AK-CESCL

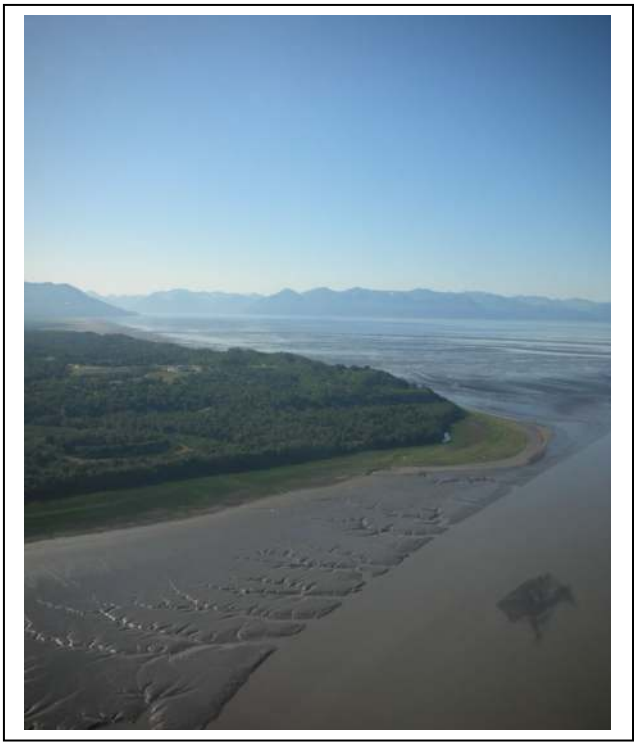
Alaska Certified Erosion & Sediment Control Lead

Training Workbook

Sponsored by:

Associated General Contractors of Alaska — Skill, Responsibility, Integrity

In Cooperation with:



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Appendices

Forms Packet (separate handbook of examples)

Note: This workbook generally follows the text of the slides shown during the course. It is meant to be used as a reference after the course. If you would like a full copy of the slides, including their photographs, you can download them from the AK-CESCL website.

AK-CESCL Website: http://www.ak-cescl.com/

COURSE OBJECTIVES

Assess and manage risks of erosion and sedimentation on construction sites

Obtain and comply with the APDES general permit for construction activities

Plan, install, monitor and maintain BMPs that comply with the Clean Water Act, EPA, & ADEC

Test score must be 70% or higher to receive the AK-CESCL certification
Test is 50 questions

What will be covered:

- Impacts of Erosion and Sedimentation
- Erosion & Sedimentation Processes
- Factors Influencing Erosion Potential
- Permitting & Regulatory Requirements
- SWPPP Introduction
- Alaska Permit Conditions
- ACGP Requirements – Erosion & Sediment
- ACGP – Good Housekeeping BMP's
- Site Inspections

I. Erosion & Sedimentation Impacts

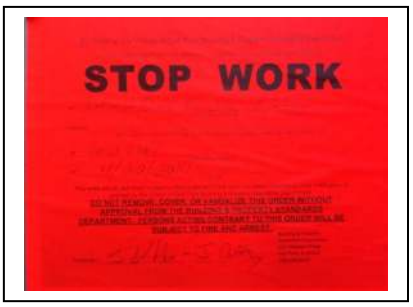
- Climate can affect erosion rates
- Human activities can affect erosion rates
  - Accelerated erosion from construction can be up to 1000 times greater than the natural rate of erosion
- Erosion impacts the production and profitability of construction
  - Repairing grades, maintaining BMPs, increase construction time & cost
- Sedimentation can impact infrastructure and involve costly cleanup
  - Clogged storm sewer systems, local flooding, filled in reservoirs, shipping channels, harbor areas
- Consider where sediment from your project may end up and the cost to clean it up and repair damages.

Water Quality & Environmental Impacts

- Clogged spawning gravels, smothered eggs and fry, gill abrasion
- Decreased photosynthesis, diminished spawning, increased temperature

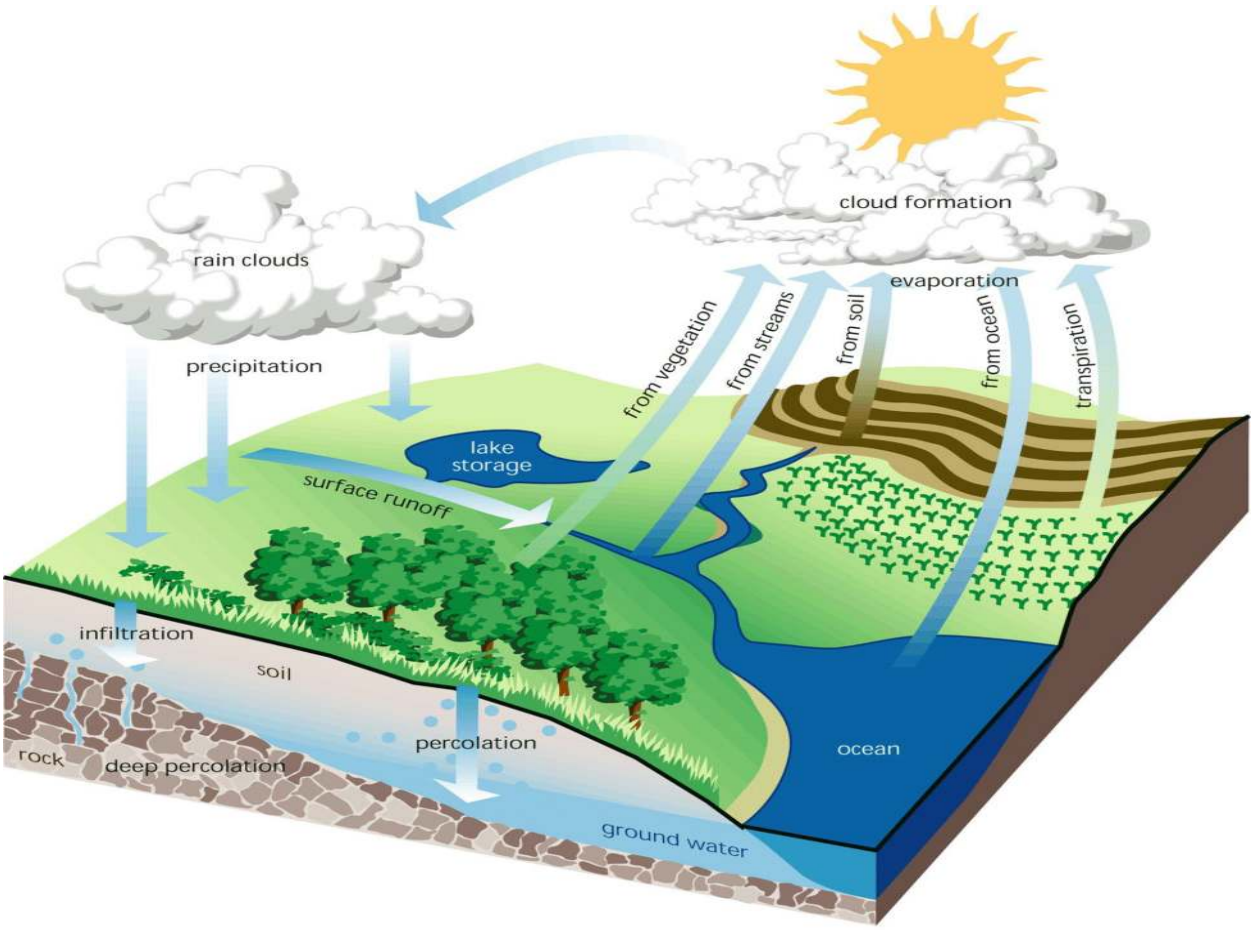
Penalties & Fines

- Legal liability for damage from sediment
- Penalties for permit non-compliance
  A. Consent Decrees
  B. Third Party Suits
  C. Stop Work Orders




Save the Money

Hydrologic Cycle



In the natural condition the runoff from an area is fairly slow and gradual. When we remove vegetation, strip the topsoil and compact the soils the discharge is increased. There can be 300 times more water leaving a developed area than the undeveloped condition.

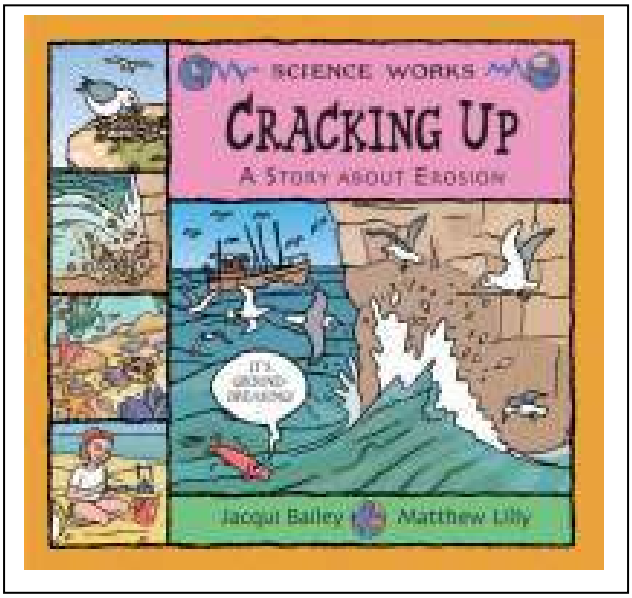
Detention & Retention

- Project discharge must be managed to prevent damage down grade
- Infiltration is encouraged where possible

Impacts of Erosion and Sedimentation on Construction

- Diversion of resources, labor and equipment for repairs
- Construction delays & increased costs
- Legal costs
- Mitigation costs (permit holder may be liable for damage & repairs off site)
- Fisheries Impacts
- Profitability Impacts

✓ Budget appropriately for the time and methods necessary to prevent erosion
✓ Plan to avoid erosion so you are not trying to control sediment
✓ Assess the risks of every task in your schedule and plan to avoid the risks



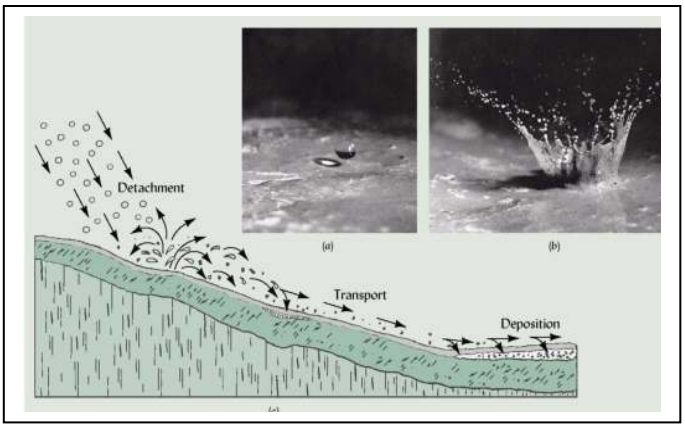
II. Erosion & Sedimentation Processes

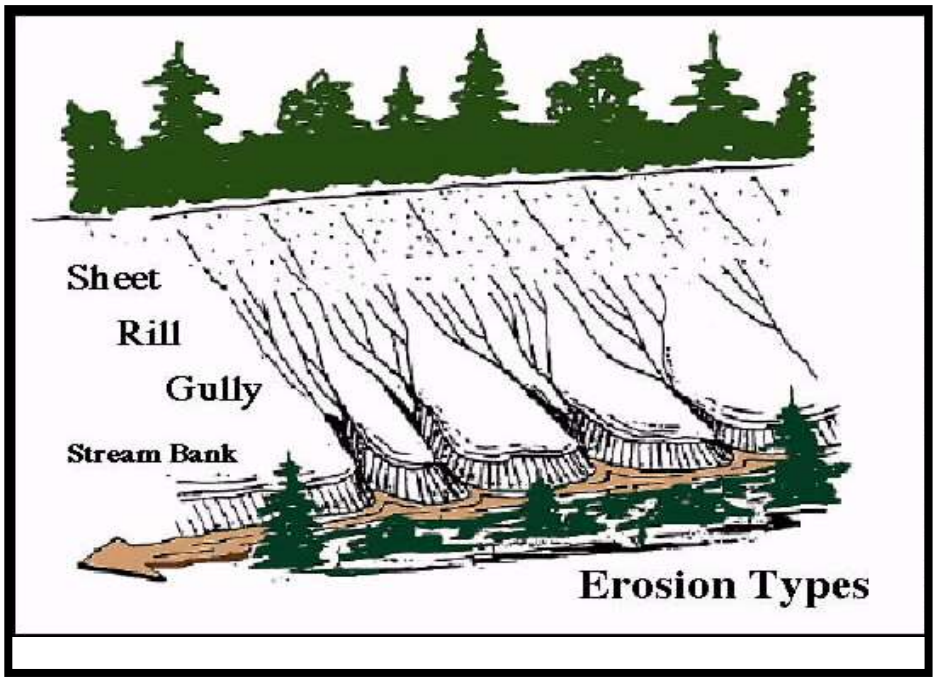
Definitions:

- **Erosion** is the process in which, by the actions of wind or water, soil particles are displaced and transported
- **Sediment** is the eroded material that is suspended in water or wind
- **Sedimentation** is the deposition or settling of the eroded material
- **Turbidity** is the measure of the relative clarity of a liquid (muddiness), measured in NTU's (Nephelometric Turbidity Units) or transparency

Types of Erosion:

- **Raindrop** – Movement of soil particles caused by the direct impact of raindrops on bare soil (Over 80% of the erosion problems on construction sites are a result of raindrop impacts. *Cover Bare Soil.*)
- **Sheet** – Runoff which flows over the ground surface as a thin, even layer
- **Rill** – A small, intermittent water course with steep sides, usually only a few inches deep
- **Gully** – A channel caused by concentrated flow of surface and storm water over unprotected, erodible soil
- **Stream & Channel Bank** – Bank and bed erosion of existing stream channel caused by increased peak flows





Raindrop Impact

- Surfaces “puddle”
- Infiltration rates lower
- Increased runoff = increased turbidity

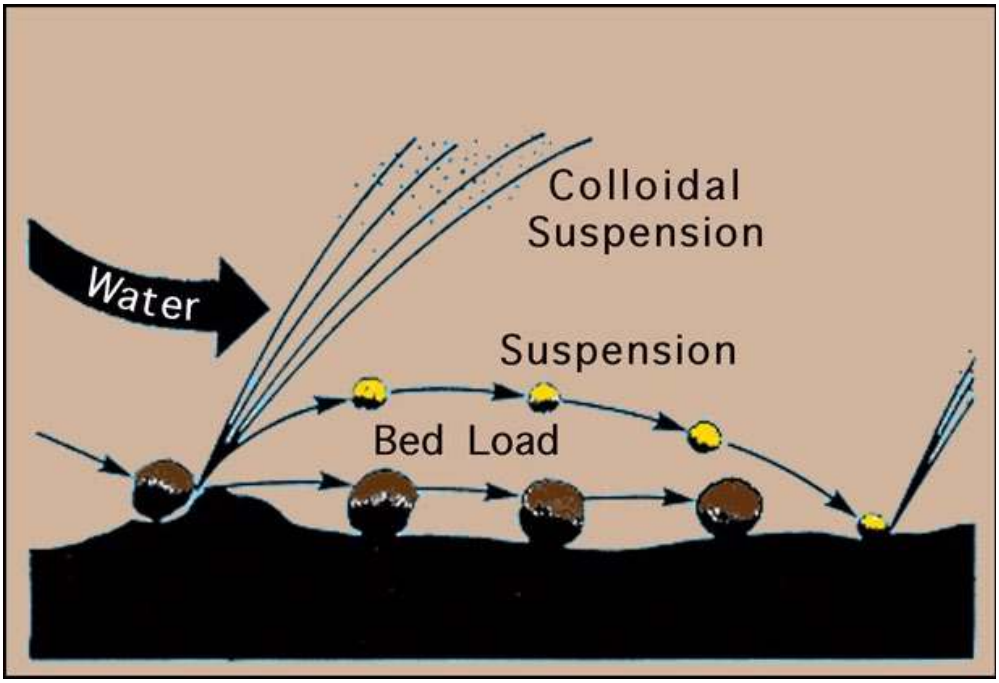
When resisting the forces of flowing water you have two choices:

- Slow it down to reduce the velocity and create ponding
- Armor against the shear stress of the flowing water

Sediment behaves the same in all moving water: the smaller the particle the farther it will travel. The greater the velocity of the flowing water, the larger the particles transported.

Transportation of Sediment by Water

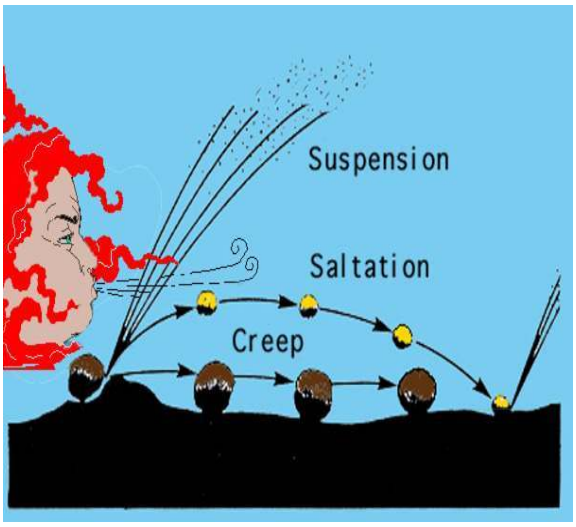
- **Bed load** - Soil particles that are dragged, rolled or skipped, or saltated
- **Suspension** – Soil particles that are lifted up by the flow energy and moved long distances downstream before settling to the bed
- **Colloidal suspension** – Same as suspension but includes only the fine, colloidal soil particles that may never settle to the bed (clay particles)



Understanding the relationship between the soil particle size distribution and the required settling time is critical to effective sediment trap and pond design to control turbidity.

The smaller the soil particles the longer the detention time required to achieve settling; therefore, bigger the settling basin. For every 450 GPM, you need 5,000 ft^2 of pond surface to settle fine silt.

Wind Erosion



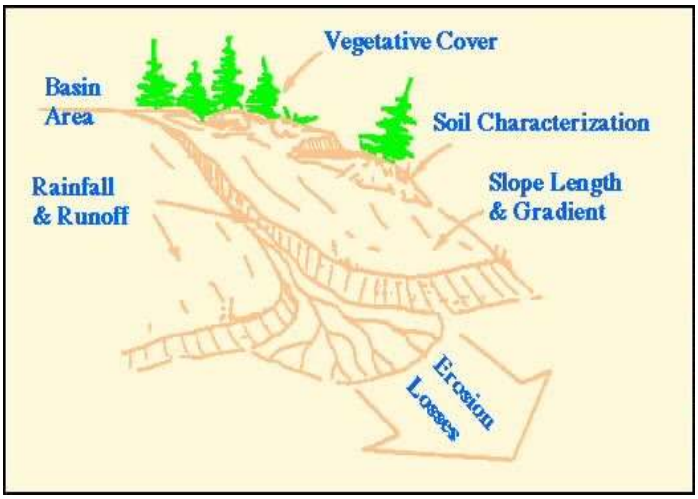
Wind Erosion works similar to water erosion. The larger the particle the more energy will be required to transport it. Fugitive dust can be very difficult to control once it is allowed to form on a project. Dust control requires staying ahead of the problem. Pre-watering and staying ahead of the dust is critical.

Transportation of Sediment by Air

- **Creep –** Rolled, pushed, slid along the ground
- **Saltation -** Soil particles that are dragged, rolled, skipped, or saltated
- **Suspension –** Small particles may become entrained in the wind very easily and may remain in the air for hours or days

Factors That Influence Erosion

- Soils
- Precipitation
- Vegetation
- Surface Area
- Slope Length
- Slope Gradient
- Surface Texture



Soils

Different soils are characterized by the following type:

A. Sandy soils

Erode and settle very quickly

Easily detached by flowing water, can be transported by concentrated flows

Raindrop impacts are minimal on flat surfaces

B. Compacted Soil

Usually has a layer that prevents downward water movement

Slow infiltration rates

Risk will increase when the soils are actively being graded and placed

Impedes downward water movement

C. Clay soils

Low erosion potential

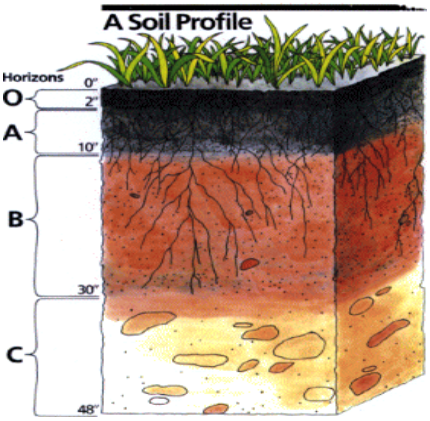
Once suspended in runoff it is very difficult to settle out

Soil Particle Settling Characteristics

Rate of settling in pure, still water (temp=10°C, sp. gravity of particles=2.65, shape of particles=spherical) (Welch, 1935)

Material	Diameter (mm)	Hydraulic subsiding value (mm/sec)	Time required to settle 1 ft.
Gravel	10.0	1000.0	0.3 sec
Coarse sand	1.0	100.0	3.0 sec
Fine sand	0.1	8.0	38.0 sec
Silt	0.01	0.154	33.0 min
Bacteria	0.001	0.00154	55.0 hr
Clay	0.0001	0.0000154	230.0 days
colloidal particles	0.00001	0.000000154	63 years

Soil Horizons



Where the soil type is located within the soil profile is described as the soil horizon. You may have a sandy soil in the C horizon. Or sandy soil in the subgrade about three feet down.

Understanding what kind of soils a site has and where the various soil types are will help in understanding the risks that a site poses. Knowing what percent of fine grained soils a site is made of alerts to the potential for turbidity challenges and the time it will take to settle out if suspended.

Soil Erodibility

- As the percent of sand and silt increases the erodibility increases.
- As the percent of organics and clay increases the erodibility decreases.

Soil Texture

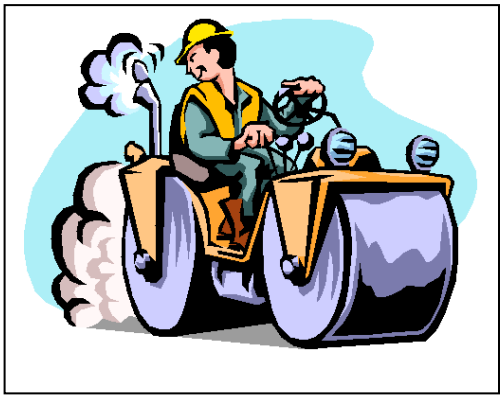
Soil texture is a reflection of the soils make up, i.e., gritty vs. slippery; sandy vs. silty

Surface Texture

- What is the roughness of the soil surface after site preparations?
- Increased roughness decreases the erosion potential
    A. Track walking
    B. Imprinting
    C. Scarifying

Soil Compaction

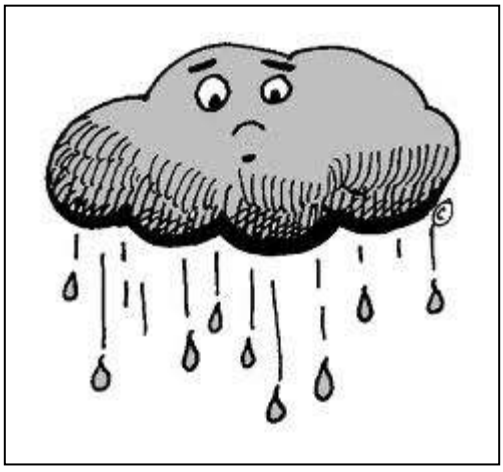
- Compaction reduces the pore spaces in the soil, reduces infiltration resulting in increased runoff
- When the vegetation is removed, the topsoil is stripped, and the construction activities compact the soils the amount of discharge will increase substantially. Planning should anticipate more water coming off the project in a shorter amount of time.



Thermal Degradation/Freeze-Thaw Erosion

- Freeze & thaw conditions detach soil particles, causing down-slope movement & increased susceptibility to erosion.

Precipitation



Rainfall factors that influence erosion

- **Frequency** – How often does it rain?
- **Intensity** – How hard does it rain?
- **Duration** – How long does the rain last?

Will the precipitation accumulate on the site as snow or ice? Will the accumulation build up result in a significant discharge during melt off or break up events?

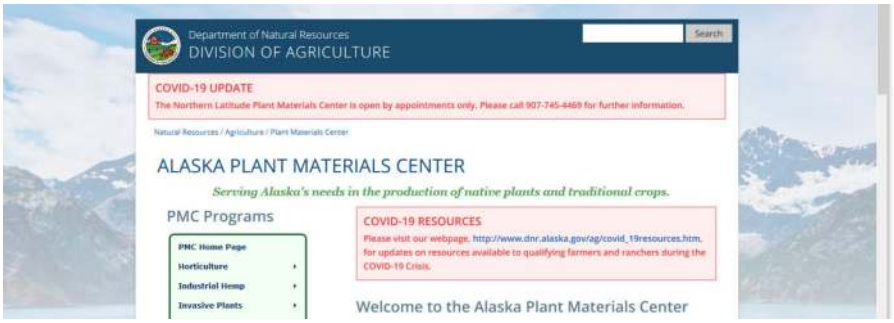
- BMP designs and standards area affected by flow and velocity.

Benefits of Vegetation

- Reduces runoff volume
  - Plants up take water and transpire back into the air
- Reduces flow velocity
  - Moving water will slow down as it encounters vegetation
- Sediment filtration
  - Silts and clays are “sticky” and can attach to vegetation
- Energy absorption
  - Raindrop impact energy is absorbed by the vegetation
- Pollution reduction
  - Many plant species can absorb pollutants of concern and retain them in their tissue
- Soil retention
  - Preserve vegetation where possible and establish vegetation as soon as possible.
  - Allow for the time it will take for the species to germinate, express, and establish.
  - Consider the germination rate, soil temperature, moisture, etc.

Consult the revegetation manuals for Alaska. These guides published by the Alaska Department of Natural Resources Division of Agriculture are excellent resources.

www.plants.alaska.gov



Topography

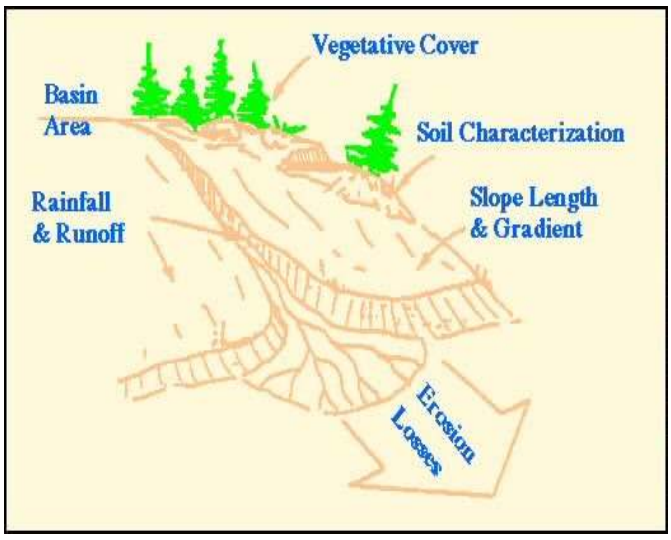
Slope Length and Gradient

- Doubling the slope length increases erosion potential by *four* times.
- Doubling the slope gradient, increases the erosion potential *five* times.

With the exponential increase in erosion potential any time you can shorten the slope and reduce the gradient, the erosion for the area can be dramatically reduced.

Surface Area

- The greater the exposed area the greater the erosion potential
- By limiting the duration and extent of your exposed soils, you're limiting your risk



All the factors that influence erosion influence each other. When managing active construction sites, consider all the factors when making risk management decisions.

Revised Universal Soil Loss Equation (RUSLE)

A=R x K x LS x C x P

Soil loss equations can be used to determine the tons per acre per year of soil loss from an area with numeric values for the factors that influence erosion.

RUSLE equation: A=R x K x LS x C x P

Where A = tons per acre per year in soil loss

R = Rainfall Runoff Erosivity (Climate factor)

K = Soil Erodibility factor

LS = Slope length (L) and Steepness (S)

C = Cover practice

P = Support practice

Climate & soil erodibility factors are given for the area where you are working. Slope length and steepness are generally determined by design. Cover practices prevent raindrop impact. Support practices, track walking vs. smooth and compact.

Do your Best Management Practices demonstrate a reduction in the erosion potential?

III. Regulations

- The Clean Water Act requires that the beneficial uses of the waters of the U.S. be preserved and protected.
- Water quality standards regulate the amount of pollutants that are permitted.
- DEC enforces the state water quality standards.
    - Regulations
    - Permit Requirements
    - Enforcement Actions

- APDES = Alaska Pollutant Discharge Elimination System (DEC)
    - Requires permits for storm water discharges from construction sites that will disturb one acre or more **AND** discharge to waters of the U.S or a municipal separate storm sewer system (MS4) leading to waters of the U.S.
      *Note: Projects in Denali National Park or Indian Reservation of Metlakatla must obtain coverage under the NPDES = National Pollutant Discharge Elimination System (EPA) CGP

Many other regulations control how construction sites are operated.

- Endangered Species Act
    - Prohibits a taking of a protected species
    - Turbid discharge has been considered a "take"
- Migratory Bird Treaty Act
    - Protects birds and their nesting habitat
    - Active nests must be protected until the young depart
- Avoid work at certain times of the year
- Prevent nesting
- Local MS4 Permitting Authority Requirements
    - Municipality of Anchorage (MOA)
    - Fairbanks North Star Borough (FNSB) in the Road Service Area
    - Joint Base Elmendorf Richardson (JBER)
    - Port of Anchorage
    - City of Fairbanks / North Pole
    - Alaska DOT&PF Construction Operations, Central Region
    - Fort Wainwright

U.S. Fish and Wildlife Service Alaska Region:
https://www.fws.gov/alaska/pages/nesting-birds-timing-

Nesting Birds: Timing Recommendations to Avoid Land Disturbance & Vegetation Clearing

TIMES TO AVOID LAND DISTURBANCE & VEGETATION CLEARING	FOREST / WOODLAND	SHRUB / OPEN	SEABIRD COLONIES *INCL. CLIFF & BURROW COLONIES*	EAGLES *e
Southeast	15April-15July *a	1May-15July *a,b	1May-5Sept	1March-31August
Kodiak Archipelago			15April-7Sept	
Southcentral *Lake Iliamna to Copper River Delta; north to Talkeetna*	1May-15July *a,b			
Bristol Bay/AK Peninsula *north to Lake Iliamna*	1May-15July *a,b,c		10May-15Sept	
Interior north of Talkeetna to south slope Brooks Range; west to treeline	1May-15July *a,b		1May-20July *d	
Aleutian Islands	N/A	25April-15July *a	1May-15Sept	
Yukon-Kuskokwim Delta	1May-15July	5May-25July *a,b,c	20May-15Sept	
Seward Peninsula		10May-20July *a,c		
Northern *including northern foothills of Brooks Range*	N/A	1June-31July *a,c		
Pribilof/Bering Sea Islands		15May-15July *a	15May-15Sept	

Table: Nesting seasons by habitat type and region and times to avoid land disturbance and vegetation clearing.

*a Raptors may nest 2+ months earlier than other birds.

*b Canada geese and swans begin nesting April 20.

*c Black scoter are known to nest through August 10.

*d Seabird colonies in Interior refer to terns and gulls

*e Eagles and eagle nests have additional protections under the Eagle Act, and a permit may be required to conduct activities near an eagle nest.

- Army Corps of Engineers
    - 404 permits for the dredge or fill of wetlands and waters of the U.S.
    - Require certain conditions in addition to the ADEC CGP
        - ✓ Fueling distances from water
        - ✓ Placard posting and others

    *Note: Areas covered by a Corp permit should be included in the APDES NOI acreage.

- Alaska Department of Fish & Game
    - Fish Habitat Permit
        - ✓ May have in-water restrictions
        - ✓ May specify the work schedule for in-water activities

- US Fish and Wildlife Service & National Marine Fisheries Service
    - Consultation for Endangered Species
    - Marine Animal Protections & Restrictions
    - May require special conditions for noise, timing, etc.

- ADEC Excavation Dewatering General Permit
    - Must comply with the permit when dewatering
    - In addition, work may require advance notice to multiple agencies.

    Send NOI to ADEC if:
        - ✓ Excavation is within 1,500 feet from a ”DEC-identified contaminated site” or“DEC-Identified contaminated groundwater plume”
            - DEC-Identified site may be “Active” or have a “Cleanup Complete-Institutional Controls” status
        - ✓ Or if the excavation will impact a local drinking water well
    - Sampling requirements

- Alaska Water Quality Standards

    - State regulation 18 AAC 70

    **See https://dec.alaska.gov/commish/regulations.aspx*

    - Freshwater Turbidity Standard
        - ✓ Nephelometric Turbidity Units (NTU) may not exceed 5 NTU above natural conditions when the background is 50 NTU or less
        - ✓ Can exceed background by up to 10% of background when concentration is between 50 and 250 NTU
        - ✓ Discharges to waters with background greater than 250 NTU cannot be greater than 25 NTU over background
    - Marine Water Discharge
        - ✓ Water bodies designated for all uses should not receive discharges that exceed 25 NTU
        - ✓ A second method in waters such as the mouth of glacial river is use of secchi disk – do not reduce depth of visibility of disk by greater than 10%
- Clean Air Act
    - Dust control is required to prevent air quality impacts
    - Local ordinances may require special conditions

        For example:

        AMC 15.35.090D Anchorage Municipal Code
        - ✓ Street Sweeping equipment must be equipped with filtering devices when dry sweeping
        - ✓ Measures must be employed to prevent dust from becoming airborne

Managing your environmental responsibilities

EPA guidebook for construction project managers

www.epa.gov/compliance/resources/publications/assistance/sectors/constructmyer/myerguide.pdf

Commence of Construction Activities or Construction Activity for the purpose of the CGP, means the initial disturbance of soils associated with clearing that disturbs the vegetative mat/grubbing, grading, or excavating activities or other construction-related activities.

Be aware of these permits and their requirements

- §401 Certification- Water Quality Certification/ 404 Permit (Army Corps Permits)
- ADEC Dewatering Permit
- ADF&G Fish Habitat Permit
- DNR TWUP- Temporary Water Use Permit
- Critical Habitat Protections – Wildlife Refuges
- Species Protections (e.g. take permits)
- USFWS Endangered Species Act (ESA) Compliance
- SHPO/OHA
- Grading Permits
- Clearing Permits

DEC Construction General Permit (CGP)

- APDES (Alaska Pollutant Discharge Elimination System)
- Requires permit coverage for construction activities that will both:
  - Disturb one acre or more of soil or be part of a common plan of development that will disturb one acre or more, **and**
  - Discharge storm water to waters of the U.S. or MS4 leading to waters of the U.S.

Permit Operators

- Operators apply for permit coverage online, Notice of Intent (NOI)
  https://dec.alaska.gov/water/wastewater/stormwater/apdesenoi/
- Operators are those in charge of the plans and specifications or are in operational control of the day to day activities on the site.
- Projects may have multiple operators
- New owners must file a new NOI
- The completed NOI and SWPPP must be on-site or at another location easily accessible during normal business hours.
  - NOI must be posted near the main entrance of the project site in public view.
- Finished projects must file a Notice of Termination (NOT) within 30 days after one or more of the following have been met:
  - Final stabilization achieved on all portions of the site
    - ✓ There are no discharges from construction related activities
    - ✓ The site is stabilized, 70% background vegetation cover
    - ✓ Temporary BMPs have been removed
  - The owner/operator/permitee assumes control
  - Authorization under an Individual Permit or Alternate APDES has been obtained
  - For residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner
  - Planned construction activities identified in the original NOI were never initiated & plans for construction have been permanently abandoned or indefinitely postponed.

Modifications to Original NOIs 2021 CGP 2.7.3

- NOI modifications must be submitted within 30 calendar days of a change (update or correction) to the following information:
  - Owner/operator address and contact information

- Site information
- Estimated start or end dates
- Number of acres to be disturbed**
- SWPPP locations and contact information

If the original project disturbance was between one and less than five acres, and will now disturb five acres or more, a SWPPP must be submitted with the NOI mod.

What if I don't comply?

Permit noncompliance is a violation of the Clean Water Act

- **Civil penalties**

  EPA: $52,414 per day/per violation

  DEC $500 - $100,000 + $5,000 per day
- **Stop Work Orders**

  Requires formal notice from permitting authority
- **Criminal Sanctions**

  If violation knowing & willful, criminal penalties up to $10,000 and possible jail time
- **Citizen Suits**

  Permit noncompliance is violation of Clean Water Act. Citizens can use SWPPPs, inspection reports, log entries and DMRs to sue you

The SWPPP should provide the blueprint for compliance with all regulatory requirements.

V. SWPPP Introduction

- A SWPPP explains how a construction site will be operated in a manner to prevent pollution from discharging beyond the project limits using all known available and reasonable technologies.
- A SWPPP should provide the rational for the BMP selection and their scheduling taking into consideration the processes of erosion and the factors that influence erosion.
- A SWPPP needs to consider the schedule and finished design in protecting water quality.
- The key to a successful SWPPP is proper site assessment and analysis to prevent all types of erosion
- SWPPP purpose
    - Describe BMPs to minimize erosion and sediment discharge.
    - Identify, reduce, or prevent the pollution of storm water.
    - Prevent violations of water quality, or air quality standards.
    - Identify, and assign maintenance responsibilities for BMPs.

What Elements Are Required in a SWPPP?

- Cover/title page
- Project and SWPPP contact information
- Site and activity description, including a site map
- Identification of potential pollutant sources
- Nature of construction activity
- Description of controls to reduce pollutants
- Maintenance/inspection procedures
- Records of inspections & maintenance of BMPs
- SWPPP amendments
- SWPPP certification

The key to a successful SWPPP is proper site assessment and analysis!

Basics of a SWPPP

- Narrative
  - Existing Site Conditions: soil types, slopes, slope lengths, drainage patterns, and other topographic features.
  - Construction Schedule
  - Rainfall Data
  - Pollution prevention strategies & responses
- Drawings and notes
  - Where & when BMPs installed
  - BMP performance goals
  - Maintenance procedures & standards

SWPPP Objectives

- Stabilize the site as soon as possible
- Protect slopes and channels
- Reduce impervious surfaces
- Promote infiltration
- Control the perimeter of the site
- Protect receiving waters adjacent to the site
- Follow pollution prevention measures
- Minimize the area and duration of exposed soils

General Principles

- Retain duff layer, tundra, native topsoil & vegetation
- Source control: preventing erosion is easier and cheaper than managing sediment
- Divert run-on / runoff
- Creativity is a BMP

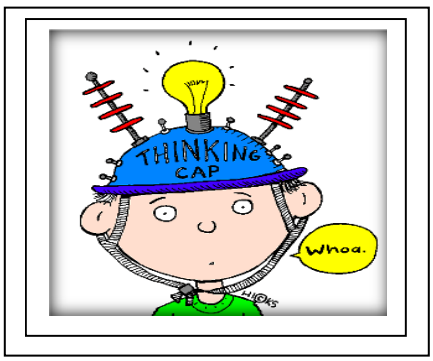
SWPPP Roles and Responsibilities

- Who is on the storm water pollution prevention team?
- Who will install structural storm water controls?
- Who will supervise and implement good housekeeping programs?
- Who will conduct routine inspections of the site?
- Who will maintain the BMPs?
- Who is responsible for documenting changes to the SWPPP?
- Who is responsible for communicating changes in the SWPPP?
    - The SWPPP must describe who is responsible for what and when.

SWPPP Format

- DEC has a SWPPP template and checklist. A SWPPP must be customized for the project. The risks associated with the project tasks must be assessed and addressed.
- Many SWPPP elements are minimum permit requirements.
- The SWPPP must be certified by the responsible parties. Their contact information will be in the SWPPP and on the site posting.
    - The NOI ties an individual to the site's compliance
    - The SWPPP certification ties an individual to the site's management.

As an AK-CESCL, you will be an integral part of permit compliance. Keeping the site maps up to date and completing required logs will be part of the AK-CESCL's responsibility.



What is a BMP?

Best Management Practice

- Design BMPs
  - Fit the site into the terrain
  - Minimize slope length and steepness
  - Reduce the required site disturbance
- Procedural BMPs
  - Time major soil disturbance for dry season
  - Complete project in phases
  - Integrate erosion control and construction schedules
- Physical BMPs
  - Implementation of erosion & sediment control practices
  - Must be a supplement to; not replacement for design & procedural BMPs
- SWPPPs must include details for the BMPs used on the project. Without proper details and specifications, an inspector cannot do their job!

Storm Water and Erosion Control manuals have two main categories of BMPs

- Source Control BMPs: Prevent the problem (= erosion control BMPs)
- Treatment BMPs/ Runoff Conveyance: Treat the problem (=sediment control BMPs)

Take a Closer Look…

Erosion Control vs. Sediment Control

When developing a SWPPP, it is important to understand the difference between erosion control and sediment control. Erosion control measures (e.g., mulch, blankets, mats, vegetative cover) protect the soil surface and prevent soil particles from being dislodged and carried away by wind or water. Sediment control measures remove soil particles after they have been dislodged (typically through settling or filtration). It is usually easier and less expensive to prevent erosion than it is to control sedimentation.

What does this mean to me?

You should try to use erosion control BMPs as the primary means of preventing stormwater contamination, and sediment control techniques to capture any soil that does get eroded. Because no one technique is 100 percent effective, a good SWPPP will use both kinds of BMPs in combination for the best results.

Erosion control (keeping the dirt in place)

- Minimize disturbed area and protect natural features and soil
- Phase construction activity
- Control stormwater flowing onto and through the project
- Stabilize soils promptly
- Protect slopes

Sediment control (the second line of defense)

- Protect storm drain inlets
- Establish perimeter controls
- Retain sediment on-site and control dewatering practices
- Establish stabilized construction exits
- Inspect and maintain controls

ADEC Storm Water Guide

https://dec.alaska.gov/water/wastewater/stormwater/guidance/

DOT&PF Alaska Storm Water Pollution Prevention Guide

Best Management Practices Department-Specific Requirements
http://dot.alaska.gov/stwddes/desenviron/resources/stormwater.shtml

Most commonly and frequently used BMPs for construction sites include:

- Minimizing soil disturbance
- Preserving natural vegetation
- Good Housekeeping
- Mulch/Seeding
- Stockpile covers
- Silt fence
- Inlet protection
- Check dams
- Stabilized rock construction
- Entrances
- Sediment traps
- Fiber Rolls

VI. Part 1 Alaska Construction General Permit Required Control Measures

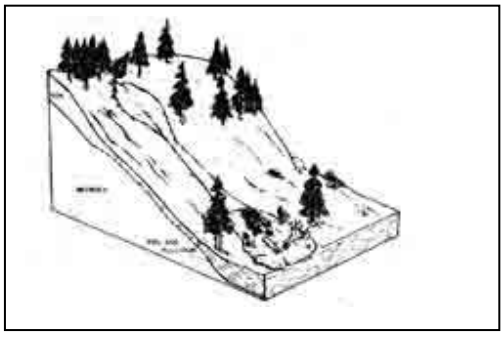
- **Delineation of the Site** 2021 CGP 4.2.1
  - The permittee must delineate the location of disturbed & preserved land.
  - Use a barrier that is appropriate for the site and conditions.

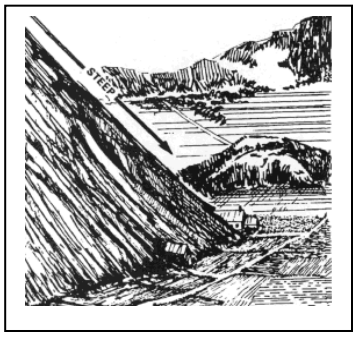
- **Minimize disturbed area** (this will also minimize the need for stabilization and inspection) 2021 CGP 4.2.2
  - Keep vegetation buffer zones in key locations
  - Stay out of critical areas
    - ✓ Tree Protection
      Protect the root zone from compaction
    - ✓ Phase / Sequence Construction
      Minimize the extent and duration of exposure and risk

- **Maintain Natural Buffer Areas** 2021 CGP 4.2.3
  - At stream crossings and around the edge of any waters of the U.S.
  - 25 feet minimum where feasible
  - Increase buffers at discharge locations

- **Control Storm Water Discharges & Flow Rates** 2021 CGP 4.2.5
  - Manage storm water around the site so it does not flow onto the project site and cause erosion (as long as it does not cause flooding and/or erosion offsite)
  - Slow it down or armor against the shear stress
  - Provide clean water diversions around work areas
  - Dissipate velocities at outlets and along conveyance channels *Note: conveyance channels may have design standards (Such as 2 year, 24 hour event)
  - Install outlet protection with the pipe / conveyance
  - Prepare for break up before winter shutdown
  - Avoid churn and suspension of previously settled sediments

- **Protect Steep Slopes** 2021 CGP 4.2.6
  - Slopes are prone to riling and gully formation
  - Track walking can reduce the erosion potential up to 55%
  - RECP's (rolled erosion control products)
    - ✓ Reduces rainfall impact
    - ✓ Helps establish vegetation
    - ✓ Protects planted soils from erosion
    - ✓ Enhances filtration
    - ✓ Traps sediment
    - ✓ Retains soils for root growth
    - ✓ Functional longevity & shear stress guide design
  - Break up slope length & direct flows off slopes

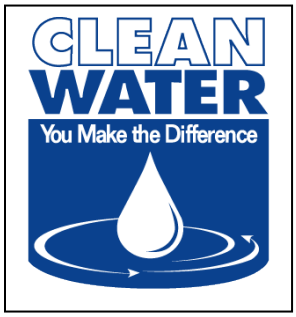




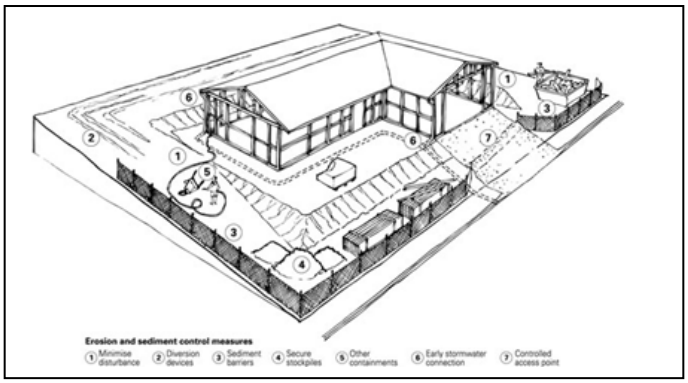
VII. Part 2 Alaska Construction General Permit Required Sediment Control

- **Storm Water Inlet Protection** 2021 CGP 4.3.1
  - Limited effectiveness for fine particles
  - Above grade ponds water; below grade filters water
    - ✓ Measures require continuous maintenance
    - ✓ Traffic can destroy protection measures

- **Water Body Protection Measures** 2021 CGP 4.3.2
  - Minimize sediment discharge to water on or near the site



- **Down Slope Sediment Controls** 2021 CGP 4.3.3
  - Must have BMPs downgrade of disturbed soils
  - Install per specification
    - ✓ Silt Fence
    - ✓ Wattles
    - ✓ Compost
    - ✓ Vegetated Buffer / Strip
    - ✓ Snow Berms



- **Stabilized Construction Vehicle Access & Exit Point** 2021 CGP 4.3.4
  - Tracked sediment must be removed to minimize off site impacts
  - Keep the tires on the rock
    - ✓ Track out is the result of driving through dirt and mud
    - ✓ No stabilized entrance can remove it all and prevent track-out
- **Vehicle Track-Out** 2021 CGP 4.3.5
  - Provide an effective way of minimizing off-site tracking
  - Remove all tracked-out sediment by the end of the same day

- **Dust Generation** 2021 CGP 4.3.6
  - Plan ahead for dust control
  - Demolition dust control must not pollute storm water
  - Consider wind barriers, privacy screens

- **Stockpile Management** 2021 CGP 4.3.7
  - Cover and protect with sediment trapping measures
  - Beware of increased flows from plastic cover
  - Install a sediment control measure along all down-gradient perimeter areas

- **Authorized Non-Storm Water Discharges** 2021 CGP 4.3.8
  - Minimize allowable discharges
  - Prevent pollution of the discharge

- **Sediment Basins** 2021 CGP 4.3.9
  - Required for 10 acre disturbances
    - ✓ Volume for a 2 year 24 hour storm event
  - May not settle out fine particles
  - Do not install a sediment basin in permafrost areas

- **Dewatering** 2021 CGP 4.4
  - Plan the activity
  - Comply with ADEC permit and give notice to ADEC as necessary
    - ✓ Less than 1,500 feet from a contaminated site or groundwater plume, waters of the U.S., or if it may adversely impact a local drinking water well.
  - Disperse the discharge; prevent discharge erosion

- **Soil Stabilization** 2021 CGP 4.5
  - Soils must be stabilized to prevent on-site erosion
  - Initiate stabilization as soon as practicable, according to following table

Mean annual precipitation	Number of days
40 inches or greater	Within 7 days
Less than 40 inches	Within 14 days

  - Applicable stabilization control measures include, but not limited to include
    a. Temporary and permanent seeding
    b. Sodding
    c. Mulching
    d. Rolled erosion control products
    e. Compost blanket
    f. Soil tackifier applications
  - "Immediately" means no later than the end of the next work day

- **Treatment Chemicals** 2021 CGP 4.6
  - The use of treatment chemicals to reduce sediment in a storm water discharge is allowed, provided all the requirements are met
  - Store all treatment chemicals in leak-proof containers with a cover surrounded by secondary containment structures

- Ensure proper training for all persons who handle and use treatment chemicals at the construction site

- **Prohibited Discharge** 2021 CGP 4.7
  - Washout wastewater from concrete
  - Waste water from stucco, paint and oils
  - Fuels, oils, or other pollutants
  - Soaps / solvents etc.

For concrete washout areas, remove hardened concrete waste when it has reached one-half (1/2) the height of the container or pit.

VIII. Part 3 Alaska Construction General Permit Requirements

Good Housekeeping

- **Washing of Equipment and Vehicles** 2021 CGP 4.8.1
  - Designate areas to be used for washing of equipment
  - Designated areas should be located to the extent practicable away from channels, inlets, and waters of the U.S.
  - Discharge of soaps and solvents is prohibited

- **Fueling and Maintenance Areas** 2021 CGP 4.8.2
  - Designate the area (site map)
  - Specify procedures for all operations
  - Train all personnel

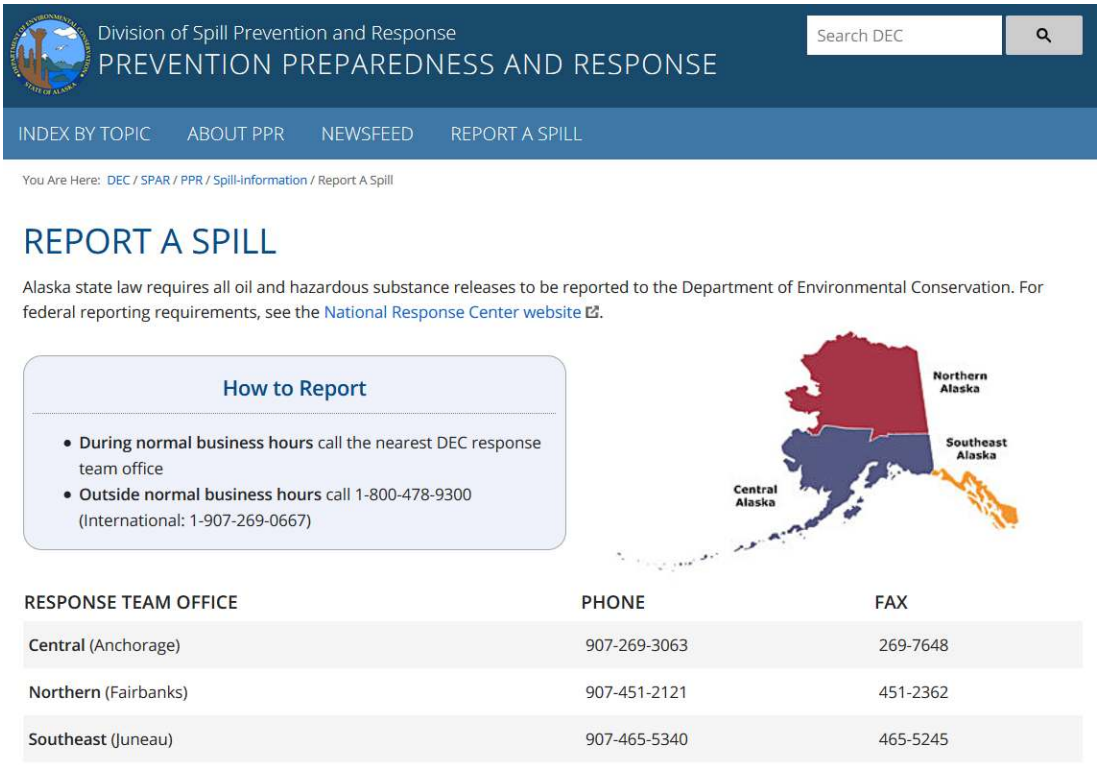
- **Staging and Material Storage Areas** 2021 CGP 4.8.3
  - Designate the area on the site map
  - If practicable, locate area away from storm water conveyance channels, inlets, and waters of the U.S.
  - Minimize the exposure of materials

- **Washout of Applicators/Containers used for Paint, Concrete, and other Materials** 2021 CGP 4.8.4
  - Designate areas to be used for washout
  - Direct all concrete, paint, and other material washout activities into a lined, water-tight container or pit

- For concrete washout areas, remove hardened concrete waste when it has reached one-half (1/2) the height of the container or pit and dispose of in accordance with Part 4.8.6

- **Storage, Handling, & Disposal of Waste** 2021 CGP 4.8.6
  - Locate areas dedicated for waste
  - Store all hazardous or toxic waste in appropriate sealed containers
  - Provide containment of sanitation facilities

- **Spill Notification** 2021 CGP 4.9
  - All oil and hazardous substance release must be reported to DEC Spill Prevention and Response



- **Winter Shutdown** 2021 CGP 4.12.1
    - Fall freeze-up and spring thaw anticipated dates must be identified in the SWPPP
    - Frozen ground by itself is not considered stabilization
    - You must ensure all conveyance channels, disturbed slopes, and stockpiles have temporary or final stabilization measures.

IX. Inspections

AK-CESCL creed: Create a paper trail that documents compliance with all permit conditions throughout the life of the project.

**All records will be kept a minimum of 3 years after the NOT is submitted.

The SWPPP must detail the inspection procedures

- ✓ Who will do inspections
- ✓ When will inspections be done
- ✓ How will problems be addressed
- ✓ What inspection form will be used

Inspection Frequencies

2021 CGP 6.1

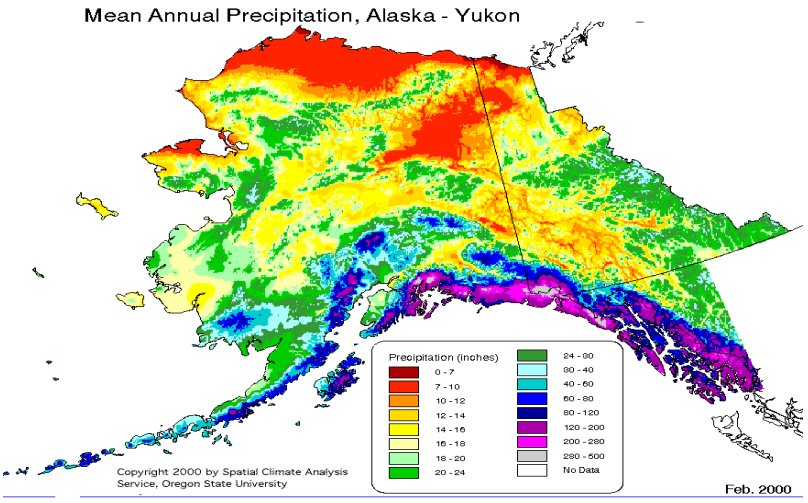
Three different inspection frequencies based on regional rainfall data.

Under 40 inches of precipitation per year

- Once every seven calendar days, or
- Once every 14 calendar days and within 24 hours of the end of a storm event that resulted in a discharge from the site

40 inches of precipitation or more per year

- Once every seven calendar days



Case by case reduced inspection frequency 2021 CGP 6.2

- Entire site must be temporarily stabilized
- Frequency of inspections may be reduced to at least once every calendar month (with minimum of 7 days separation between each monthly inspection), and
- Must inspect within 2 business days of storm discharge at actively staffed sites
- Going into winter shutdown 2021 CGP 6.2.3
    - Permittee may stop inspections 14 days after fall freeze-up date
    - Permittee must resume inspections at least 21 days prior to the anticipated spring thaw date
- Winter construction 2021 CGP 6.2.4
    - If the project is undergoing winter construction the inspection frequency can be reduced to once per month if runoff is unlikely due to continuous frozen conditions that are likely to continue at the site for at least three (3) months based on historic seasonal averages.
    - If unexpected weather conditions (such as above freezing temperatures or rain events) make discharges likely, the permittee must immediately resume a regular inspection frequency

Site Inspection 2021 CGP 6.4

During a site inspection, a permittee must inspect the following:

- Areas disturbed by construction activity
- Areas used for storage of materials that are exposed to precipitation
- Areas where control measures are installed and maintained (BMPs)
- Areas where pollutants have accumulated and may enter storm water
- Locations where vehicles enter or exit the site
- Areas where storm water typically flows

- Points of discharge from the site
- Portions of the site where stabilization measures have been initiated
- Any incidents of noncompliance observed and corrective actions taken

Inspection Report Form 2021 CGP 6.7

- Make sure your form meets all permit and contract requirements
- Consider developing your own form as DOT&PF did, see DOT&PF website for Form 25D-100

  See Example Inspection report in the Forms Packet
  - Inspection date
  - Inspector's name and qualifications
  - Weather data
    - ✓ Beginning & duration of storm events
    - ✓ Whether any discharges occurred
  - Locations of sediment or other pollutant discharges
  - Locations of control measures requiring maintenance
  - Locations where additional BMPs are needed
  - Corrective actions and complete by dates
- The Inspection must be signed in accordance with CGP Appendix A, Part 1.12. Review the certification language on the inspection report in the Forms Packet

Monitoring & Discharge to Impaired Water Body 2021 CGP 3.2 & 7.0

- Projects subject to CGP 3.2, Discharge to Impaired Water Body
- When discharging to a 303(d) listed Alaska water body for turbidity or sediment, *and*
- Disturbing 20 or more acres, a permittee must:
  - Develop and implement a written DEC approved analytical monitoring plan consistent with CGP 7.0
  - Obtain 2 representative samples during each discharge event (In safe conditions during operating hours)
  - Submit data to DEC

Corrective Actions 2021 CGP 8.0

- Must be taken when
  - An unauthorized release or prohibited discharge
  - Controls are not designed, installed or maintained
  - A required measure was never installed
  - Controls are not operating as intended
- Deadlines for Corrective Actions must be completed by: 2021 CGP 8.2
  A. For easy remedied = initiate within 24 hours from time of discovery
  B. For all other control measure = within 7 days unless infeasible

See example Corrective Action Log in the Forms Packet

Additional Documentation Requirements (Logs) 2021 CGP 5.8.2

- Grading & Stabilization Log
- The permittee must document the following:
  - Dates when grading activities occur
  - Dates when construction activities cease on a portion of the site, even temporarily
  - Dates when stabilization measures are initiated
  - Description of stabilization measures

See example Grading & Stabilization Activities Log in the Forms Packet

SWPPP Modifications (including site maps) 2021 CGP 5.9.1

- Whenever plans change
- When BMPs change
- When good housekeeping measures change
- If monitoring plans change
- Changes made in response to a corrective action
- If regulations require a change

SWPPP Amendment Log 2021 CGP 5.9.2

Must include the following:

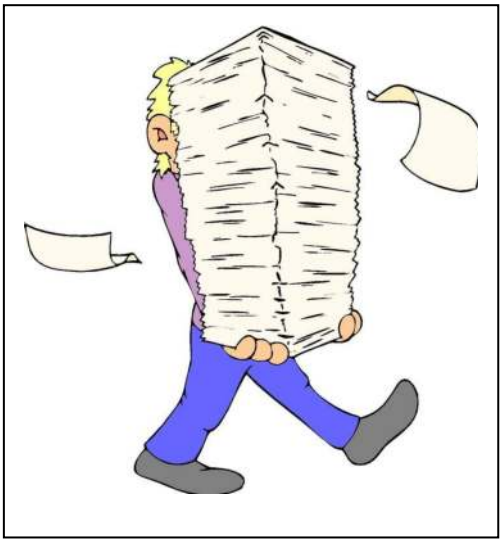
- Name of the person authorizing the change

- Brief summary of the change

See example SWPPP Amendment Log in the Forms Packet

Retention of Records 2021 CGP 9.4

- All records, logs, reports etc. must be kept for 3 years after NOT
  - Inspect thoroughly
  - Report accurately
  - Document the good aspects of the site
  - Record all corrective actions
- All records are discoverable at the request of credentialed officials; The public can request your records as well



Keep the records organized!

Do the records document compliance?

What Inspectors/Qualified Person/AK-CESCL's are required to do.

- Conduct and document inspections
- Assess BMP performance
- "I certify that this report is true, accurate, and complete, to the best of my knowledge and belief."
- Determine compliance with SWPPP & Permit
- Detail summary of remedial actions

What you will probably be expected to do

- Sampling
- Annual reporting

APPENDIX 1

ACRONYM LIST

AAC:	Alaska Administrative Code
AKART:	All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment
ADEC, DEC:	Alaska Department of Environmental Conservation
ADOT&PF, DOT:	Alaska Department of Transportation and Public Facilities
ADNR, DNR:	Alaska Department of Natural Resources
ADF&G:	Alaska Department of Fish & Game Habitat Division
AMC:	Anchorage Municipal Code
APDES:	Alaska Pollutant Discharge Elimination System
ATB:	Asphalt Treated Base
AWWU:	Anchorage Water and Wastewater Utility
BAT:	Best Available Technology
BART:	Best Available Reasonable Technology
BFM:	Bonded Fiber Matrix
BMP:	Best Management Practice
CESCL:	Certified Erosion and Sediment Control Lead
CESCP:	Contractor's Erosion and Sediment Control Plan
CESSWI:	Certifier Erosion Sediment and Storm Water Inspector
CFR:	Code of Federal Regulations
cfs:	Cubic Feet per Second
CGP:	Construction General Permit (A DEC general permit)
CISEC:	Certified Inspector Sediment and Erosion Control
CKD:	Cement Kiln Dust
CPESC:	Certified Professional in Erosion and Sediment Control
CTB:	Cement Treated Base
CWA, FCWA:	Federal Clean Water Act
DEC:	Alaska Department of Environmental Conservation

DMR:	Discharge Monitoring Report
ECTC:	Erosion Control Technology Council
EPA, USEPA:	United States Environmental Protection Agency
COE, CORPS, USACE:	United States Army Corps of Engineers
ESA:	Endangered Species Act
ESC:	Erosion and Sediment Control
ESCP:	Erosion and Sediment Control Plan
FAA:	Federal Aviation Administration
FEMA:	Federal Emergency Management Agency
FHWA:	Federal Highway Administration
FNSB:	Fairbanks North Star Borough
HMCP:	Hazardous Materials Control Plan
IECA:	International Erosion Control Association
LID:	Low Impact Development
MBFM:	Mechanically Bonded Fiber Matrix
MEP:	Maximum Extent Practicable
MGBTA:	Migratory Bird Treaty Act
MOA:	Municipality of Anchorage
MSGP:	Multi-Sector General Permit (A DEC general permit)
MS4:	Municipal Separate Storm Sewer System
MUSLE:	Modified Universal Soil Loss Equation
NEPA:	National Environmental Policy Act
NMFS:	National Marine Fisheries Service
NOEC:	No observed effects concentration
NOI:	Notice of Intent
NOT:	Notice of Termination
NPDES:	National Pollutant Discharge Elimination System
NRC:	National Response Center
NTU:	Nephelometric Turbidity Unit (Turbidity)
PAM:	Polyacrylamide

RECP:	Rolled Erosion Control Product (blankets, TRMs Open Weave Textiles)
RUSLE:	Revised Universal Soil Loss Equation
SHPO:	State Historic Preservation Office
SPCC:	Spill Prevention Control & Countermeasures
SWMM:	Storm Water Management Manual
SWPPP:	Storm Water Pollution Prevention Plan
SWTP:	Storm Water Treatment Plan
TESC:	Temporary Erosion and Sediment Control
TMDL:	Total Maximum Daily Load, also **"303D Listed"** or **"Impaired"** waterways
TRM:	Turf Reinforcement Mat
UIC:	Underground Injection Control
USC:	United States Code
USCG:	United Stated Coast Guard
USDA:	United States Department of Agriculture
USF&WS:	United States Fish & Wildlife Service
WMS:	Watershed Management Services MOA
WQ:	Water Quality

APPENDIX 2

ALASKA CONSTRUCTION

GENERAL PERMIT