



Site Soils and Stormwater Management

Cody Obropta, PE
Environmental Engineer
Stormwater Engineering Team

MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

Protecting Maine's Air, Land, and Water

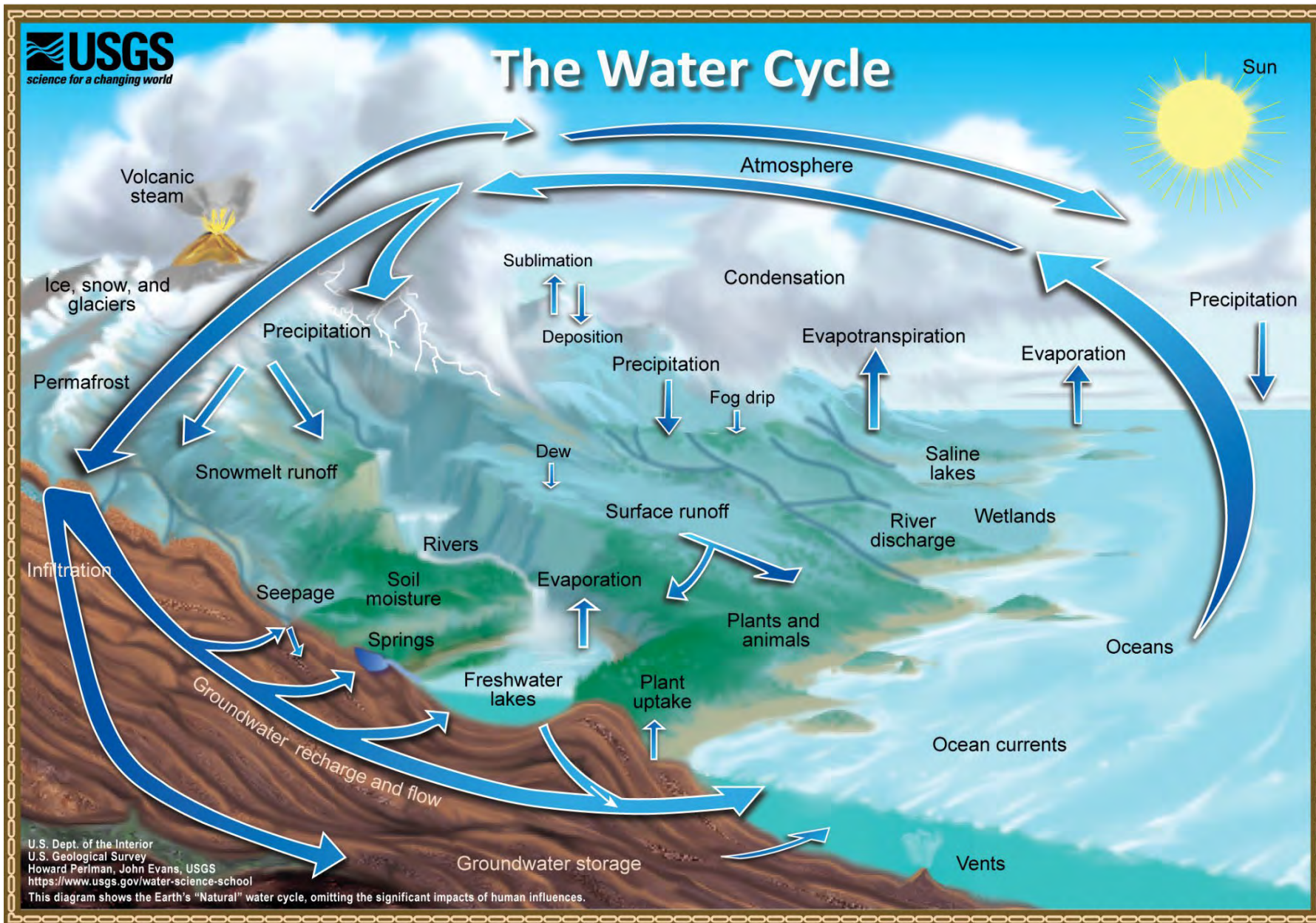
Overview

- How Stormwater & Soils Are Related
- Soil Test Pits
- Stormwater Buffers
- Infiltration
- Soil Surveys

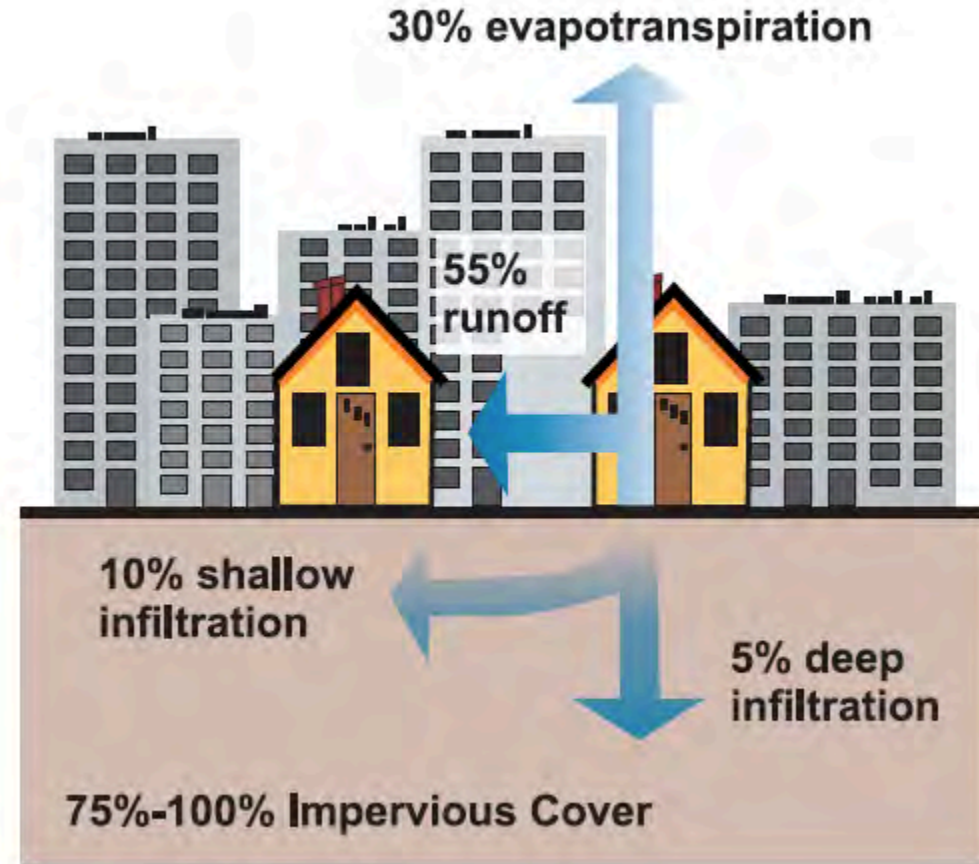
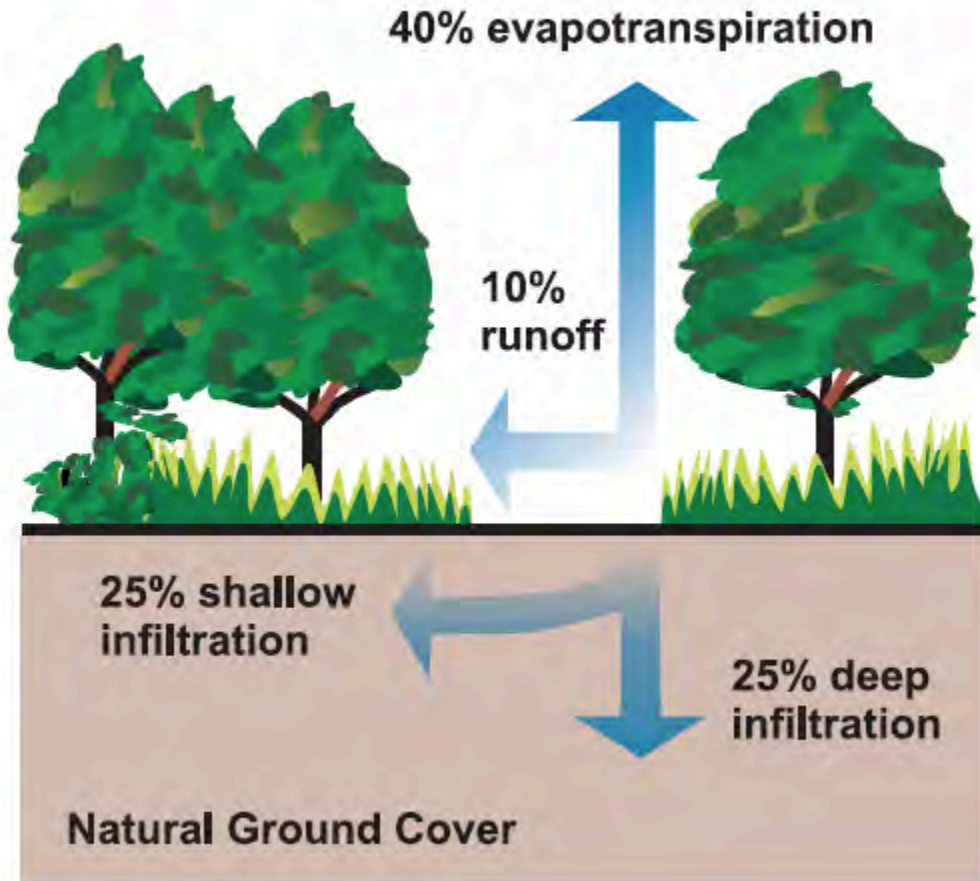




The Water Cycle

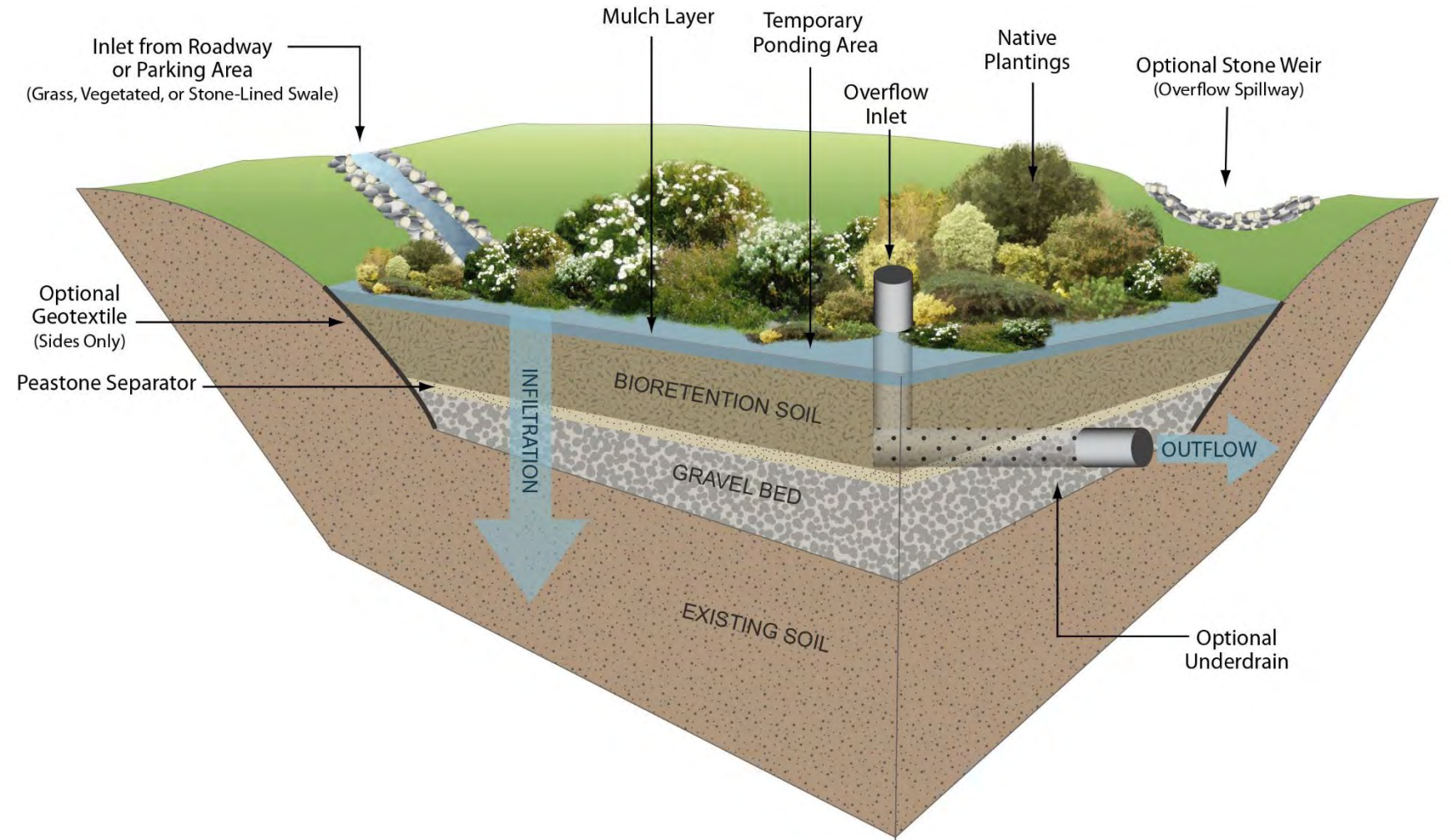


How Land Cover Impacts Stormwater Runoff



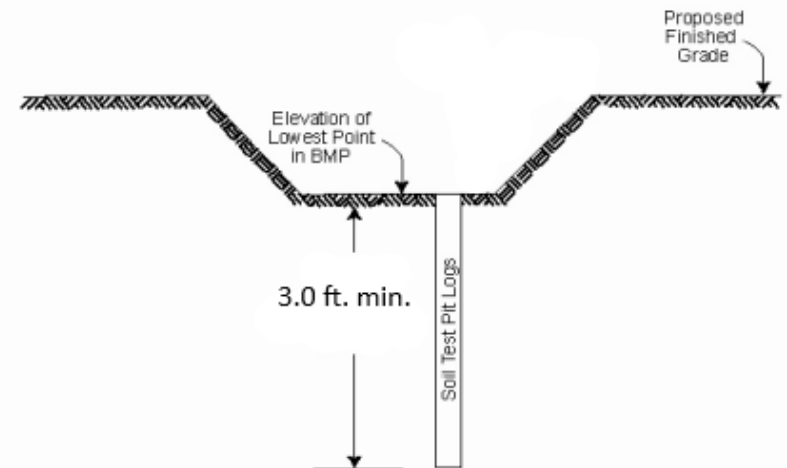
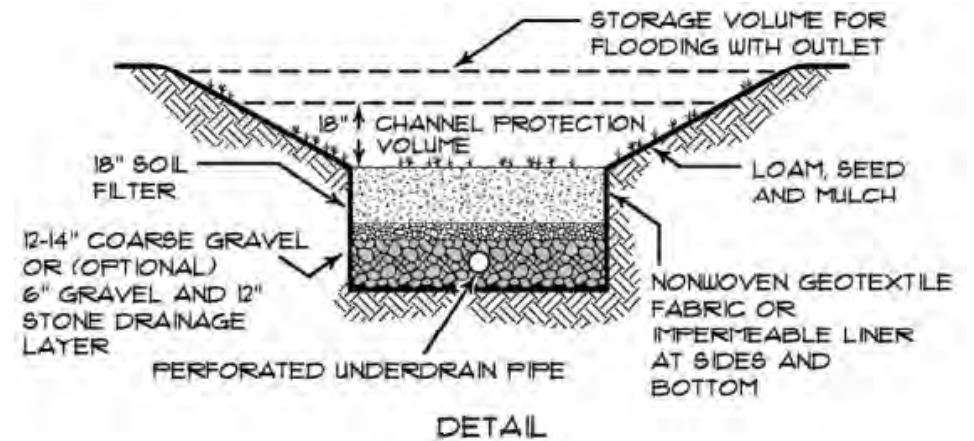
Soils & Stormwater Treatment

- Groundwater recharge via infiltration
- Pollutant removal via physical filtering, microbial activity, vegetation uptake, etc.
- Reduce peak flow via temporary ponding, forcing slow filtering through media, controlling outlet size



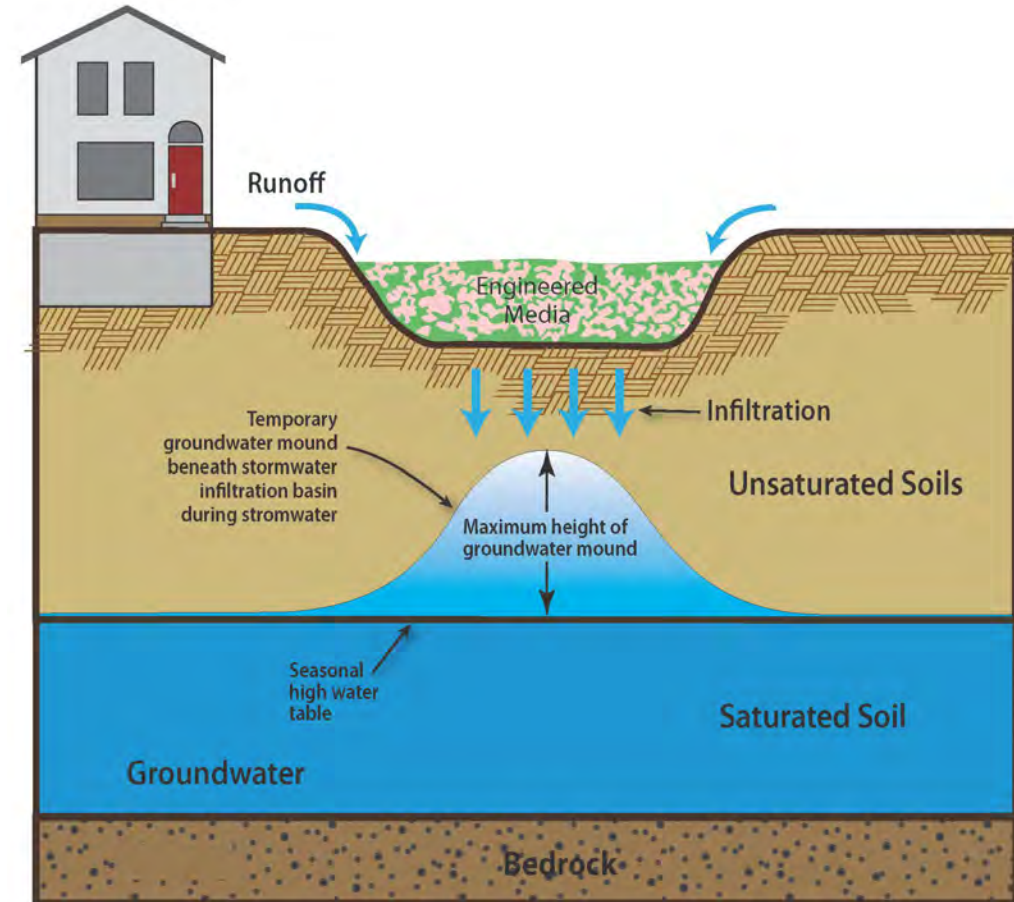
Soil Test Pits

- Detailed log or boring in area of each proposed BMP
- Extend to a depth of at least three feet below the lowest component of proposed structure



Why They're Necessary

- Ensure no groundwater intrusion
- Provide room for groundwater mounding
- Check for ledge
- Check for hydric soils
- Verify hydrologic soil group
 - buffer design & infiltration ability



More on Buffers

- Some buffer lengths depend on hydrologic soil group

The ideal buffer:

- Thick, organic duff layer
- 12” min. to restrictive layer
- Granular structure / well draining
- Low bulk density
- Pit-mound topography

High quality buffers may be allowed a reduced flow path length (case-by-case basis).

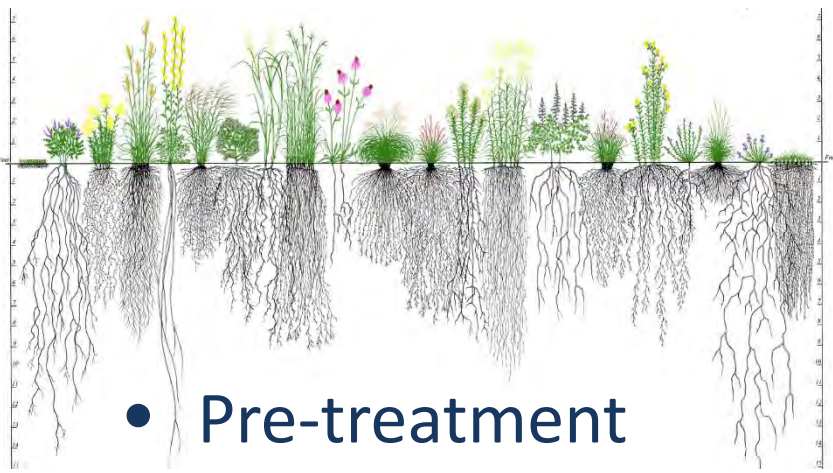
Table 5.7
Buffer Flow Path Length per Length of Road or Ditch (feet)

Hydrologic Soil Group	Length of Road or Ditch (feet)	0-8% Slope		9-15% Slope	
		Forested Buffer	Meadow Buffer	Forested Buffer	Meadow Buffer
A	200	50	70	60	84
	300	50	85	60	102
	400	60	100	72	120
B	200	50	70	60	84
	300	50	85	60	102
	400	60	100	72	120
C Loamy Sand or Sandy Loam	200	60	100	72	120
	300	75	120	90	144
	400	100	N/A	120	N/A
C Silty Loam, Clay Loam or Silty Clay Loam	200	75	120	90	144
	300	100	N/A	120	N/A
D Non-Wetland	200	100	150	120	180

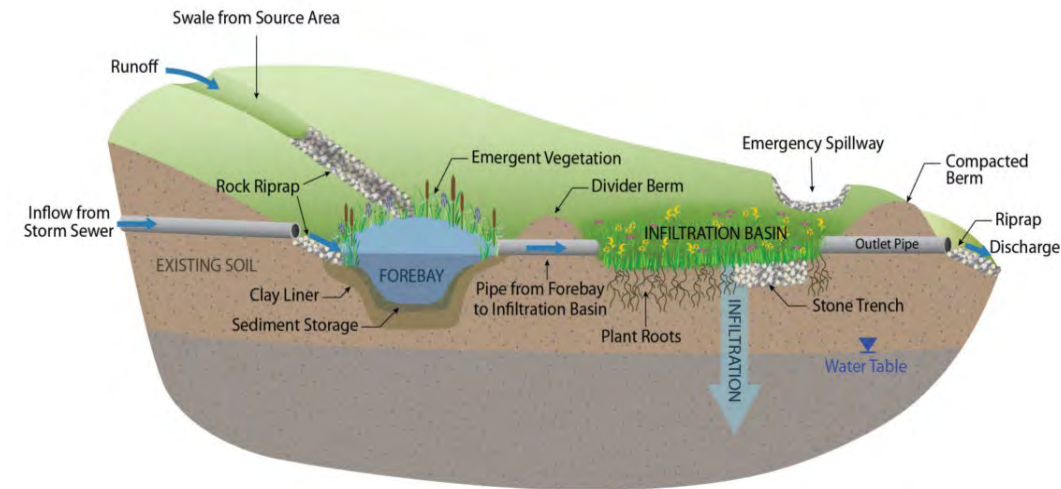
Soil variability across a buffer = take the weighted average



Infiltration

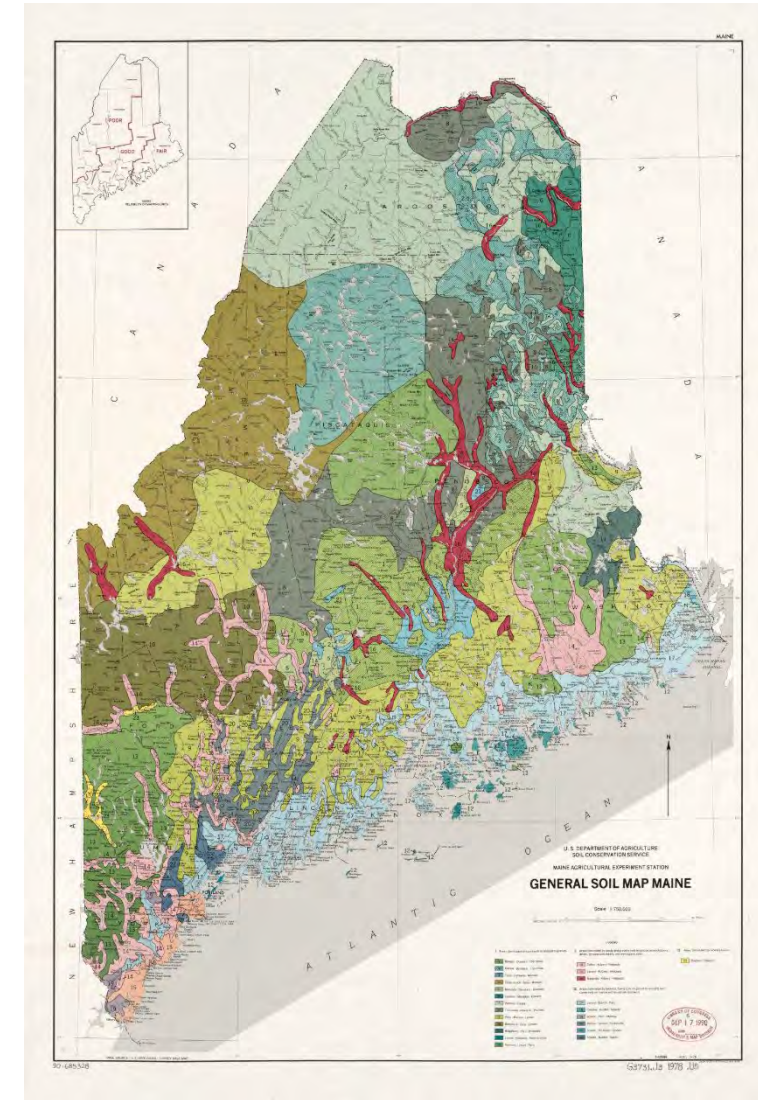


- Pre-treatment
- Setbacks from natural resources, wells, and septic systems
- 3 feet separation from SHWT
- Max permeability of 2.41 in/hr
- Systems serving >1 ac. impervious need more than 5 ft saturated overburden above bedrock surface (measured during seasonal low GW) – see exceptions Pg. 47 Ch. 500 Appx D 3.(e)



Soil Surveys

- Hydrologic Soil Group needed for developing runoff models
- Helpful for Low Impact Development
 - Avoiding development of well draining soils
 - Lowers overall runoff totals



Wrapping Up

- Soils play an important role in stormwater treatment and runoff volume control
- Chapter 500 has requirements for test pits at BMP locations
- Buffers and infiltration BMPs may require additional soil information
- Soil surveys can help with modeling and designing low impact development projects





Contact:
Cody Obropta, PE
Stormwater Engineering Team
207-356-1481
cody.obropta@maine.gov

www.maine.gov/dep

