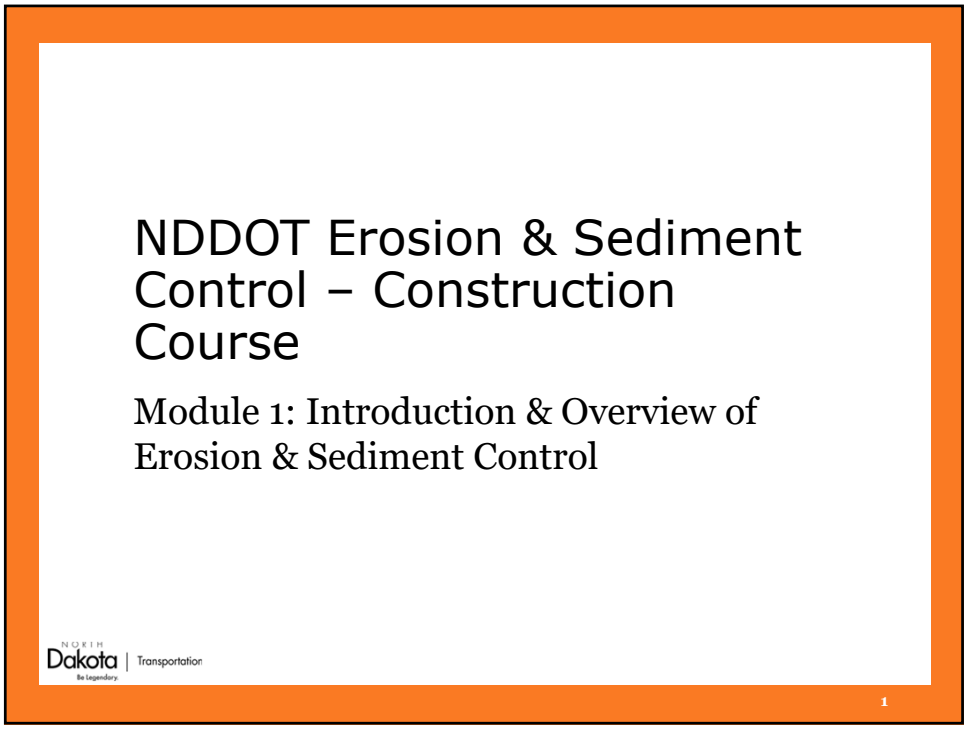
NDDOT Erosion & Sediment Control – Construction Course
Module 1: Introduction & Overview of Erosion & Sediment Control
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Housekeeping
• Agenda
• Breaks
• Restrooms
• Lunch
• Courtesies
• Course Materials
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Participant Expectations

Attendance:

Required

Recertification:

Within 4 years

Written Exam:

Open Book

50 questions

2 hours

80% to Pass

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Participant Introductions

What is your name?

Where are you from?

What is your job?

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Environmental Quality
NDSU NORTH DAKOTA STATE UNIVERSITY
DEPARTMENT OF CONSTRUCTION MANAGEMENT AND ENGINEERING
NDSU UPPER GREAT PLAINS TRANSPORTATION INSTITUTE
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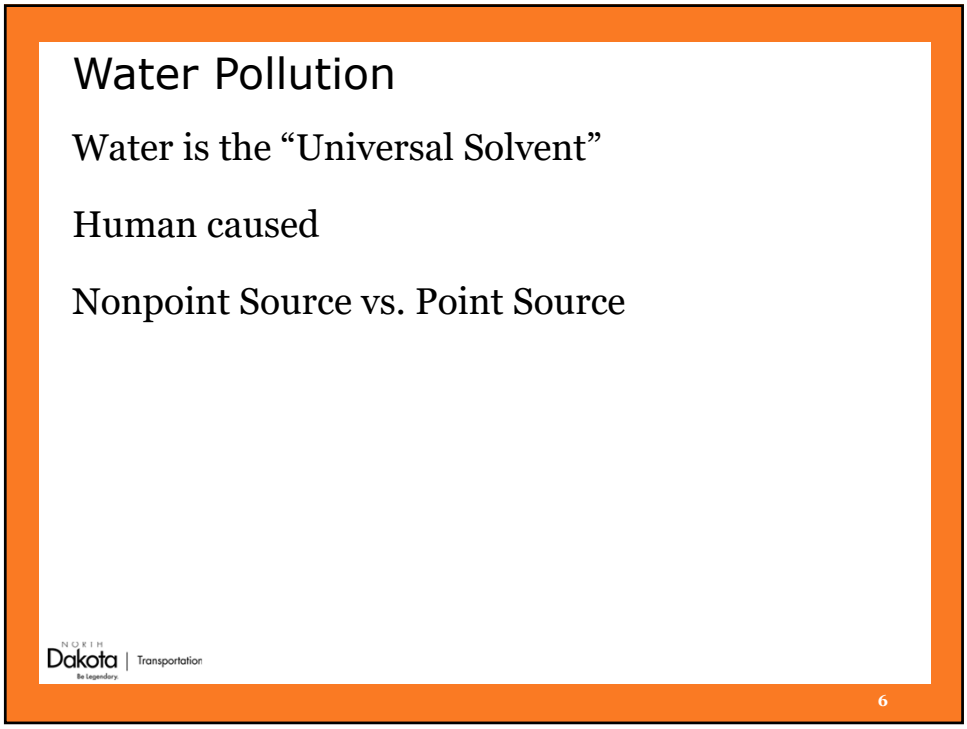
Water Pollution
Water is the “Universal Solvent”
Human caused
Nonpoint Source vs. Point Source
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Point Source Pollution from Construction

Removal of surface vegetation

Stripping and stockpiling topsoil

Placement of erodible soil on or near streets

Pumping water from excavations

Vehicle tracking

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Other Impacts:

Influx of poisonous chemicals

Changes in water chemistry

Growth of undesirable plants/algae

Flattening of streambed channels

Increased possibility of flooding

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Erosion Types

Two main types of soil erosion experienced on construction sites are:

– Water

– Wind

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Five Levels of Water Erosion

- Raindrop Erosion
- Interill (sheet) Erosion
- Rill
- Gully
- Streambank Erosion

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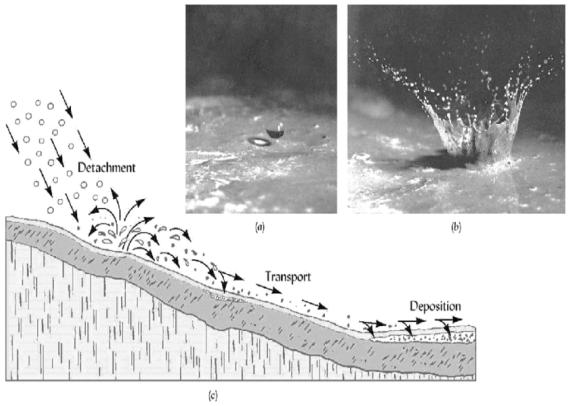
Levels of Water Erosion

Raindrop (Splash) Erosion:

A ¼" diameter raindrop can impact the ground at speeds up to 20 mph

Approximately **80%** of erosion problems on construction sites are a result of raindrop impacts



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Levels of Water Erosion

Interill (Sheet) Erosion:

Runoff over the site as a thin, uniform layer

Approximately 1/16" to 1/8" deep

Will typically pick up and transport soil particles dislodged by raindrop impacts

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Levels of Water Erosion

Gully Erosion:

A larger channel caused by concentrated flow of surface and storm water over unprotected, erodible soil

Typically formed by multiple rills joining together

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Gully Erosion

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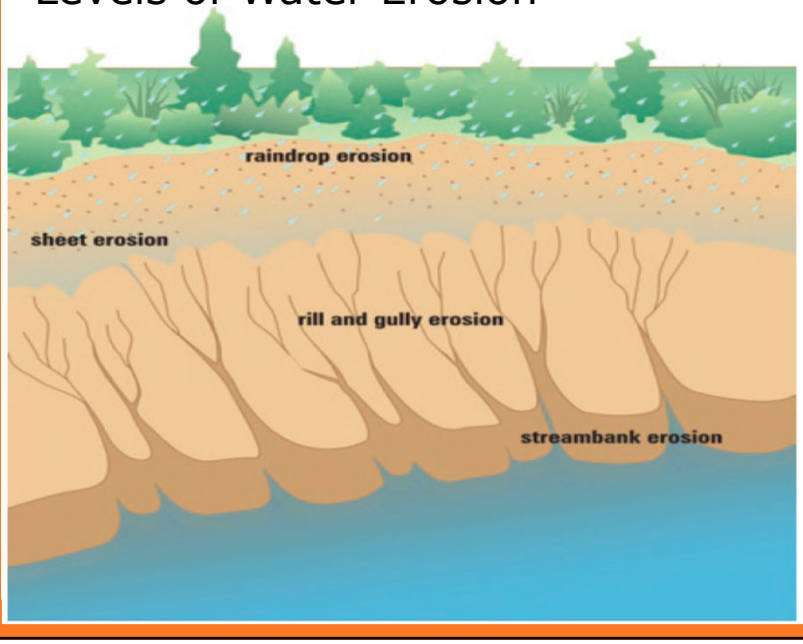
Levels of Water Erosion



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Suspension

Suspension:

Particles are picked up by current (wind or water) and carried long distances

Fine and light soil particles (silts and clays). Fine colloidal soil particles that may never settle to the bed.

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Suspension of Eroded Materials

Suspended material will cause additional impacts through:

Bed Load:

Soil particles that are dragged or rolled along the bed of the channel

Saltation:

Soil particles are skipped or bounced along the bottom

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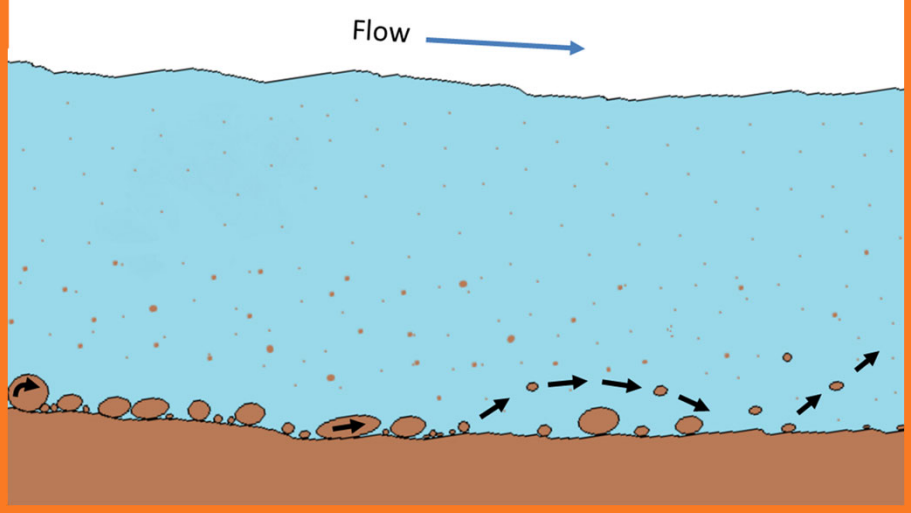

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Sediment/Sedimentation

Sediment refers to the soil particles that are suspended in construction runoff water.

Sedimentation is the depositing of those soil particles from runoff over time.

Once settled out, the particles can be harmful to infrastructure, fish, wildlife, and aquatic species.

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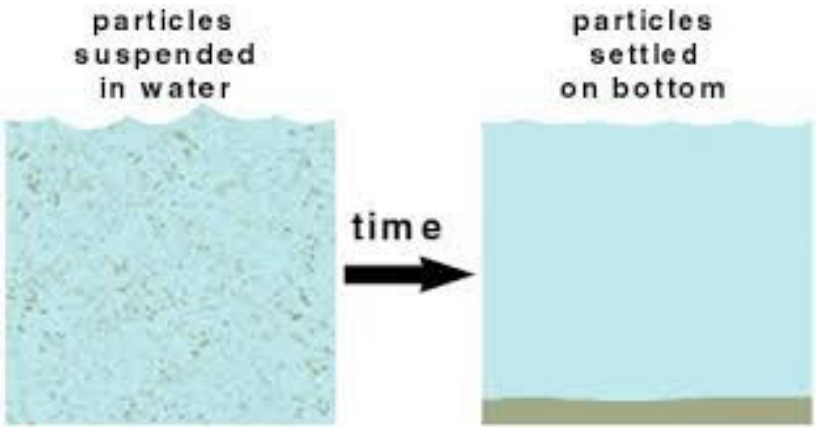
Sediment/Sedimentation



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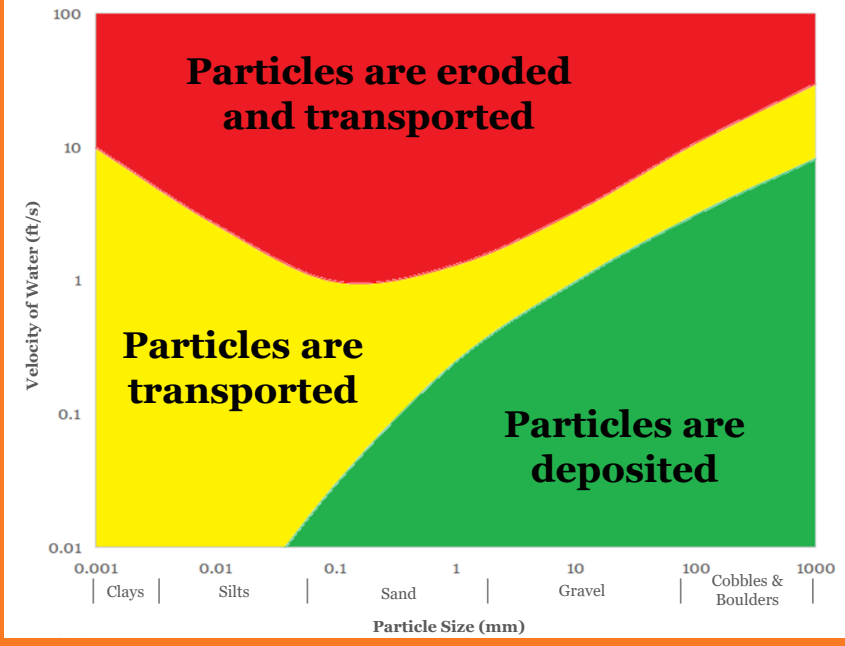

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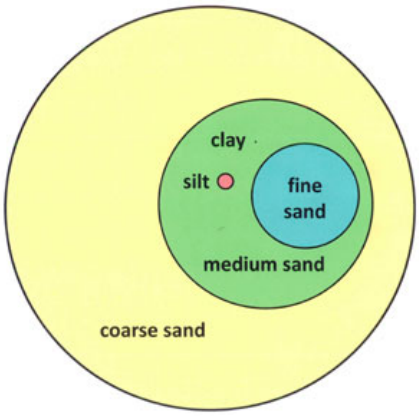
Erosion Mechanisms (USDA and Colorado State Ext.)

Soil particles come in various shapes and sizes

Soil Size Classification	Soil Particle Diameter (mm) [in]
Coarse Sand	0.5-1 [0.020-0.039]
Medium Sand	0.25-0.5 [0.010-0.020]
Fine Sand	0.08-0.1 [0.001-0.004]
Silt	0.002-0.05 [7.87E-05-0.002]
Clay	<0.0001 [3.94E-06]



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Soil Size Classification	Settling Velocity	Time to Settle 1 ft
Gravel	1.67 – 3.33 ft/sec	0.3 – 0.6 seconds
Sand	0.008 – 0.33 ft/sec	3 – 120 seconds
Silt	0.02 – 0.03 ft/min	30 – 60 minutes
Clay	0.005 – 0.010 ft/day	100 – 200 days
Colloids	0.02 – 1.6 ft/year	>200 days

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Wind Erosion

Wind erosion is similar to water erosion except the movement of air is responsible for the movement of the soil

Disturbing the soil with equipment and vehicles can cause soil particles to become dislodged and more easily transported by wind

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Wind Erosion

Wind erosion is influenced by multiple factors:

– Wind velocity

– Surface roughness

– Surface cover

– Moisture level of the top layer of soil

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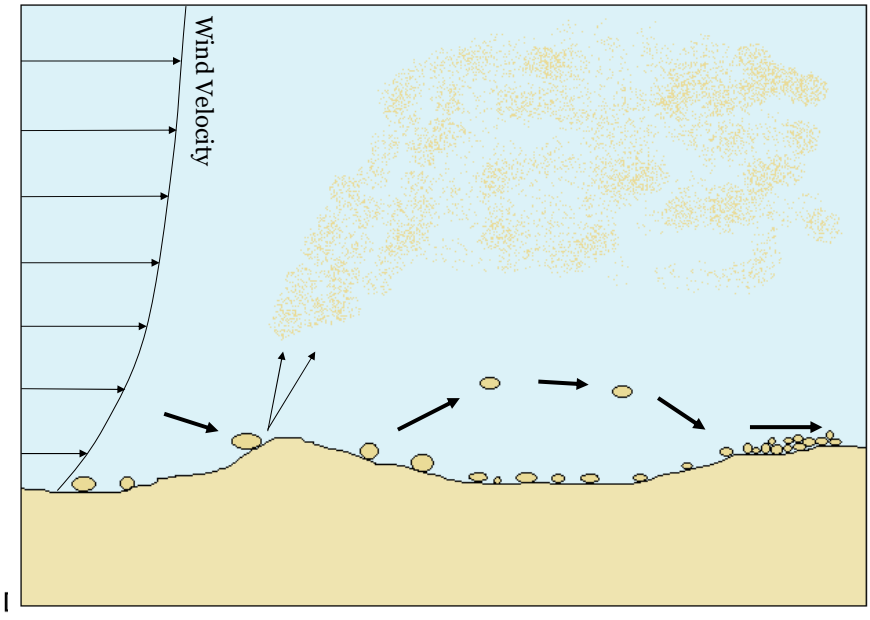

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Wind Erosion and Deposition

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Erosion Facts (USDA NRCS Soil Quality – Urban Technical Note No. 1 "Erosion and Sedimentation on Construction Sites")

Construction sites can erode at a rate of 100 to 500 tons/acre/year

– 100 times greater than cropland

– 2,000 times greater than woodlands

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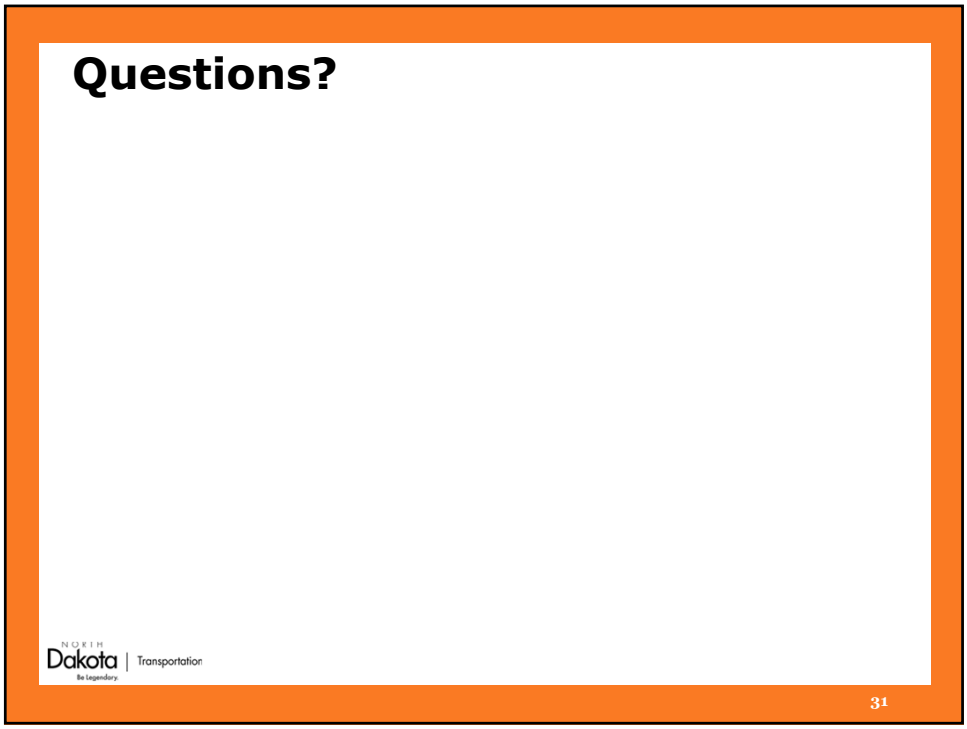
Questions?
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