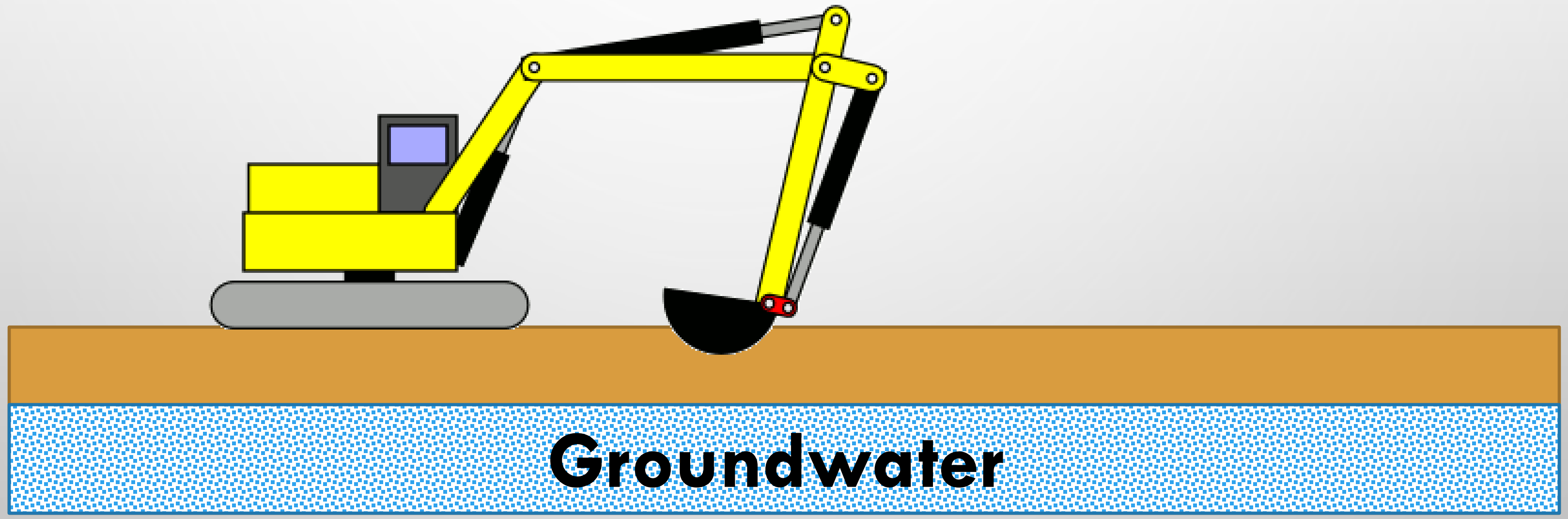
Why does it matter?

- 75% of Americans live near polluted waters
- 50,000 Impaired water bodies (TMDLs)
- $44,000,000,000 – annual total cost to society
- 850 – US cities w/ outdated & under-designed SWM infrastructure

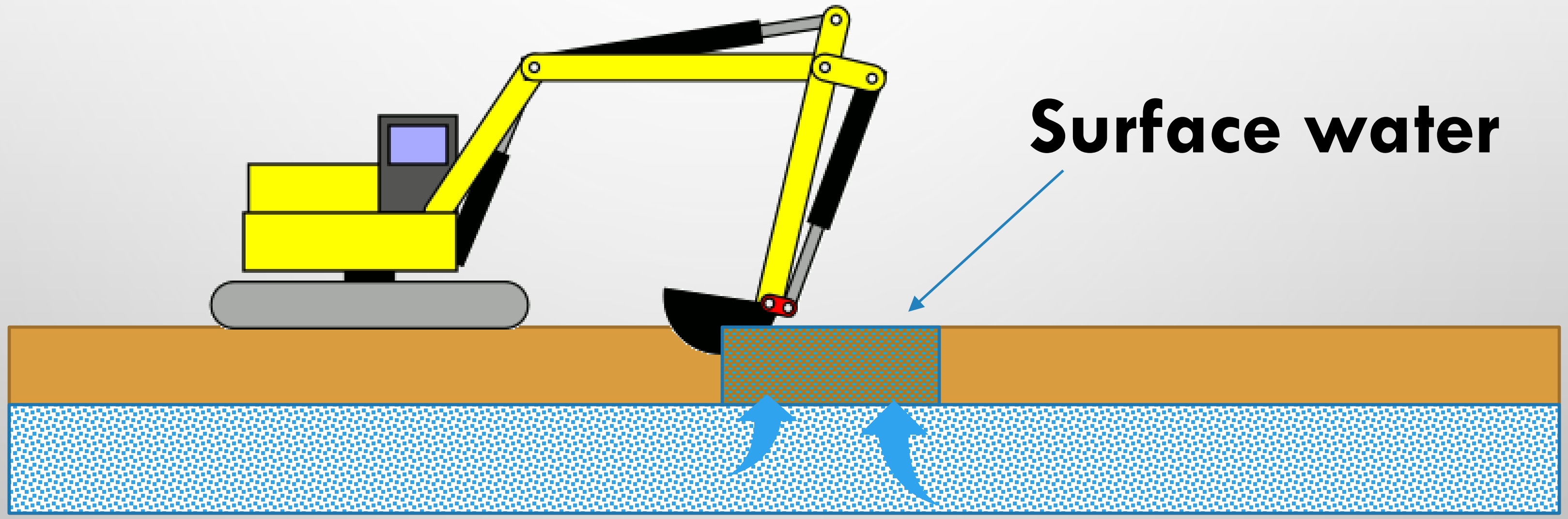
What is not?

- Groundwater
- Process water
- Wastewater

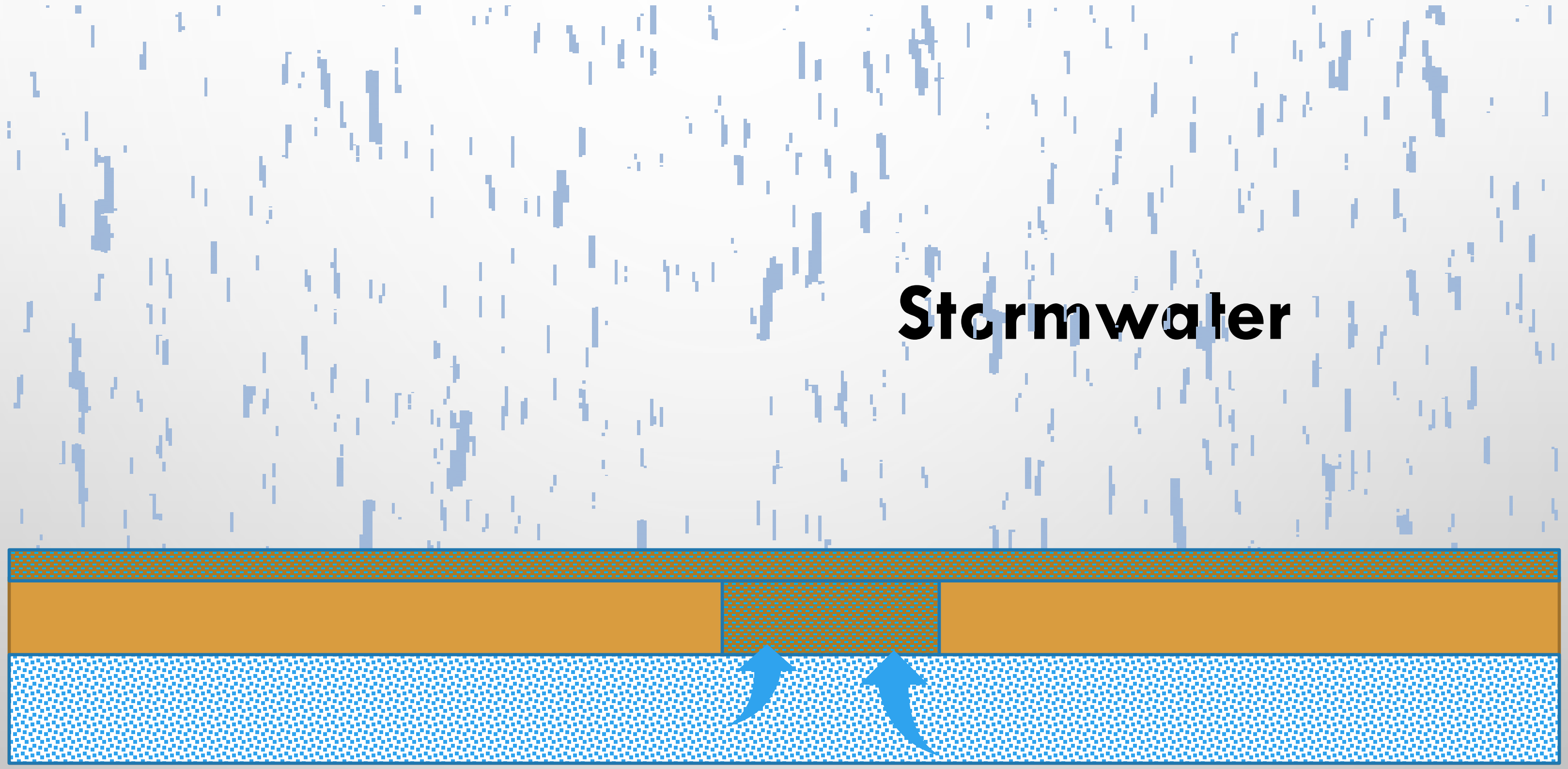
WATER CLASSIFICATIONS FOR A SUBGRADE INSTALLATION



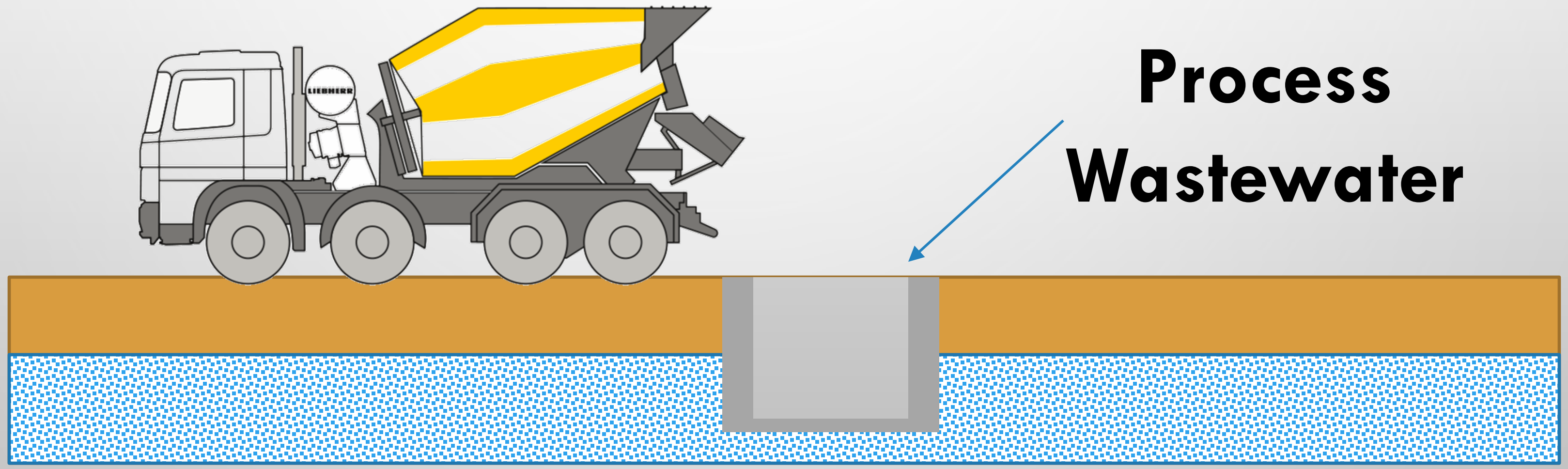
WATER CLASSIFICATIONS FOR A SUBGRADE INSTALLATION



WATER CLASSIFICATIONS FOR A SUBGRADE INSTALLATION



WATER CLASSIFICATIONS FOR A SUBGRADE INSTALLATION



Erosion Processes

EROSION

- DISPLACEMENT/ TRANSPORTATION OF SOIL PARTICLES
- NATURAL PROCESS, ACCELERATED BY HUMAN DISTURBANCES

TYPES OF EROSION

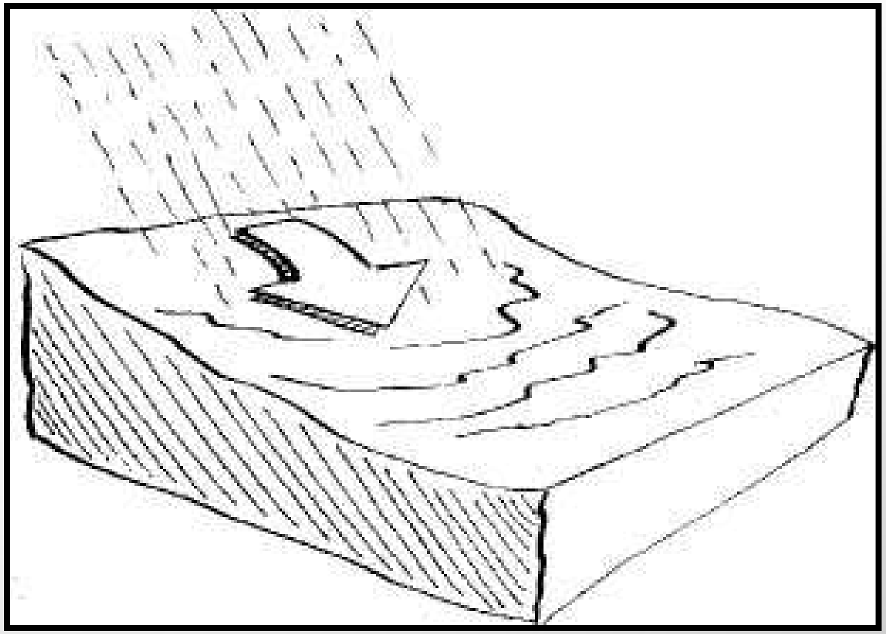
- WATER
  - SPLASH
  - GULLY
  - RILL
  - SHEET
  - MASS WASTING
- WIND
  - SURFACE CREEP
  - SALTATION
  - SUSPENSION

SPLASH EROSION

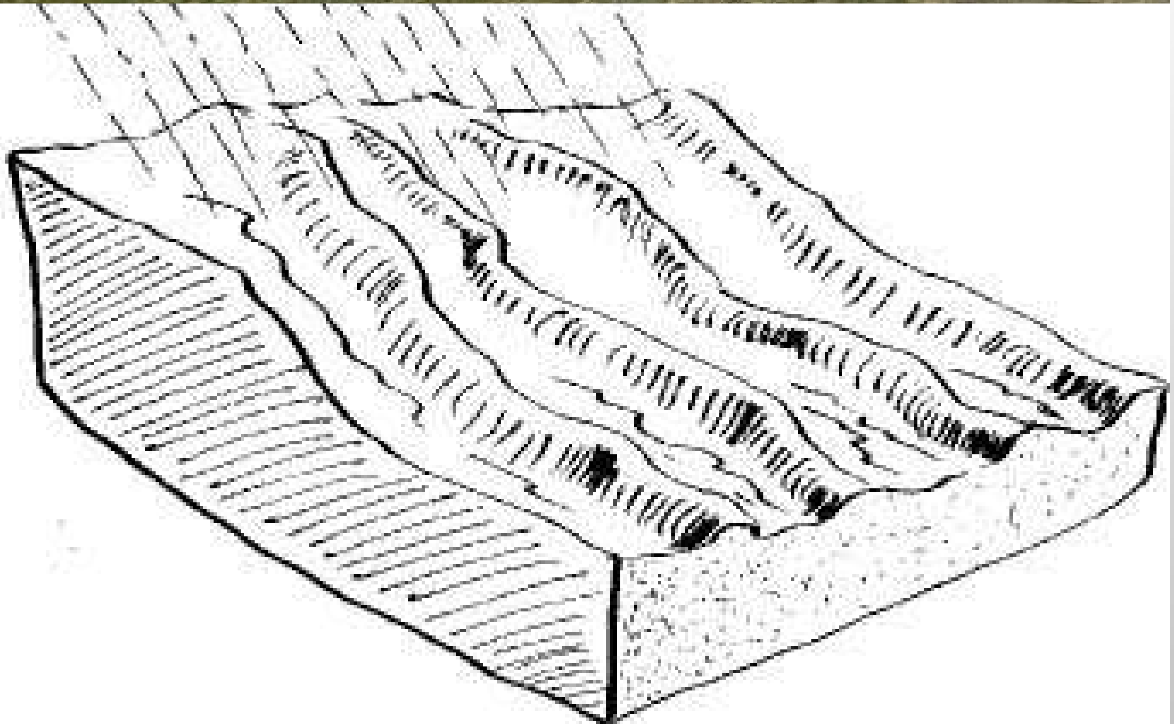
- IMPACT OF RAINDROPS RELEASES LARGE AMOUNT OF ENERGY, DISPLACING A GREAT DEAL OF SOIL.
- OVER THE DURATION OF A STORM, SIGNIFICANT VOLUMES OF SEDIMENT ARE MADE AVAILABLE TO BE TRANSPORTED.

SHEET EROSION

As rain accumulates a non concentrated, uniform layer of runoff is formed.



This sheet flow transports detached soil, as well as plucks off additional soil particles caused by the shear stress of the runoff.



RILL EROSION

- WHEN SHEET FLOWS CONVERGE, INCREASED VOLUMES AND VELOCITIES OF WATER ARE CONCENTRATED.
- SMALL, INTERMITTENT WATERCOURSES WITH STEEP SIDES, KNOWN AS RILLS, ARE FORMED.

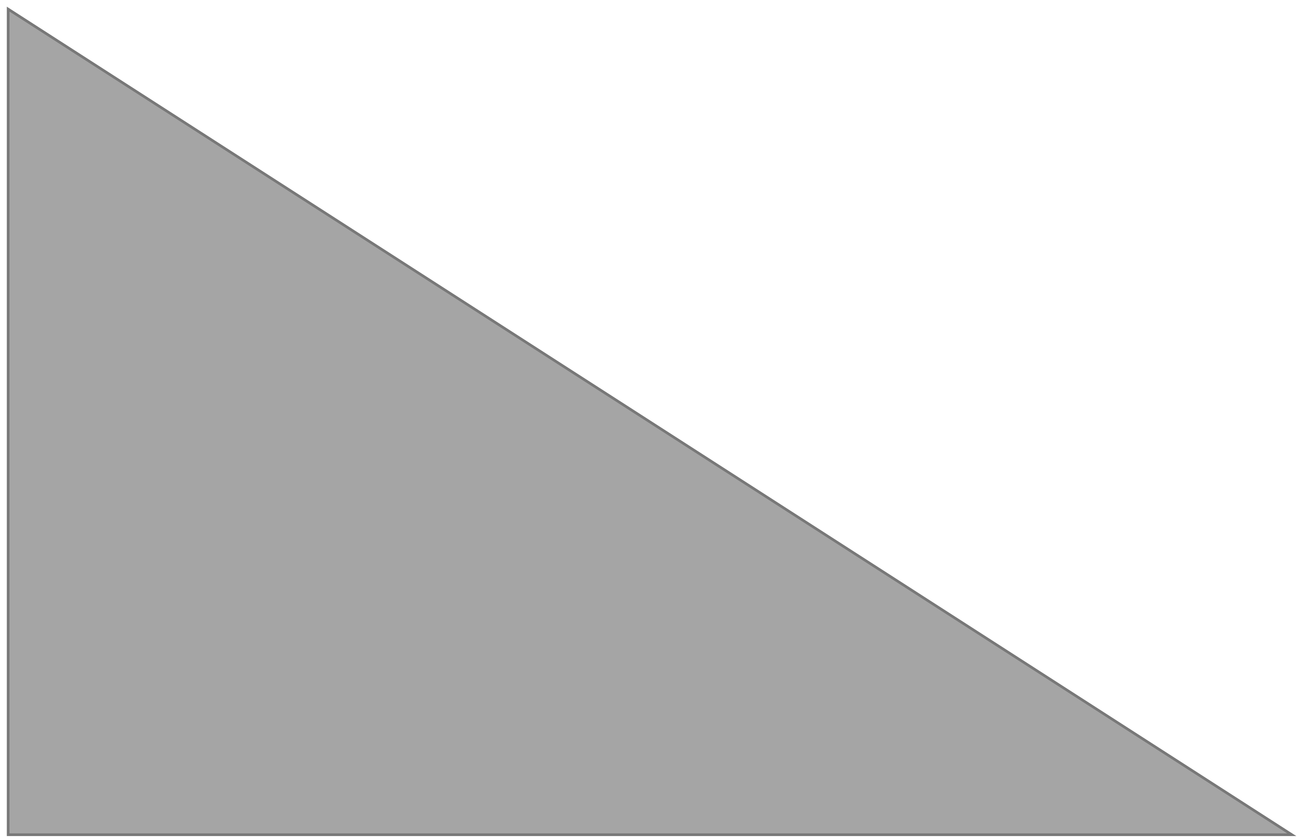
GULLY EROSION

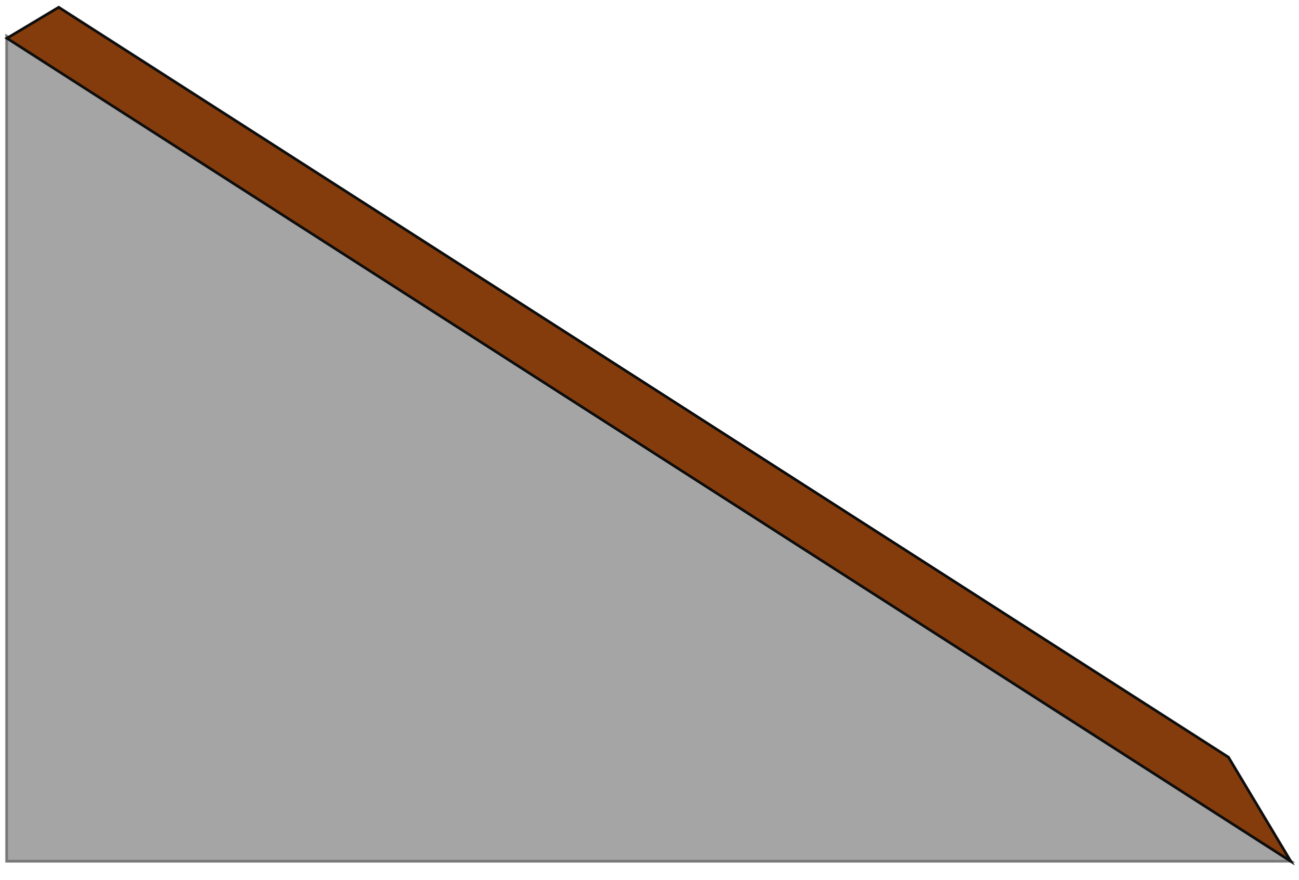
- WHEN RILLS CONVERGE AND/OR IMPERVIOUS SURFACES FOCUS RUNOFF IN A SINGLE LOCATION, A LARGE CHANNEL (OR GULLY) IS FORMED.

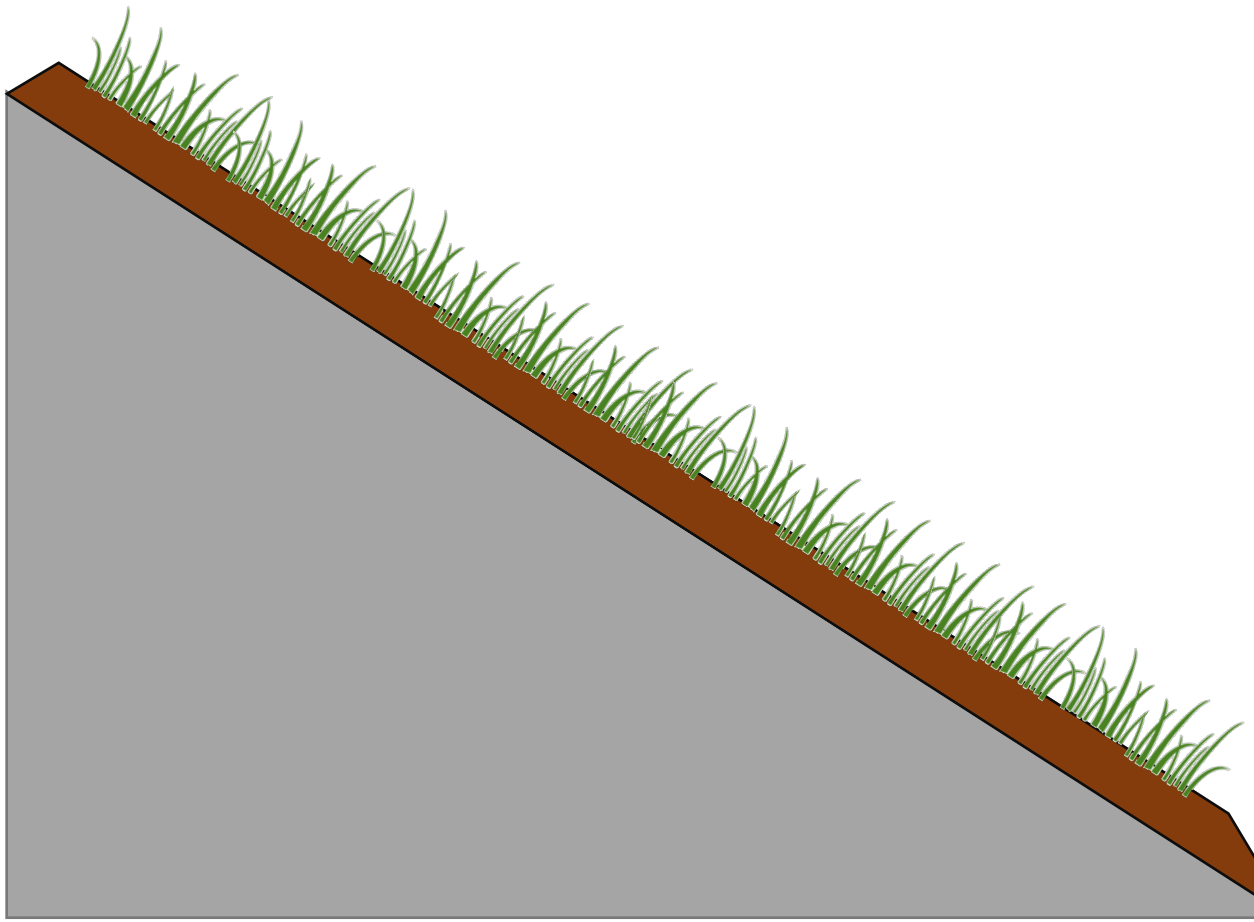
- Volumes and velocities of water, along with shear stress increase dramatically.
- Significant material migration

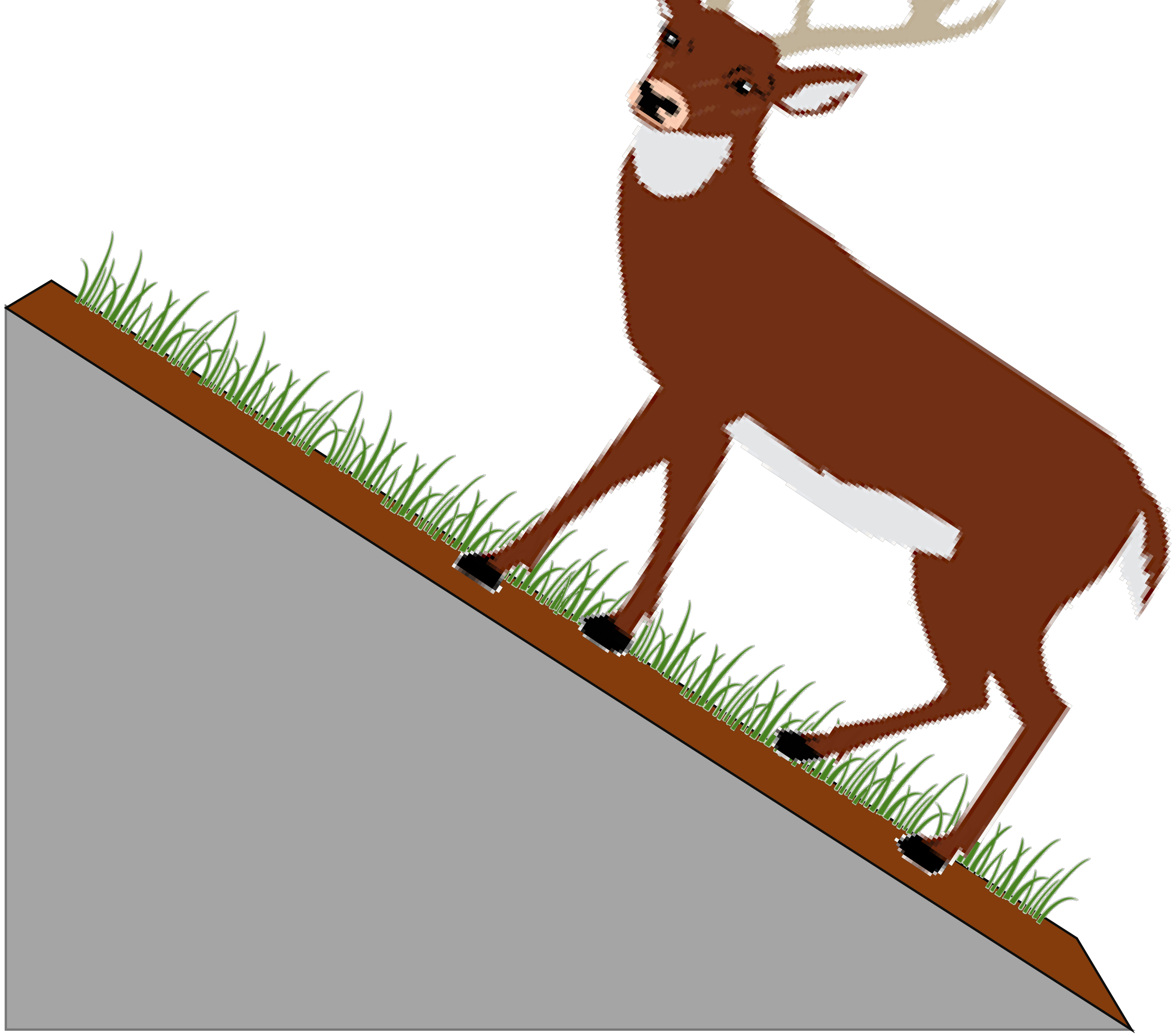
MASS WASTING

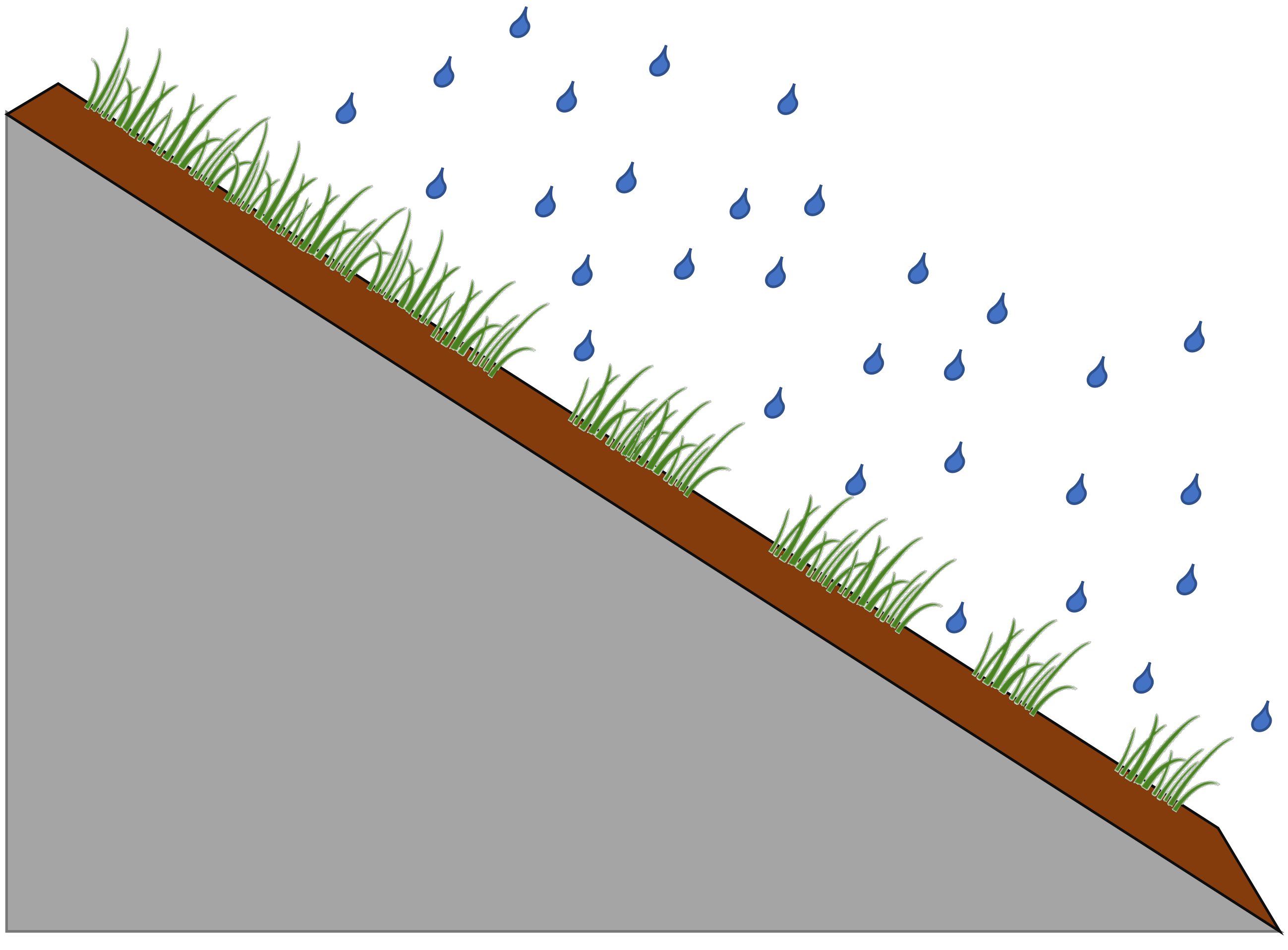
- MASSES MOVE UNDER FORCE OF GRAVITY
  - I.E. ROCK SLIDES, DEBRIS SLIDES, DEBRIS FLOWS, AND EARTHFLOWS
  - CAVE-INS ALONG RIVERBEDS
  - SLIDES ALONG ROAD BANKS

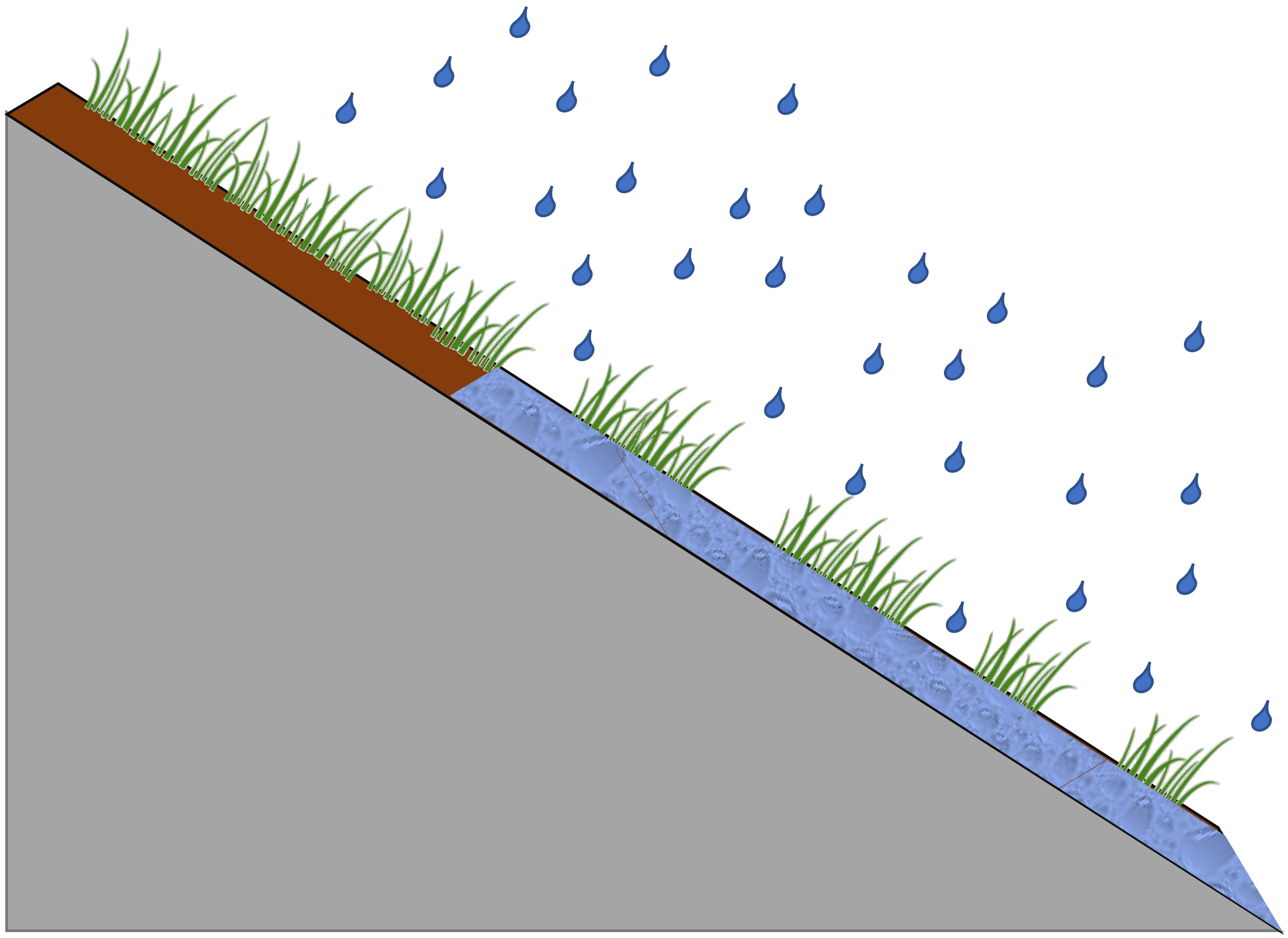


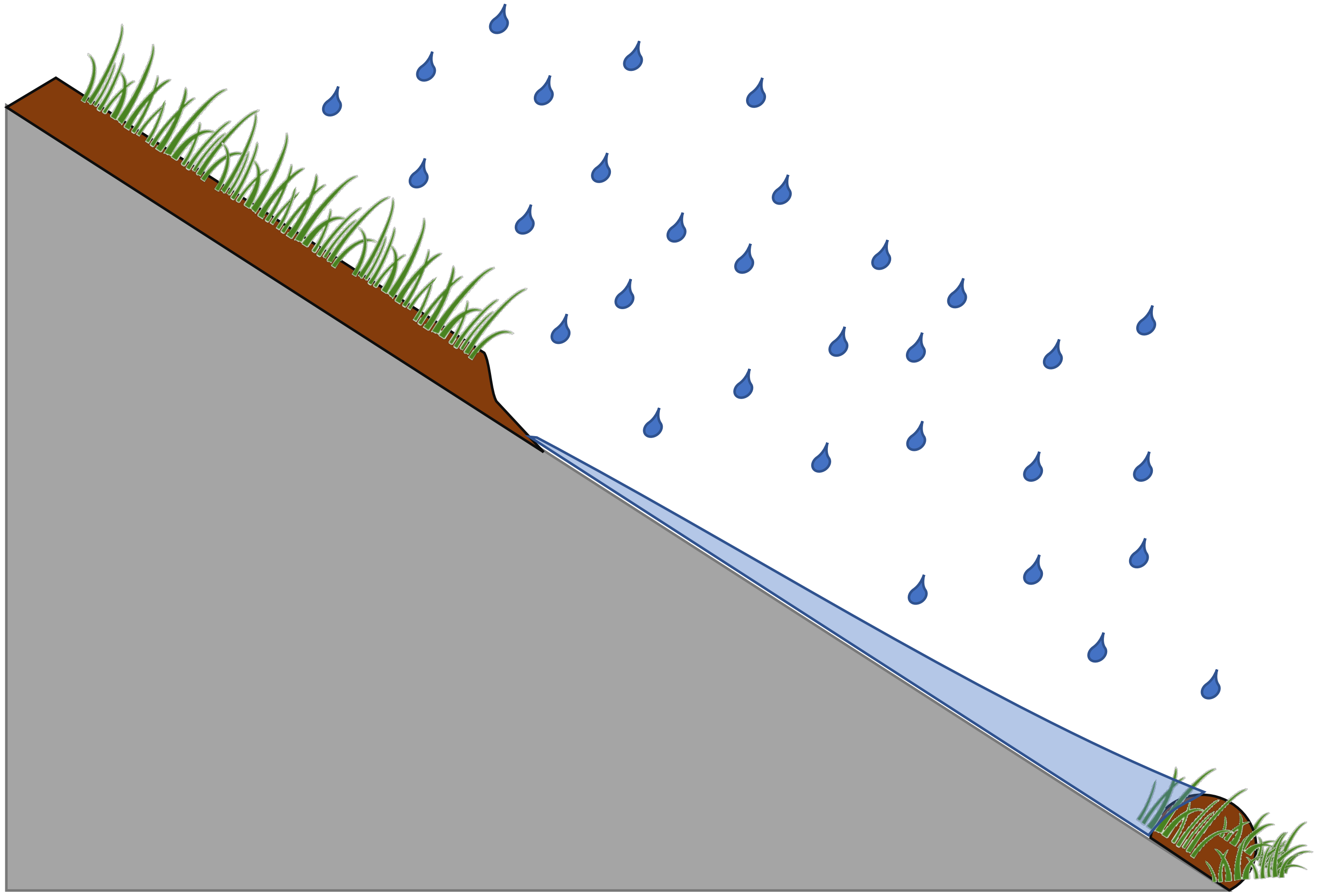






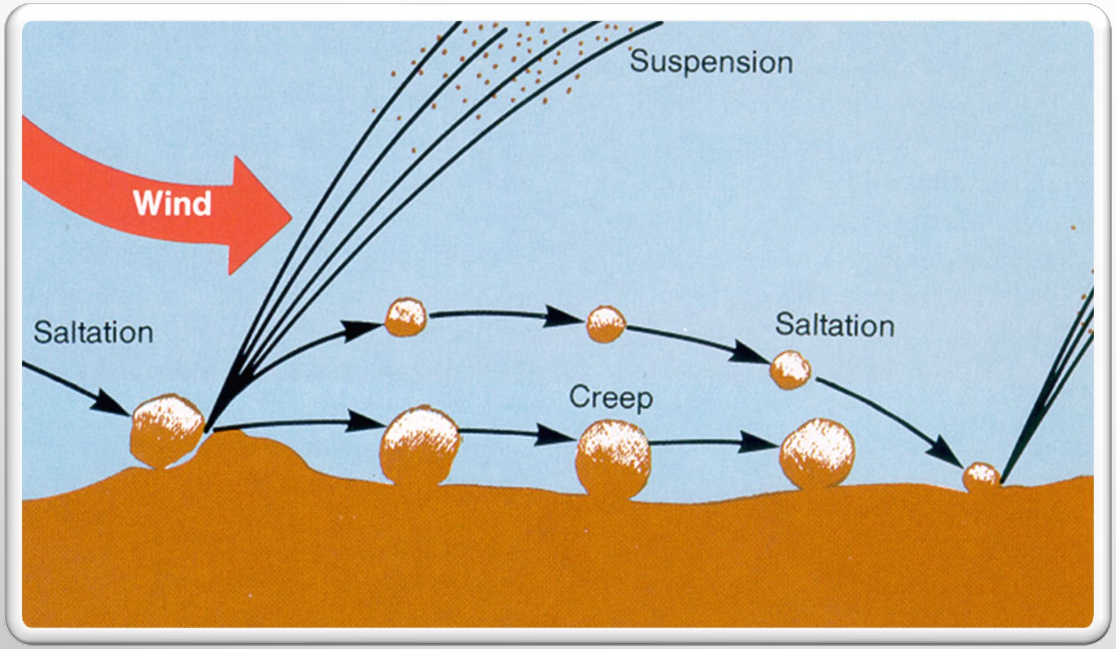






MASS WASTING ON CONSTRUCTION SITES

WIND EROSION



- SURFACE CREEP - ROLLING SOIL PARTICLES
- SALTATION - BOUNCING SOIL PARTICLES
- SUSPENSION - FINE PARTICLES SUSPENDED IN AIR

FACTORS INFLUENCING EROSION

- TOPOGRAPHY
- SOIL TYPE
- VEGETATION
- CLIMATE

SOIL TYPES

SANDY SOIL

ERODIBLE

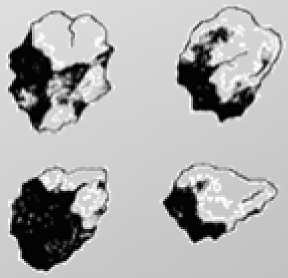
SILTY SOIL

HIGHLY ERODIBLE

CLAY

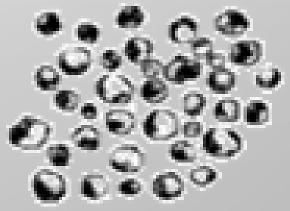
SANDY SOIL

- HARSH AND COARSE GRAINS VISIBLE
- EASILY ERODED BY WIND AND WATER.



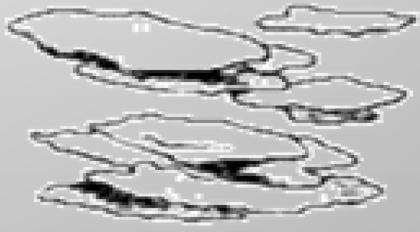
SILTY SOIL

- MOIST, FEELS SLIPPERY AND SMOOTH.
- FINE ENOUGH TO BE SUSPENDED IN FLOWING WATER.
- CAN BE PICKED UP AND CARRIED LONG DISTANCES.

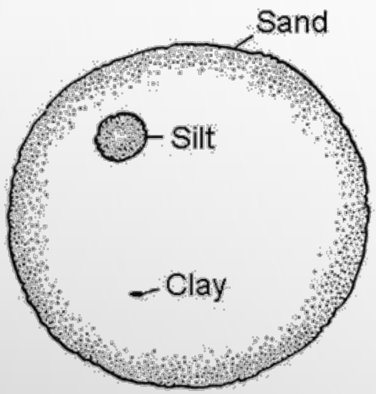


CLAY

- CLAY IS STICKY SOIL, WILL RUB INTO RIBBON
- CLAYS SWELL WHEN WET AND SHRINK WHEN DRY
- LOW INFILTRATION, HIGH RUNOFF.



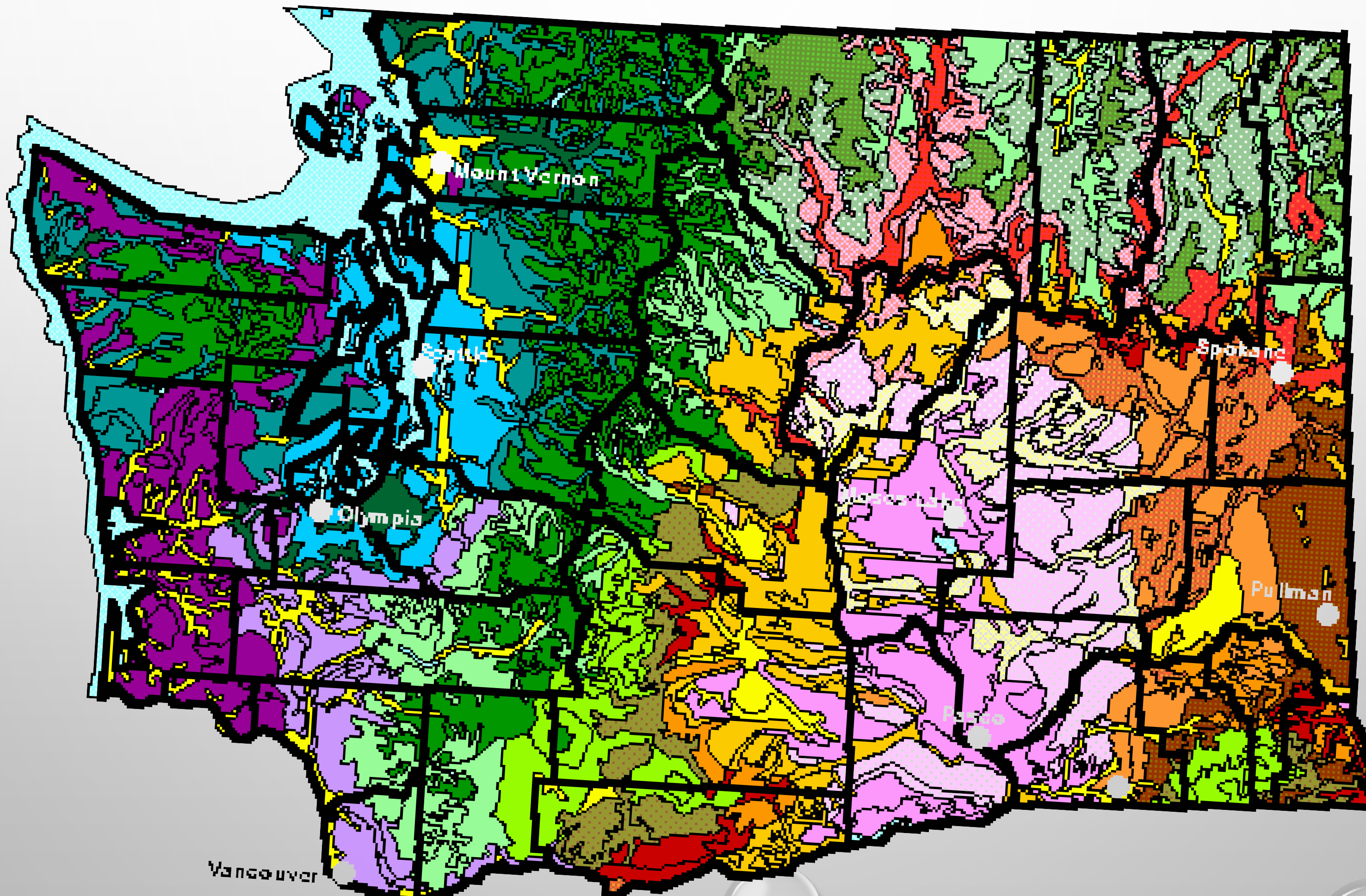
EROSIVITY BASED ON SOIL TYPE AND SLOPE



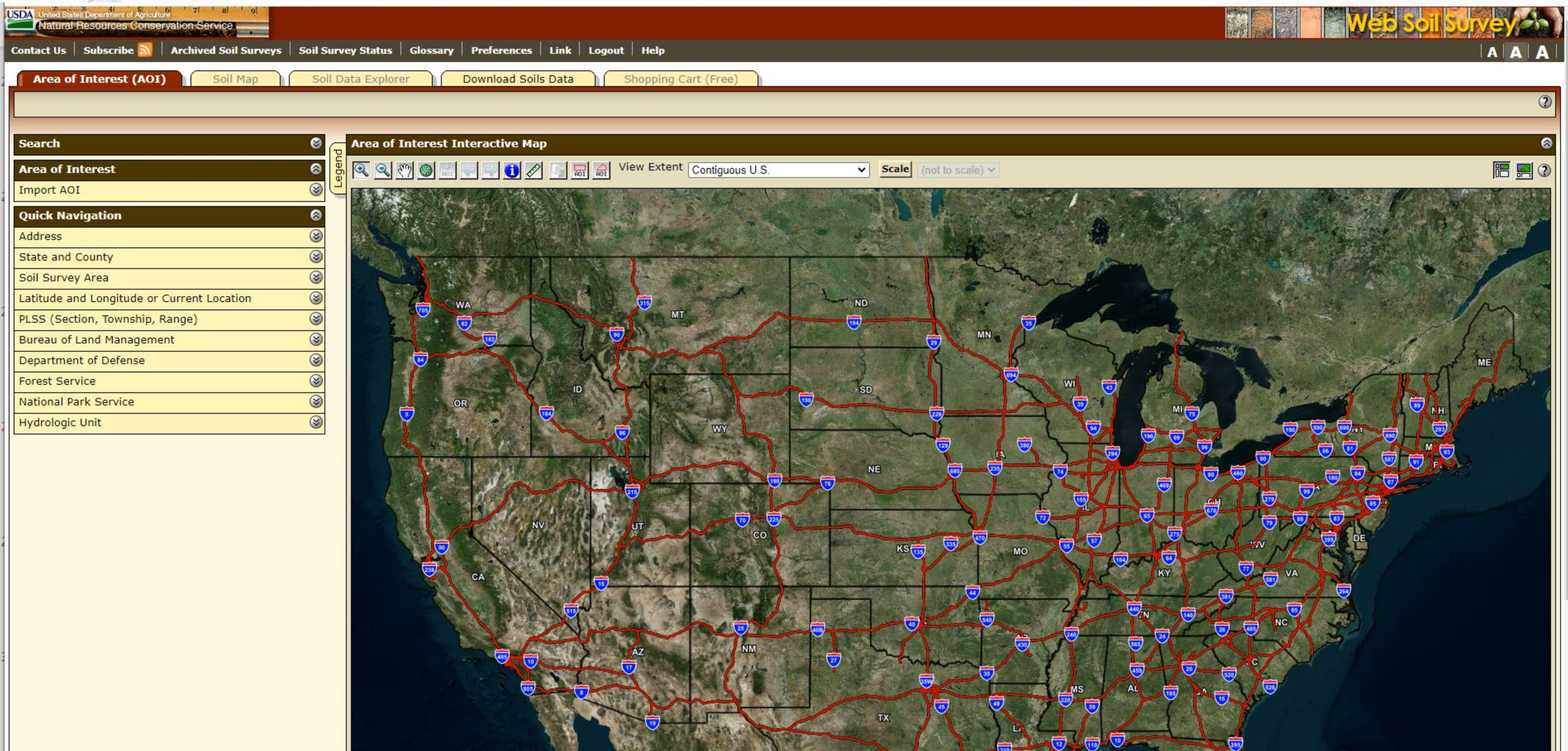
	Soil Type		
Slope Angle	**Silty**	**Clays**	**Sandy**
Very Steep (2:1 or more)	**Very High**	**High**	**High**
Steep (2:1 - 4:1)	**Very High**	**High**	**Moderate**
Moderate (5:1-10:1)	**High**	**Moderate**	**Moderate**
Slight (10:1-20:1)	**Moderate**	**Moderate**	**Lower**

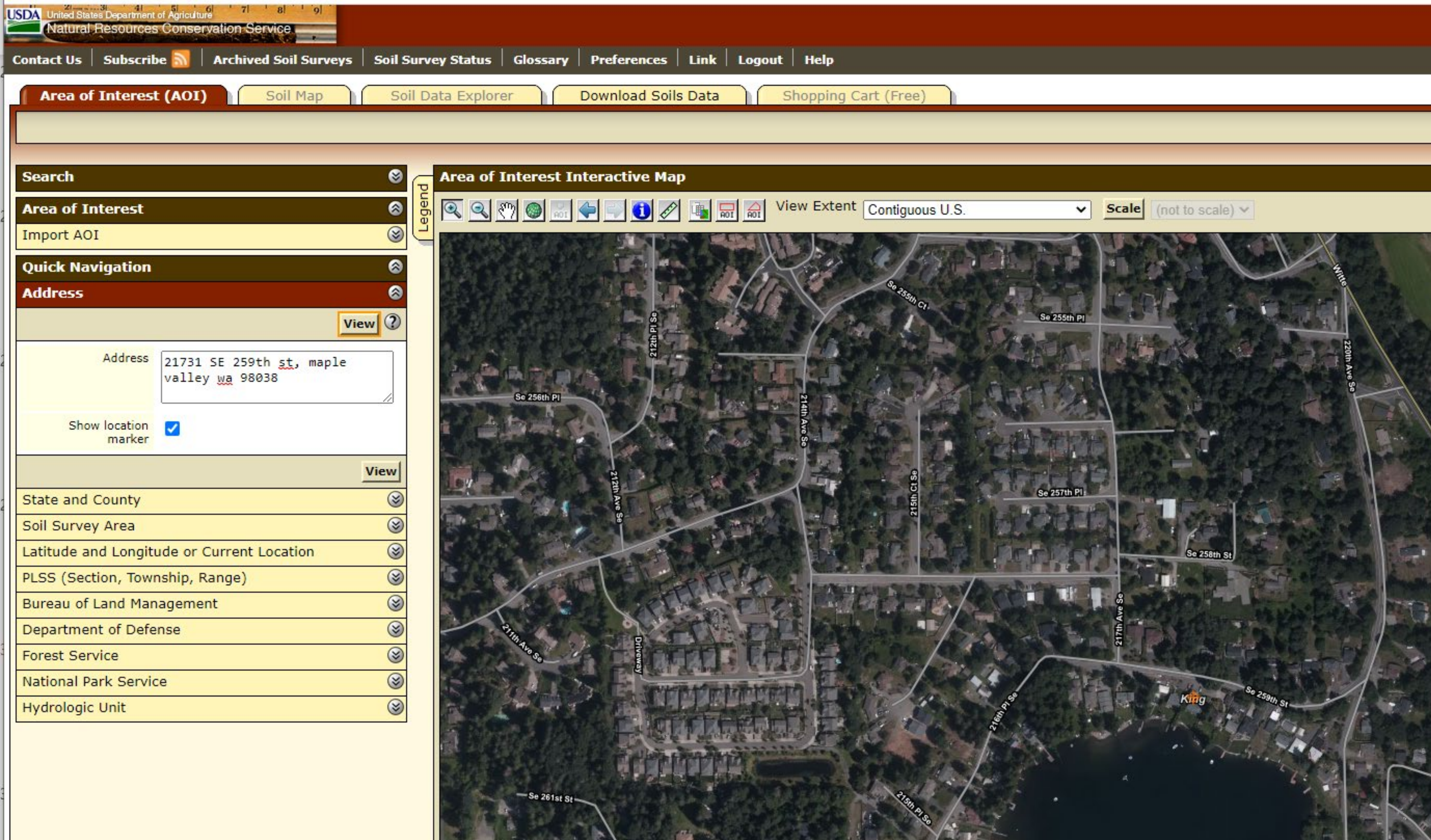
KY ESC FIELD MANUAL

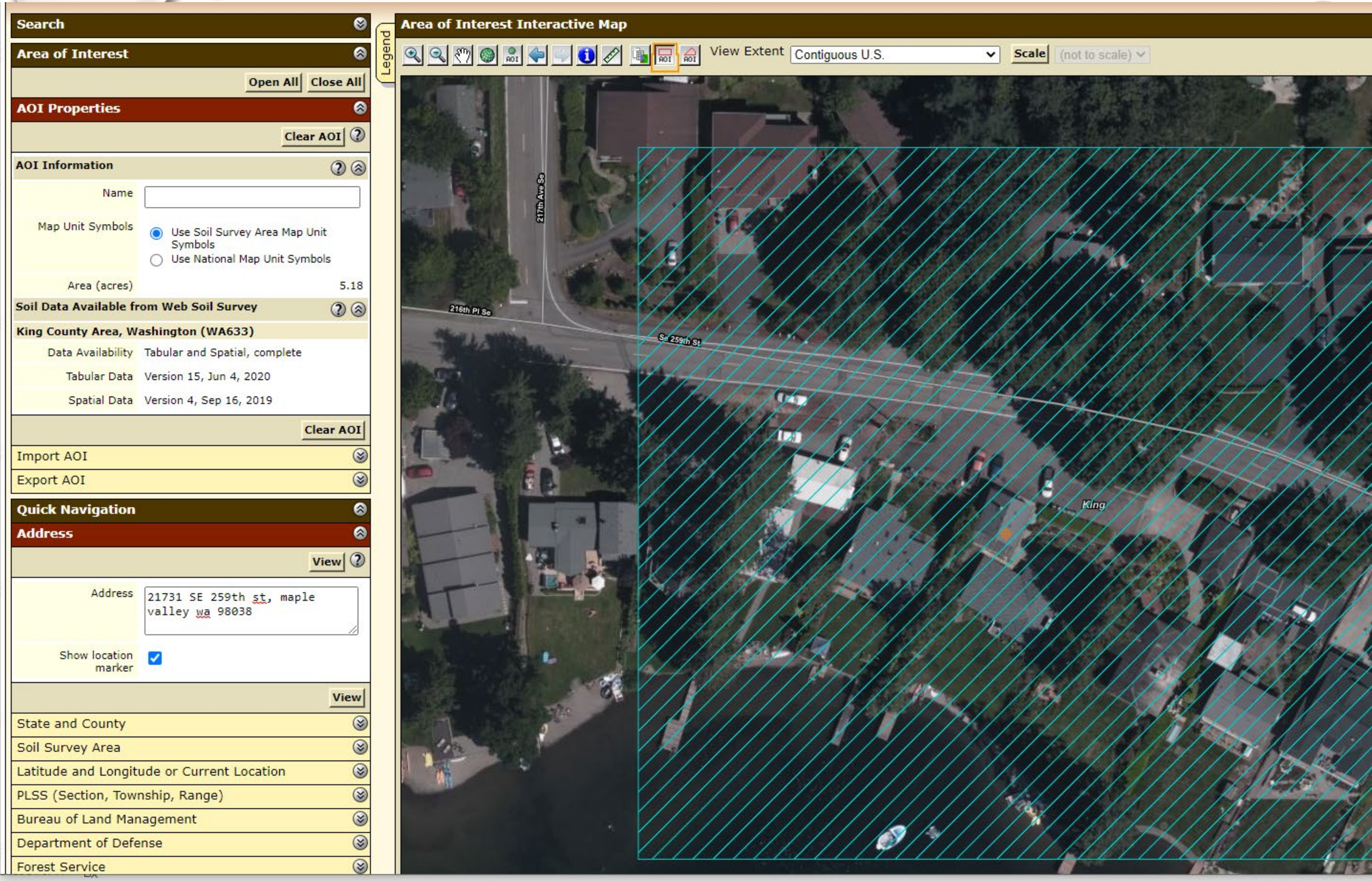
SOILS OF WASHINGTON

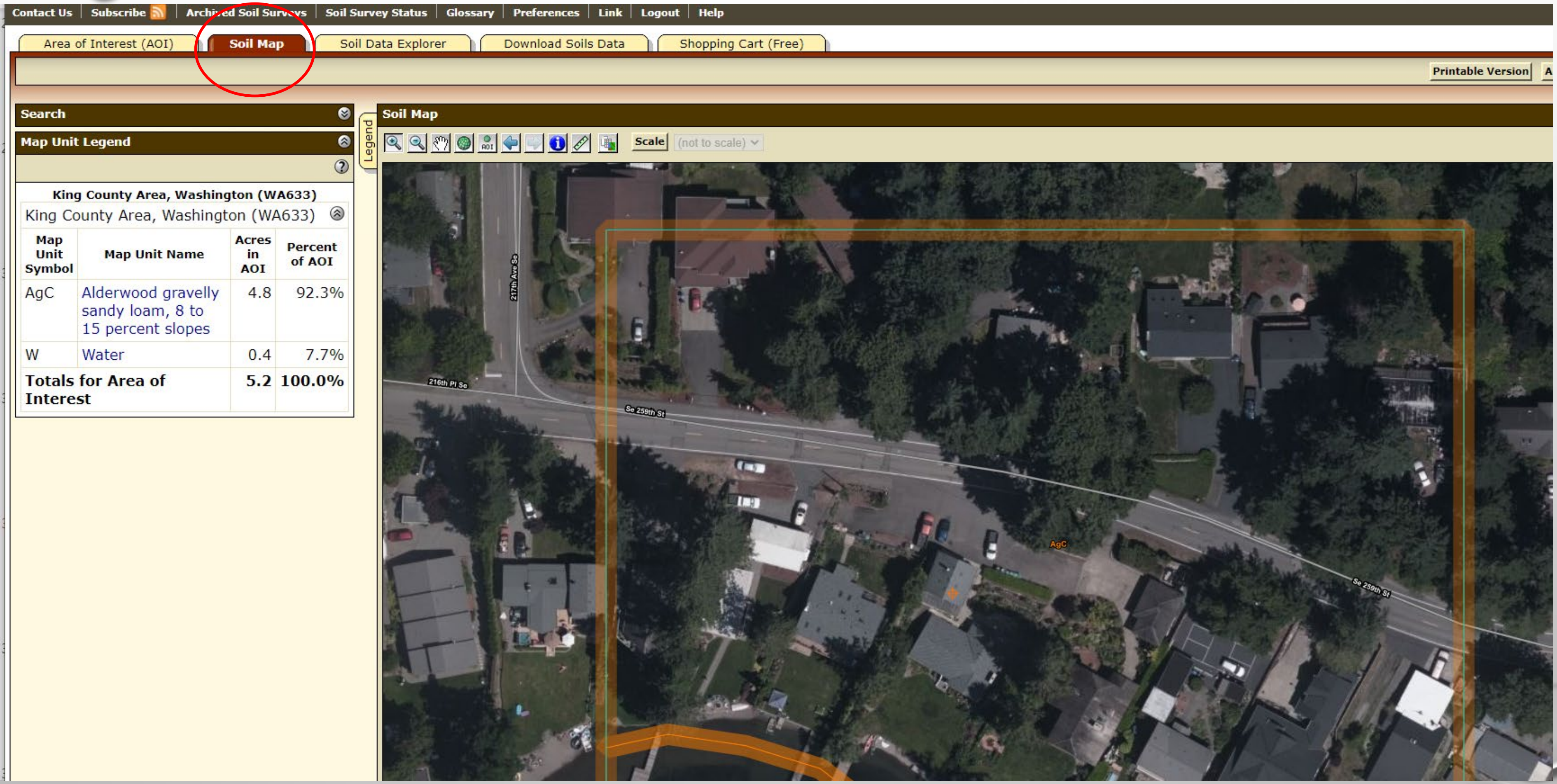


http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx


United States Department of Agriculture
Natural Resources Conservation Service
Web Soil Survey
Contact Us
Subscribe
Archived Soil Surveys
Soil Survey Status
Glossary
Preferences
Link
Logout
Help
Area of Interest (AOI)
Soil Map
Soil Data Explorer
Download Soils Data
Shopping Cart (Free)
Search
Area of Interest
Import AOI
Quick Navigation
Address
State and County
Soil Survey Area
Latitude and Longitude or Current Location
PLSS (Section, Township, Range)
Bureau of Land Management
Department of Defense
Forest Service
National Park Service
Hydrologic Unit
Legend
Area of Interest Interactive Map
View Extent
Contiguous U.S.
Scale
(not to scale)


USDA United States Department of Agriculture
Natural Resources Conservation Service
Contact Us | Subscribe | Archived Soil Surveys | Soil Survey Status | Glossary | Preferences | Link | Logout | Help
Area of Interest (AOI)
Soil Map
Soil Data Explorer
Download Soils Data
Shopping Cart (Free)
Search
Area of Interest
Import AOI
Quick Navigation
Address
View
Address
21731 SE 259th st, maple valley wa 98038
Show location marker
View
State and County
Soil Survey Area
Latitude and Longitude or Current Location
PLSS (Section, Township, Range)
Bureau of Land Management
Department of Defense
Forest Service
National Park Service
Hydrologic Unit
Legend
Area of Interest Interactive Map
View Extent
Contiguous U.S.
Scale
(not to scale)
Se 255th Ct
Se 255th Pl
212th Pl Se
Se 256th Pl
214th Ave Se
215th Ct Se
Se 257th Pl
212th Ave Se
220th Ave Se
Se 258th St
211th Ave Se
Driveway
217th Ave Se
216th Pl Se
Se 259th St
King
Se 261st St
215th Pl Se


Search
Area of Interest
Open All
Close All
AOI Properties
Clear AOI
AOI Information
Name
Map Unit Symbols
Use Soil Survey Area Map Unit Symbols
Use National Map Unit Symbols
Area (acres)
5.18
Soil Data Available from Web Soil Survey
King County Area, Washington (WA633)
Data Availability
Tabular and Spatial, complete
Tabular Data
Version 15, Jun 4, 2020
Spatial Data
Version 4, Sep 16, 2019
Clear AOI
Import AOI
Export AOI
Quick Navigation
Address
View
Address
21731 SE 259th st, maple valley wa 98038
Show location marker
View
State and County
Soil Survey Area
Latitude and Longitude or Current Location
PLSS (Section, Township, Range)
Bureau of Land Management
Department of Defense
Forest Service
Legend
Area of Interest Interactive Map
View Extent
Contiguous U.S.
Scale
(not to scale)
217th Ave Se
216th Pl Se
Se 259th St
King


Contact Us | Subscribe | Archived Soil Surveys | Soil Survey Status | Glossary | Preferences | Link | Logout | Help
Area of Interest (AOI)
Soil Map
Soil Data Explorer
Download Soils Data
Shopping Cart (Free)
Printable Version
Search
Map Unit Legend
King County Area, Washington (WA633)
King County Area, Washington (WA633)
Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI
AgC | Alderwood gravelly sandy loam, 8 to 15 percent slopes | 4.8 | 92.3%
W | Water | 0.4 | 7.7%
Totals for Area of Interest | 5.2 | 100.0%
Legend
Soil Map
Scale
(not to scale)
217th Ave Se
216th Pl Se
Se 259th St
AgC
Se 259th St

Search

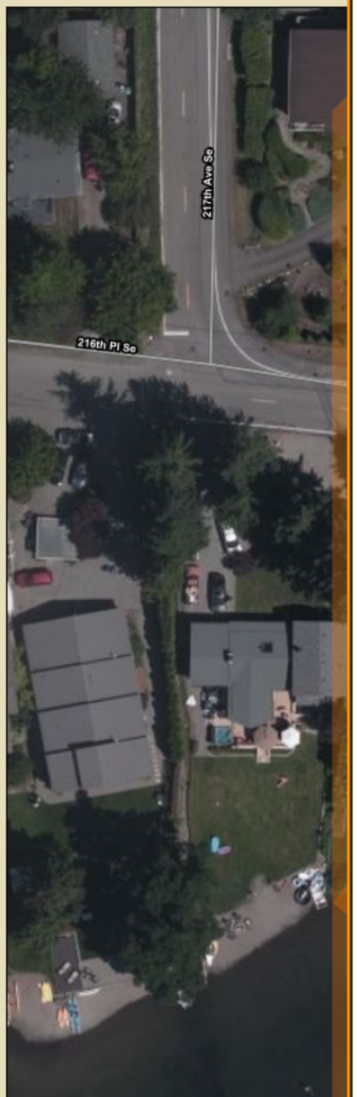
Map Unit Legend

King County Area, Washington (WA633)

King County Area, Washington (WA633)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AgC	Alderwood gravelly sandy loam, 8 to 15 percent slopes	4.8	92.3%
W	Water	0.4	7.7%
Totals for Area of Interest		**5.2**	**100.0%**

Soil Map



King County Area, Washington

AgC—Alderwood gravelly sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2t626
Elevation: 50 to 800 feet
Mean annual precipitation: 20 to 60 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Alderwood and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Alderwood

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Glacial drift and/or glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 7 inches: gravelly sandy loam
Bw1 - 7 to 21 inches: very gravelly sandy loam
Bw2 - 21 to 30 inches: very gravelly sandy loam
Bg - 30 to 35 inches: very gravelly sandy loam
2Cd1 - 35 to 43 inches: very gravelly sandy loam
2Cd2 - 43 to 59 inches: very gravelly sandy loam

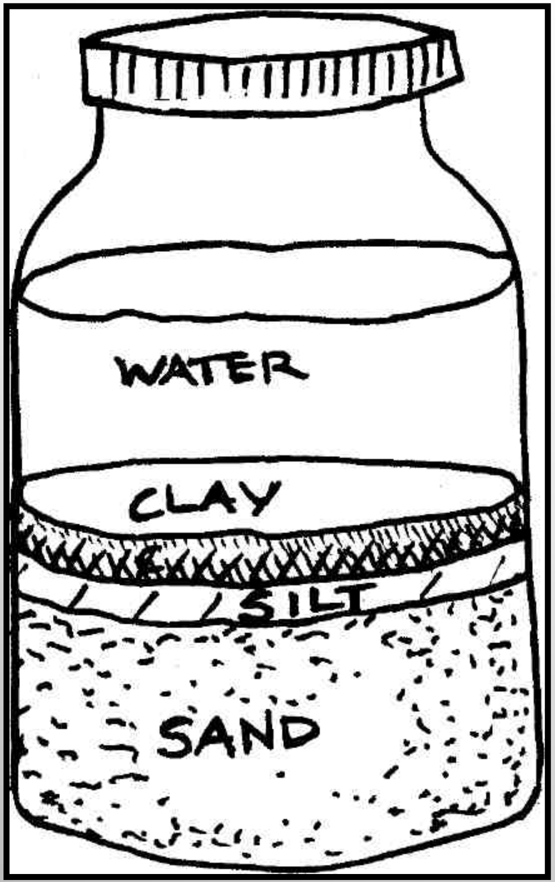
Properties and qualities

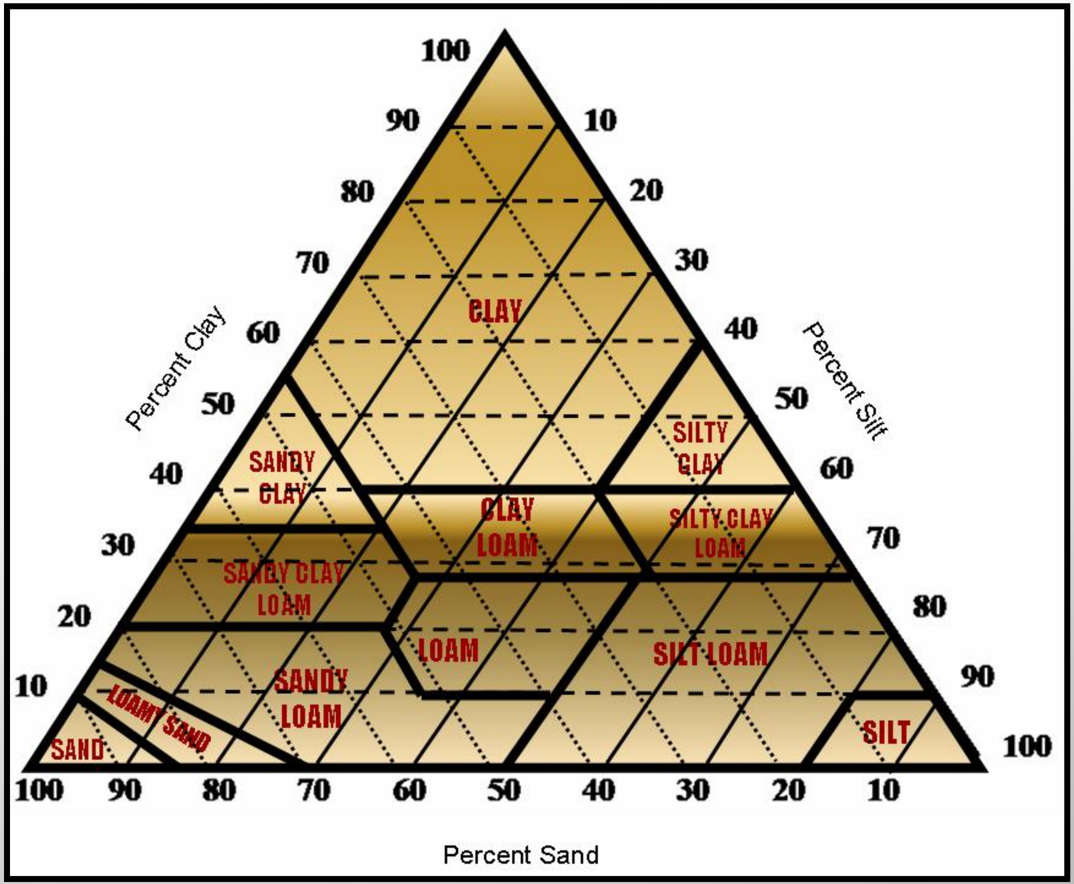
Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Forage suitability group: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XS301WA)
Other vegetative classification: Limited Depth Soils (G002XN302WA), Limited Depth Soils (G002XF303WA), Limited Depth Soils (G002XS301WA)

JAR TEST

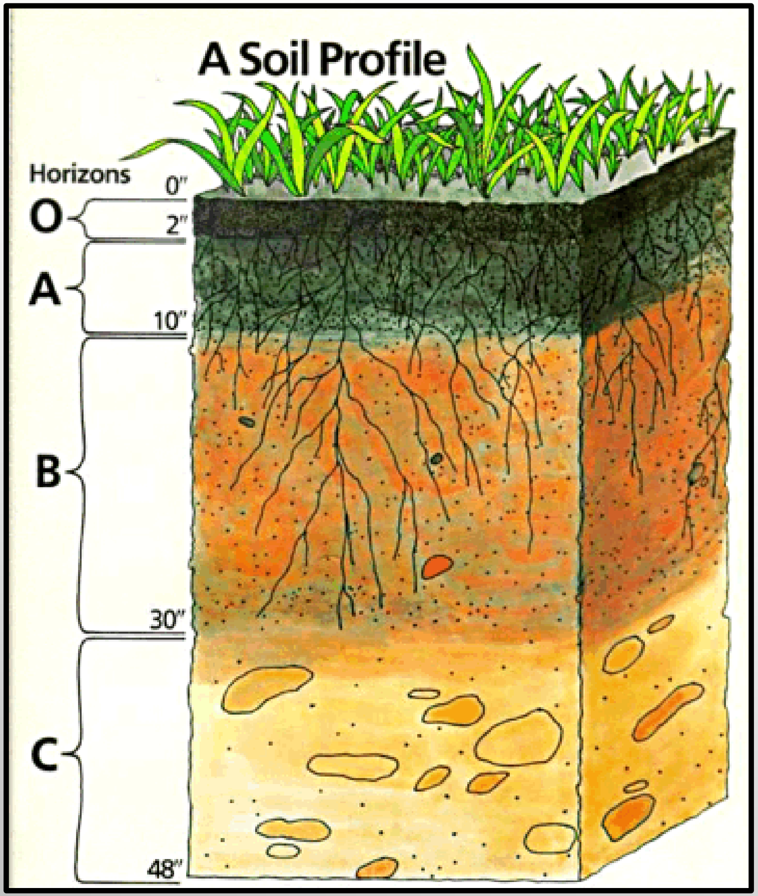

WATER
CLAY
SILT
SAND


Percent Clay
Percent Silt
Percent Sand
100
90
80
70
60
50
40
30
20
10
CLAY
SANDY CLAY
SILTY CLAY
CLAY LOAM
SILTY CLAY LOAM
SANDY CLAY LOAM
LOAM
SILT LOAM
SANDY LOAM
LOAMY SAND
SAND
SILT

VEGETATION

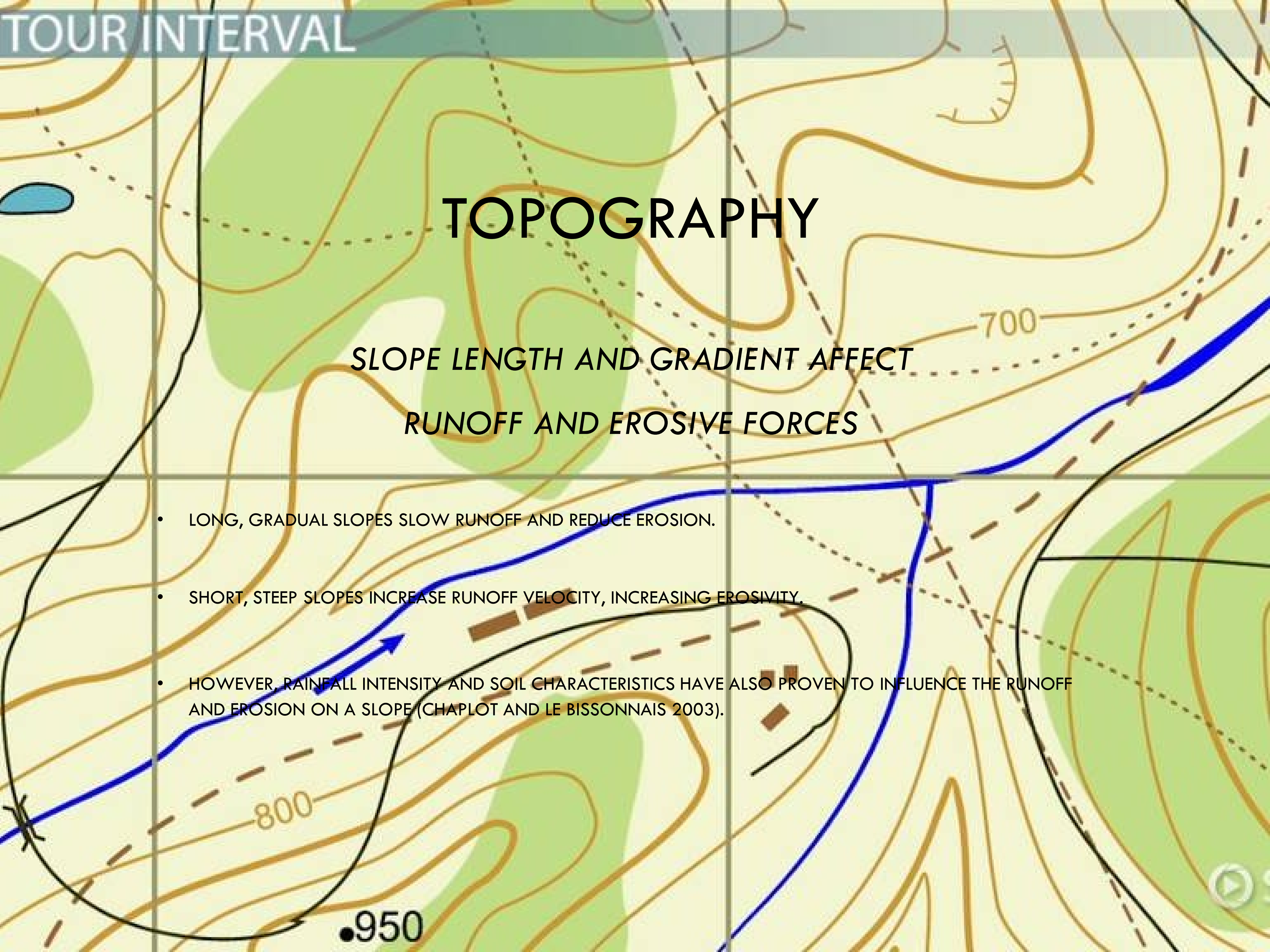
- VEGETATIVE COVER DISSIPATES RAINDROPS AND RUNOFF ENERGY, REDUCING EROSION.
- TRAPS SEDIMENTS

SOIL PROFILE



USDA NRCS

- ROOTS STABILIZE SOIL AND HOLD IT IN PLACE.
- INFILTRATION IS INCREASED.



TOPOGRAPHY

SLOPE LENGTH AND GRADIENT AFFECT RUNOFF AND EROSIVE FORCES

- LONG, GRADUAL SLOPES SLOW RUNOFF AND REDUCE EROSION.
- SHORT, STEEP SLOPES INCREASE RUNOFF VELOCITY, INCREASING EROSIVITY.
- HOWEVER, RAINFALL INTENSITY AND SOIL CHARACTERISTICS HAVE ALSO PROVEN TO INFLUENCE THE RUNOFF AND EROSION ON A SLOPE (CHAPLOT AND LE BISSONNAIS 2003).

CLIMATE

Precipitation and temperature

- Combined and individual impacts
- Water evaporates slowly in cool temperatures and more rapidly in warm temperatures

Phase projects seasonally to reduce erosion potential

Prepare for extreme rain events, NOT average

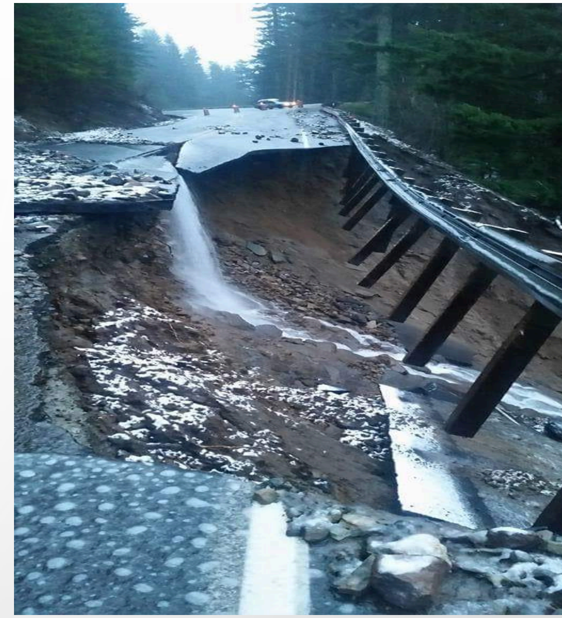
WEATHER HEADLINES

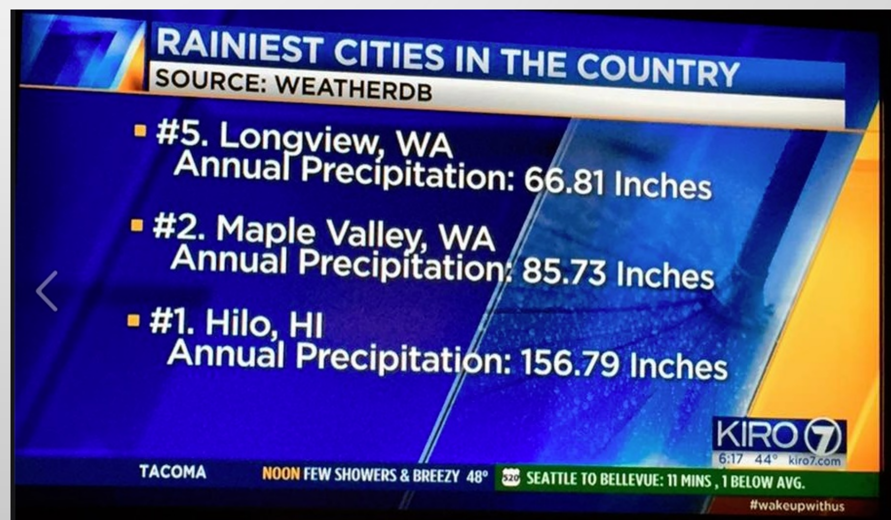
Capital Weather Gang – May 9, 2016

Washington's streak of consecutive rainy days is longest on record

Ranking the **Worst** El Niños – Jan 6, 2016

https://rainfall.weatherdb.com/stories/9588/ranking-worst-el-ninos





CLIMATE DATA RESOURCES

Western Regional
Climate Center

Coop sites

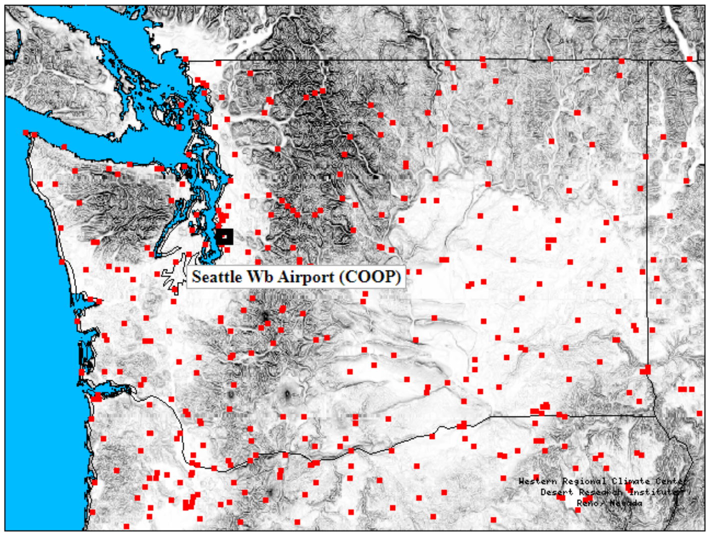
Idaho

- Bayview Model Basin
- Coeur D Alene 1 E
- Cottonwood 2 Wsw
- Craigmont
- Lewiston Water Plant
- Lewiston Wso Ap
- Moscow Univ Of Idaho
- Plummer 3 Wsw
- Porthill
- Potlatch 3 Nne
- Priest River Exp Stn
- Saint Maries
- Sandpoint Expermnt Stn
- Tensed
- Winchester 1 Se
- Winchester

Oregon

- Arlington
- Astor Experiment Stn
- Astoria
- Astoria Wso Airport
- Aurora
- Beaverton 2 Ssw
- Big Eddy
- Boardman
- Bonneville Dam
- Brightwood
- Canby 2 Ne
- Canby 2 S
- Cascade Locks
- Cherry Grove 2 S
- Clatskanie
- Cloverdale
- Condon
- Cove
- Cove 1 E
- Dilley 1 S
- Dufur
- Eagle Creek 9 Se
- Echo
- Elgin

Select a site by placing mouse cursor over a site. Site name will appear in location box below the map if browser supports javascript1.1. Click site to go to graphing options.
Large boxes indicate stations that had reported during the month when these maps were last generated. Small boxes indicate inactive or removed stations.
Map last generated on 04/11/06.
If a location has multiple stations or more than one platform in the near vicinity, overlapping boxes may create difficulty when selecting from the map. Select from the list to the left in such cases.



Western Regional Climate Center, wrcc@dri.edu

Back to:

State Map | Western U.S. map | Home Page

NOTE:
To print data frame (right side), click on right frame before printing.

1981 - 2010

- Daily Temp. & Precip.
- Daily Tabular data (~23 KB)
- Monthly Tabular data (~1 KB)
- NCDC 1981-2010 Normals (~3 KB)

1971 - 2000

- Daily Temp. & Precip.
- Daily Tabular data (~23 KB)
- Monthly Tabular data (~1 KB)
- NCDC 1971-2000 Normals

SEATTLE BOEING FIELD, WASHINGTON (457483)

Period of Record Monthly Climate Summary

Period of Record : 06/01/1948 to 09/30/1965

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	44.8	49.4	52.3	59.2	66.1	70.9	76.4	75.1	70.1	60.7	51.7	47.3	60.3
Average Min. Temperature (F)	33.9	37.0	37.6	41.9	47.2	52.4	55.5	55.5	51.3	45.6	39.4	36.8	44.5
Average Total Precipitation (in.)	5.98	4.38	3.43	2.15	1.36	1.18	0.71	0.93	1.60	3.46	6.16	5.20	36.55
Average Total SnowFall (in.)	4.6	1.9	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	9.3	18.1
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 99.5% Min. Temp.: 99.5% Precipitation: 99.5% Snowfall: 99.5% Snow Depth: 99.5%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

- Heating Degree Days
- Cooling Degree Days
- Growing Degree Days

Temperature

- Daily Extremes and Averages
- Spring 'Freeze' Probabilities
- Fall 'Freeze' Probabilities
- 'Freeze Free' Probabilities
- Monthly Temperature Listings
  - Average
  - Average Maximum
  - Average Minimum
  - Extreme Maximum
  - Extreme Minimum

Precipitation

- Monthly Average
- Daily Extreme and Average
- Daily Average
- Precipitation Probability by Duration.
- Precipitation Probability by Quantity.
- Monthly Precipitation Listings
  - Monthly Totals
  - Daily Extreme

Snowfall

Precipitation Probability by Quantity

Available data: Period of Record.

457483 SEATTLE BOEING FIELD, WA

Select Amount (at least) : 0.25"

Select Precipitation Duration Periods (up to 8 max) :

☑ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days ☑ 5 Days ☐ 6 Days
☑ 7 Days ☐ 8 Days ☐ 9 Days ☐ 10 Days ☐ 12 Days ☐ 14 Days
☐ 15 Days ☐ 16 Days ☐ 18 Days ☐ 20 Days ☐ 22 Days ☐ 24 Days
☐ 25 Days ☐ 26 Days ☐ 28 Days ☐ 30 Days

Create Graph

Options

Smooth values with 29 day running mean. (1-30)

Image Size: ◉ Small (510x290) ○ Medium (650x370) ○ Large (850x480)

Return to WRCC Home Page

Heating Degree Days
Cooling Degree Days
Growing Degree Days

Temperature

Daily Extremes and Averages
Spring 'Freeze' Probabilities
Fall 'Freeze' Probabilities
'Freeze Free' Probabilities

- Monthly Temperature Listings
  - Average
  - Average Maximum
  - Average Minimum
  - Extreme Maximum
  - Extreme Minimum

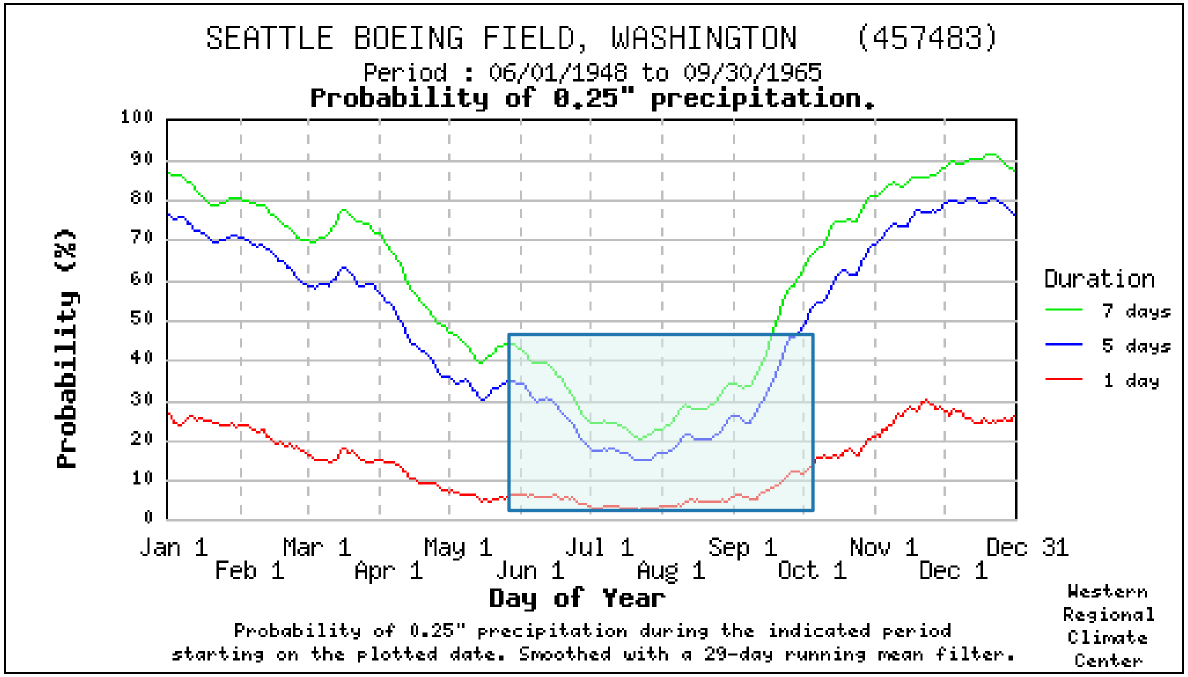
Precipitation

Monthly Average
Daily Extreme and Average
Daily Average
Precipitation Probability by Duration.
Precipitation Probability by Quantity.

- Monthly Precipitation Listings
  - Monthly Totals
  - Daily Extreme

Snowfall

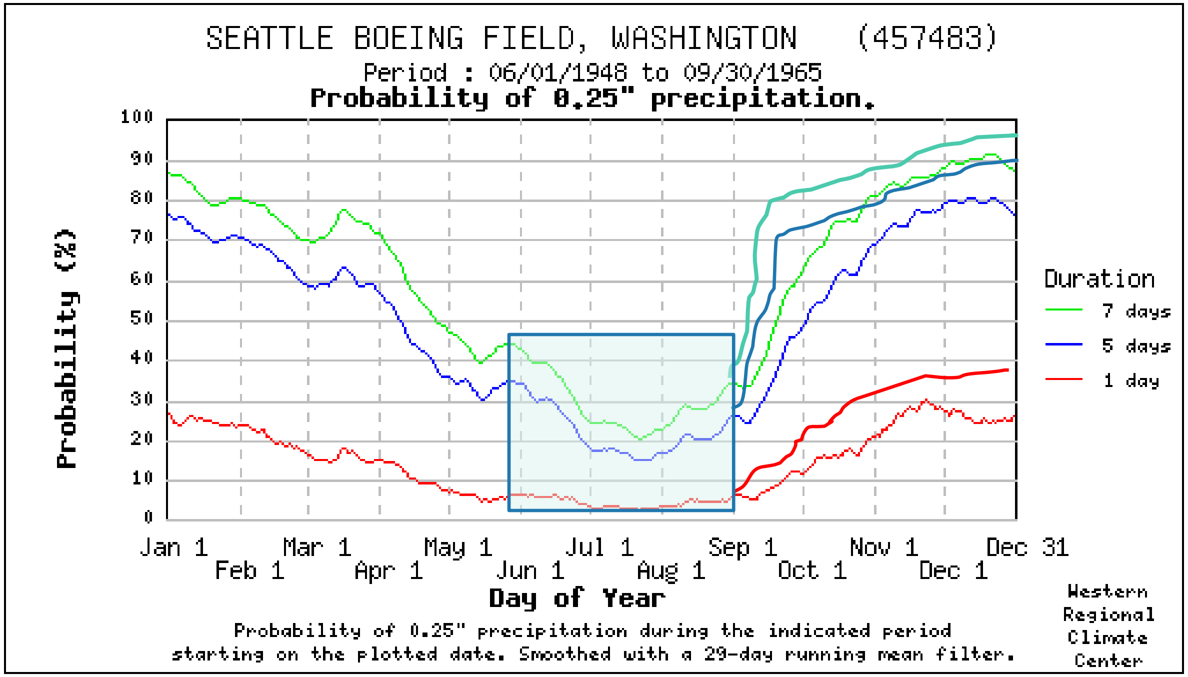
Precipitation Probability by Quantity



Back to Probability Graph Options

[Heating Degree Days]
[Cooling Degree Days]
[Growing Degree Days]
Temperature
[Daily Extremes and Averages]
[Spring 'Freeze' Probabilities]
[Fall 'Freeze' Probabilities]
['Freeze Free' Probabilities]
Monthly Temperature Listings
[Average]
[Average Maximum]
[Average Minimum]
[Extreme Maximum]
[Extreme Minimum]
Precipitation
[Monthly Average]
[Daily Extreme and Average]
[Daily Average]
[Precipitation Probability by Duration.]
[Precipitation Probability by Quantity.]
Monthly Precipitation Listings
[Monthly Totals]
[Daily Extreme]
Snowfall

Precipitation Probability by Quantity



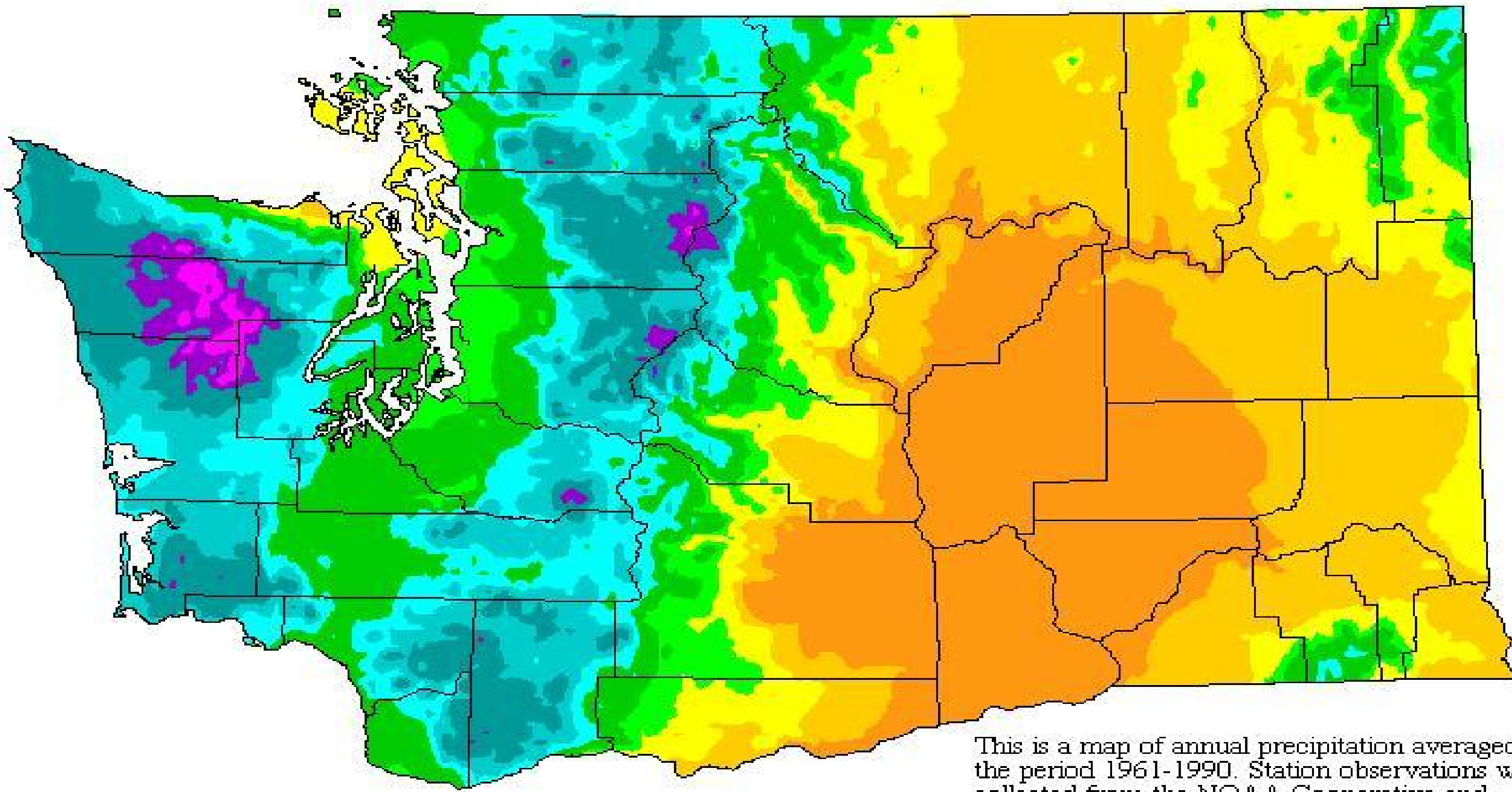
[Back to Probability Graph Options]

PRECIPITATION

- FREQUENCY
  - TIME BETWEEN STORM EVENTS MAY EXPOSE A SITE TO GREATER POTENTIAL FOR EROSION DUE TO INCREASED SATURATION.
  - 100-YEAR, 10-YEAR, AND 2-YEAR STORM EVENTS
- INTENSITY
  - AMOUNT OF RAIN FALLING IN A CERTAIN PERIOD OF TIME (MM OR INCHES PER HOUR)
  - HARD RAIN VS. SPRINKLING
- DURATION
  - PROLONGED STORM EVENTS WILL INCREASE EROSION POTENTIAL
  - ONE HOUR VS. 24 HOURS

Average Annual Precipitation

Washington



Legend (in inches)

- Under 10
- 10 to 20
- 20 to 30
- 30 to 40
- 40 to 60
- 60 to 80
- 80 to 100
- 100 to 140
- 140 to 180
- Above 180

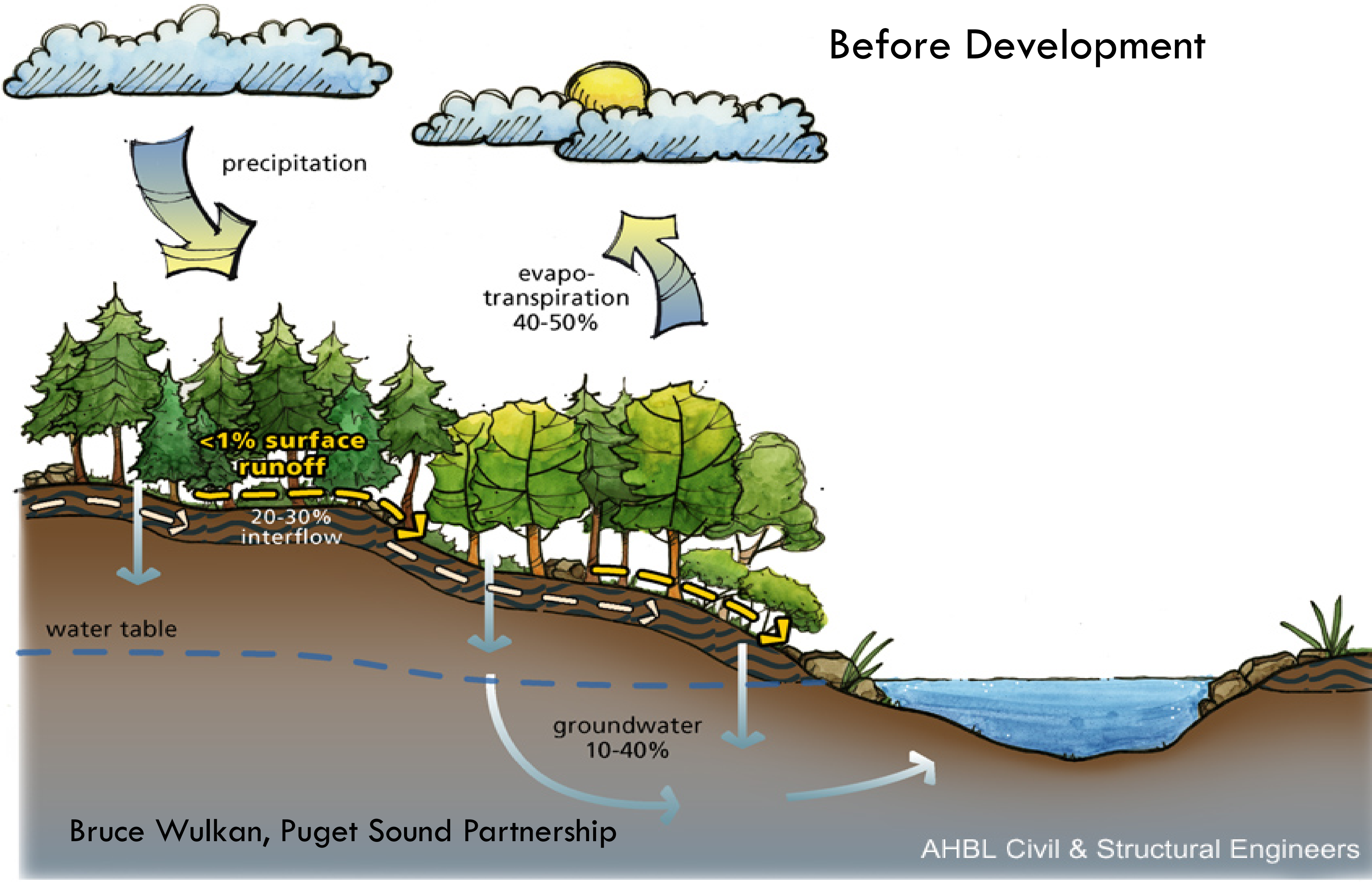
For information on the PRISM modeling system, visit the SCAS web site at http://www.ocs.orst.edu/prism

The latest PRISM digital data sets created by the SCAS can be obtained from the Climate Source at http://www.climatesource.com

This is a map of annual precipitation averaged over the period 1961-1990. Station observations were collected from the NOAA Cooperative and USDA-NRCS SnoTel networks, plus other state and local networks. The PRISM modeling system was used to create the gridded estimates from which this map was made. The size of each grid pixel is approximately 4x4 km. Support was provided by the NRCS Water and Climate Center.

Problem: Development Alters Natural Hydrology

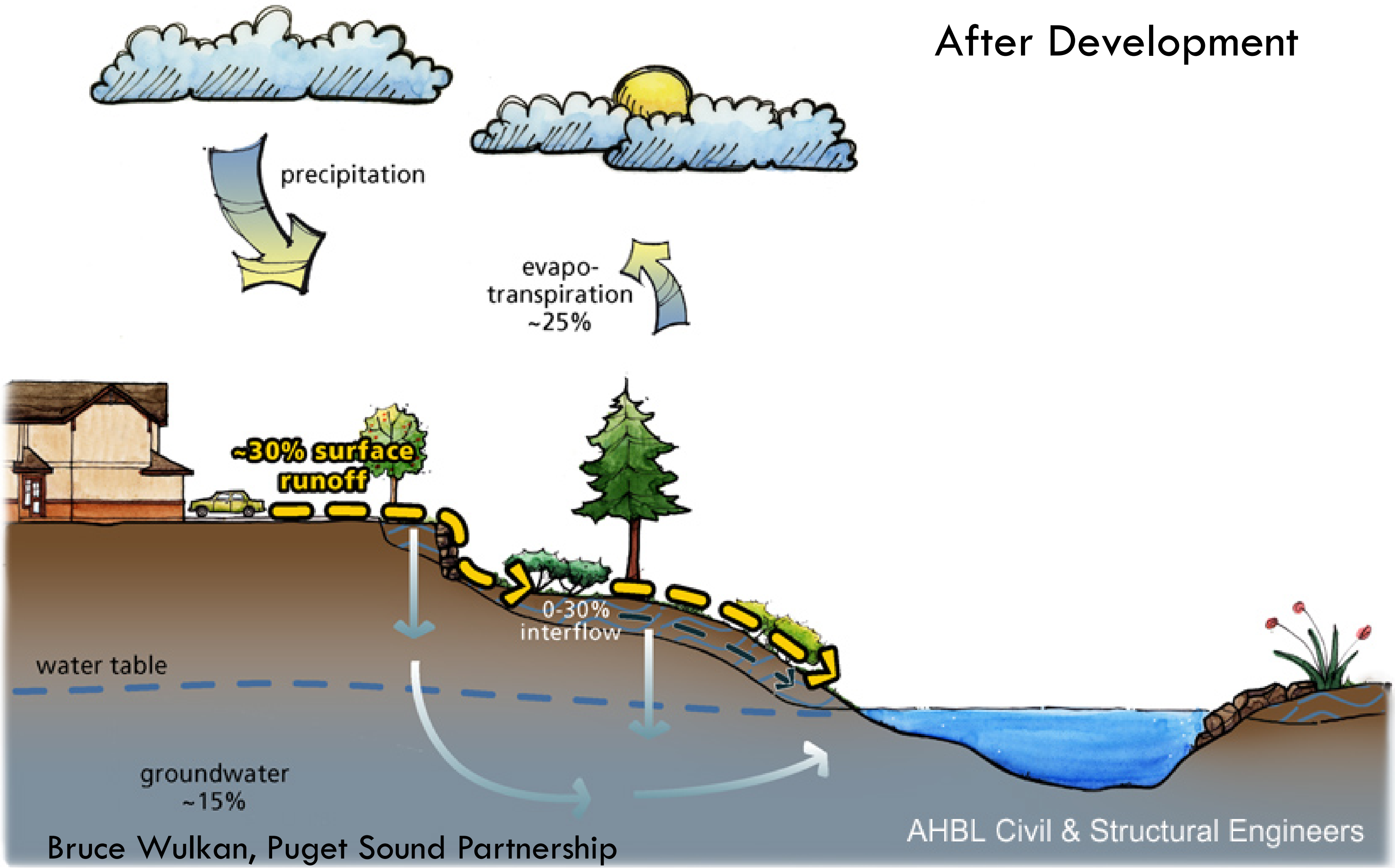
Before Development



Bruce Wulkan, Puget Sound Partnership

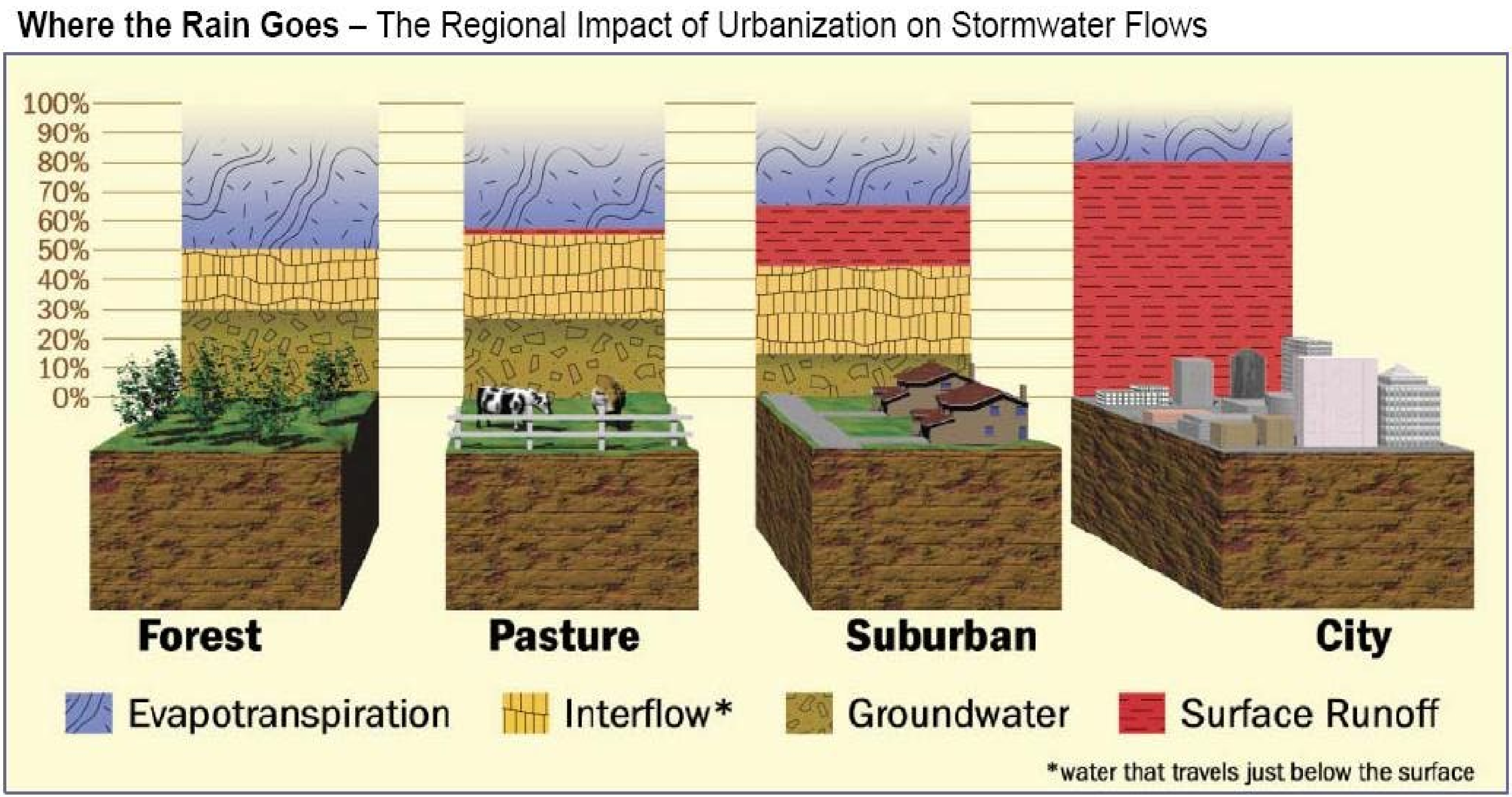
Problem: Development Alters Natural Hydrology

After Development



Bruce Wulkan, Puget Sound Partnership

WHERE THE RAIN GOES



EROSION FACTS

- ESTIMATES INDICATE THAT 80 PERCENT OF PHOSPHORUS AND 73 PERCENT OF NITROGEN IN STREAMS IS ASSOCIATED WITH ERODED SEDIMENT FROM CONSTRUCTION AND OTHER ACTIVITIES.

- SEDIMENT YIELDS FROM SMALLER CONSTRUCTION SITES ARE AS HIGH OR HIGHER THAN THE 20 TO 150 TONS/ACRE/YEAR MEASURED FROM LARGER SITES. *U.S. Environmental Protection Agency, 1999 Report to Congress on the Phase II Storm Water Regulations*

- EROSION OF 1/8" OF SOIL OVER AN AREA OF ONE ACRE RESULTS IN THE TRANSPORT OF 16.8 CUBIC YARDS OF SOIL – APPROXIMATELY 25 TONS.

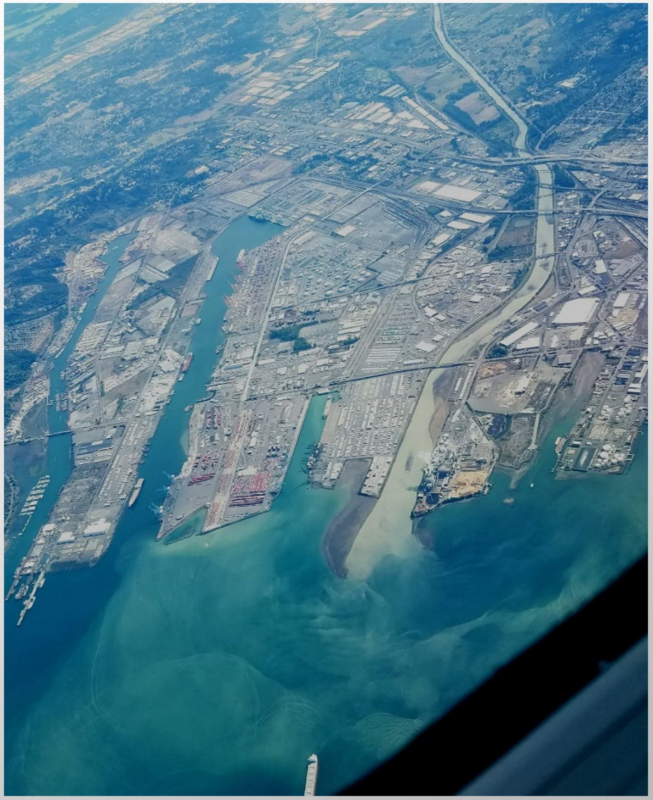
SEDIMENTATION

- Caused by erosion
- Soil picked up and carried by flowing water
- Deposited when flow slows enough to settle out sediment load

PICS AFTER STORMS

DEC 14, 2015

NOV 2017



http://www.ecy.wa.gov/programs/eap/mar_wat/surface.html

SEDIMENTATION

- SEDIMENTS ARE FINE SOIL
- SEDIMENTS AS POLLUTANTS
  - REDUCES PHOTOSYNTHESIS DECREASING FOOD SUPPLY
  - CLOGS FISH GILLS AND SPAWNING BEDS
- BASIC SETTLING CONCEPTS
  - DENSE PARTICLES SETTLE OUT QUICKLY, LESS DENSE PARTICLES REMAIN SUSPENDED IN WIND AND WATER
  - PROBLEMS WITH CLAYS/TURBIDITY

Settling Velocities of Sediment Particles in Water

Diameter of Particle (mm)	Order of Size	Settling Velocity (mm/sec)	Time Required to settle one meter (3.28 ft)
10	Gravel	1,000	1.0 Seconds
1		100	9.8 Seconds
0.6	Coarse Sand	63	
0.3*		32	
0.2*		21	48 Seconds
0.15*	Fine Sand	15	67 Seconds
0.1		8	125 Seconds
0.06		3.8	
0.015		0.35	47.6 Minutes
0.01	Silt	0.154	107 Minutes
0.005		0.0385	7.2 Hours
0.003		0.138	20.1 Hours
0.0015	Clay	0.0035	
0.001		0.0015	180 Hours
0.0001		0.0000154	754 Days
0.00001	Colloidal Particles	0.000000154	204 Years

*Range of acceptable pore sizes for (apparent opening size) for silt fence geotextiles

TURBIDITY VALUES

EROSION AND SEDIMENTATION IMPACTS

- ENVIRONMENTAL DEGRADATION
- BIOLOGICAL IMPACTS
- IMPACTS TO WATER QUALITY
- AQUATIC HABITAT DEGRADATION
- IMPACTS TO CONSTRUCTION PROJECTS
- INTRODUCTION TO BEST MANAGEMENT PRACTICES

STORMWATER RUNOFF FROM CONSTRUCTION SITES OFTEN RELEASE HIGH SEDIMENT LOADS TO RECEIVING WATERS

Construction runoff is the LARGEST CAUSE of impaired water quality in rivers and the third largest cause of impaired water quality in lakes.

EPA 305(b) Report to Congress

ENVIRONMENTAL DEGRADATION

- WATER POLLUTION
  - TURBIDITY
  - PH
  - HYDROCARBONS
  - METALS
- INCREASED FLOODING

Sediments can be eroded from construction sites, developed areas, and cropland. In addition to the impact the sediment particles can have themselves, sediment runoff can pick up and transport additional pollutants such as metal flakes, debris, toxics, and even more phosphorus into our lakes.

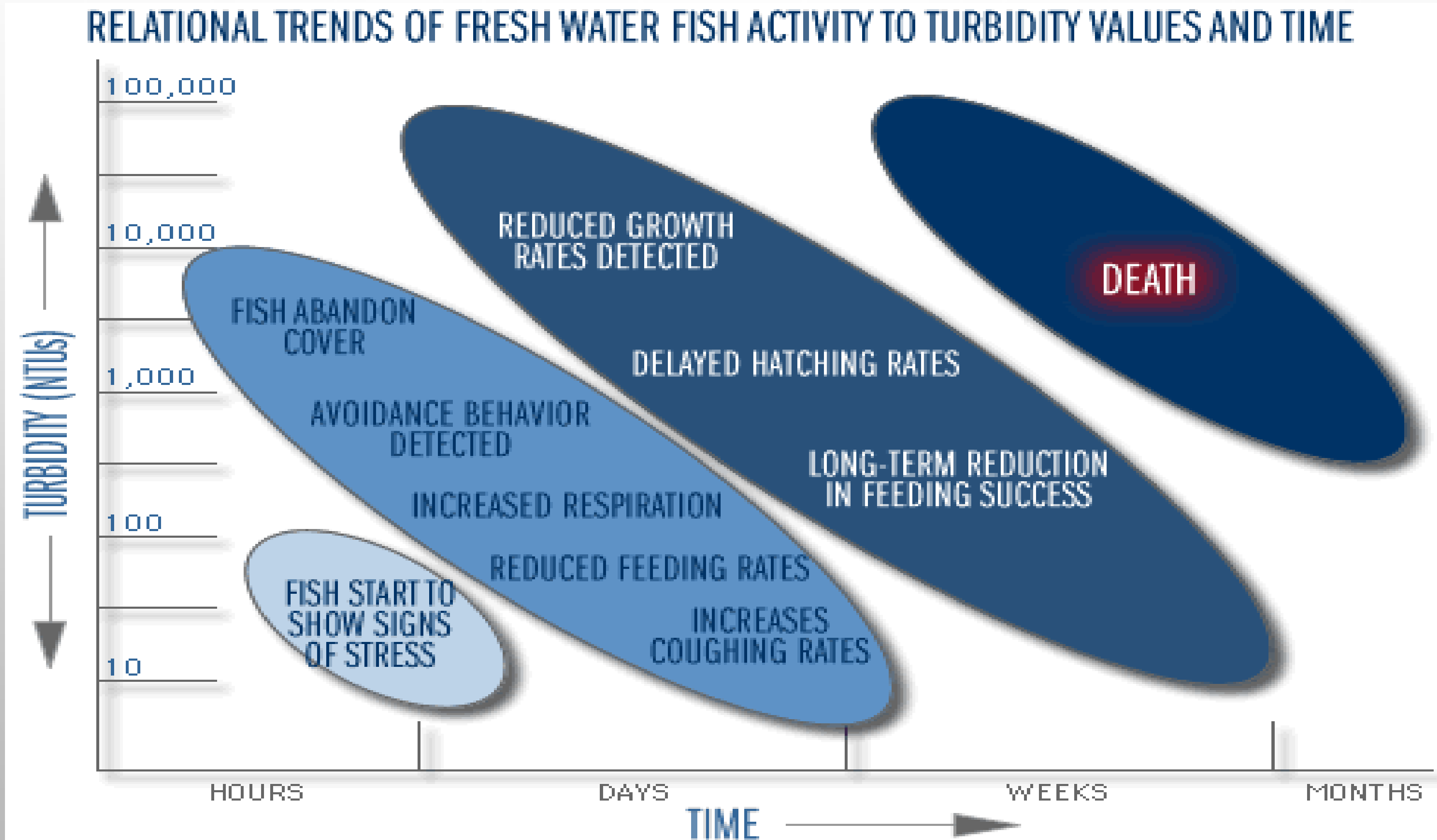
-Wisconsinlakes.org

BIOLOGICAL IMPACTS

IMPACTS TO AQUATIC ENVIRONMENT

- EUTROPHICATION
- SMOTHERS EGGS & FRY
- DECREASE IN FOOD-CHAIN ORGANISMS
- REDUCED LIGHT PENETRATION (FOOD)
- DIMINISHED SPAWNING
- INCREASED TEMPERATURE

TURBIDITY IMPACT ON FISH



Courtesy of: Water Action Volunteers, Monitoring Factsheet Series. UW-Extension, Environmental Resources Center

IMPACTS TO WATER QUALITY

- WATER QUALITY CAN BE IMPACTED WHEN RUNOFF CARRIES SEDIMENT OR OTHER POLLUTANTS INTO STREAMS, WETLANDS, LAKES, AND MARINE WATERS OR INTO
- GROUND WATER.

THE UNITED STATES NOT WANTING TO FOLLOW IN OTHER COUNTRY HEADLINES

Keep Your Mouth Closed: Aquatic Olympians Face a Toxic Stew in Rio

Rural Water, Not City Smog, May Be China's Pollution Nightmare


Site Discharge
Surface Water
Slide Courtesy of CSI Geosynthetics

CONSTRUCTION OF A LID PROJECT

8.5 Tons / Year

TSS Ratio 1:70

595 Tons / Year

Erosion & Construction Risk Management

“Issues” or “Problems” arise when “Risk” is not properly evaluated!

RISK

- ***RISK*** IS THE POSSIBILITY OF UNCERTAIN EVENTS OCCURRING.
- ***PROJECT RISK*** IS AN UNCERTAIN EVENT OR CONDITION THAT, IF IT OCCURS, HAS A POSITIVE OR NEGATIVE EFFECT ON AT LEAST ONE PROJECT OBJECTIVE.
- ***RISK MANAGEMENT*** IS IDENTIFYING AND ASSESSING THE RISKS TO THE PROJECT AND MANAGING THOSE RISKS TO MINIMIZE NEGATIVE IMPACTS. THERE ARE NO RISK-FREE PROJECTS. RISK MANAGEMENT IS NOT ABOUT ELIMINATING RISK BUT ABOUT IDENTIFYING, ASSESSING, AND MANAGING RISK.

RISK MANAGEMENT DECISIONS

Planning	When is my lowest risk to erosion? Is the soil I am working in going to cause a problem for me?
BMP Implementation	Do I really need those BMPs? They should hold up, I don't need to change that out
Monitoring	I am too busy for paperwork
Enforcement	No inspector has ever some to one of my projects! No one cares, I am way back here in the woods
Economics	What is the cost if I do, but what is the cost if I don't?

SWPPP + BMPs = Positive Economic and Environmental Outcomes

RISK OF CAUSING EROSION AND SEDIMENTATION

- PUBLIC PERCEPTION AND REPUTATION
- INCREASED OVERSIGHT AND PLANNING
- PROPERTY DAMAGE/LOSS
- STORM SYSTEM REPAIR
- RESOURCE MITIGATION
- REPAIRS TO GRADE
- FINES
- STOP WORK
- LAWSUITS

ENFORCEMENT

- ENFORCEMENT GROUPS
  - REGULATORY AGENCY
    - EPA
    - STATE AGENCY
    - LOCAL
  - CITIZEN GROUPS OR CITIZEN COMPLAINT
- HOW DO YOU BECOME A DOT ON THE RADAR?
  - DIRTY WATER
  - DEAD FISH – HIGH PH
  - ROCK IN A WINDSHIELD
  - POOR HOUSEKEEPING

SHARED LIABILITY
CITY AND CONTRACTOR FINED $430,851
ENCINITAS, CA

- CITY OWNS AND OPERATES A MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
  - REQUIRED TO PROHIBIT DISCHARGES INTO AND FROM ITS MS4 THAT CAUSE OR THREATEN HARM TO WATERS OF THE STATE
- PROJECT DISCHARGED SEDIMENT INTO A CREEK UPSTREAM OF A LAGOON

- City was in violation because they
  - Allowed discharge of sediment from the project
  - Failed to require the project to comply with state orders
  - Obtained permits to complete the project
- Contractor was in violation because of failure to implement adequate controls, structures, and management practices

INCREASE IN ENFORCEMENT

By Craig Welch , Seattle Times environment reporter

Officials spoke repeatedly with the contractor and his employees. When it didn't stop, authorities ordered work halted.

State and federal regulators wrangled for more than three years with Bryan Stowe…

Now Stowe, his company and an employee have earned a dubious distinction: They are the first Western Washington defendants to plead guilty to criminal charges in U.S. District Court in connection with stormwater pollution.

…one count of intentionally violating the Clean Water Act.

In the end the case will cost the builder and his company $750,000 in fines. Stowe faces up to three years in prison...court-ordered stormwater-compliance plans for any future developments

Ecology even issued Stowe a $36,000 fine, which he declined to pay. One of his employees confessed to doctoring water-sampling tests,…

Authorities eventually determined his site washed 50,000 tons of material downstream.

TYPICAL EROSION CONTROL ISSUES

Exposed soils bringing sediment onto (or off) site.

Poor protection of stockpiles

TYPICAL EROSION CONTROL ISSUES

Installing erosion control BMPs incorrectly

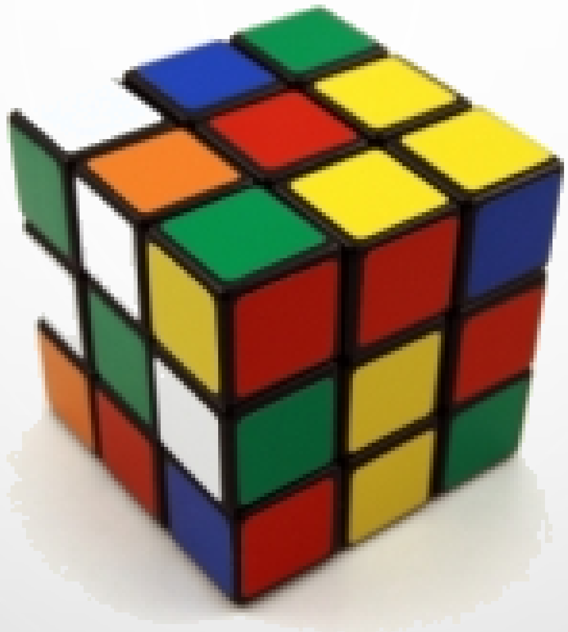
No erosion control efforts

TYPICAL EROSION CONTROL ISSUES

Large area of exposed soils – dust hazard.

Poorly maintained construction entrance.

PROBLEM SOLVING



PROACTIVE

ADAPTIVE STORMWATER MANAGEMENT PRACTICES CAN HELP TO REDUCE EFFECTS ON WATER QUALITY.

THERE ARE NO SHORTCUTS!

CONCLUSION OF SECTION 1