

# Erosion Control BMPs for Construction Site Storm Water Runoff Control

One of the pollutants contributing to storm water pollution that most people are unaware of is sediment. Sediment contains nitrogen, phosphorous and possibly other contaminants. When rain carries sediment into our local streams and Humboldt Bay, nitrogen and phosphorous trigger algae growth which reduces water clarity, depletes oxygen, creates odors and leads to fish kills. Just the mere presence of extra sediment in our streams and Humboldt Bay increases turbidity (cloudiness) which reduces photosynthesis and food production. Sediment deposition also destroys fish habitat and spawning areas.

The main goal is to prevent erosion before it happens. Erosion control is typically 90-98% effective. Erosion control measures should be supplemented with sediment control measures in case erosion does occur. All new development and redevelopment projects that could possibly cause sediment runoff from disturbed areas into the storm drain system or watercourse should consider the use of the following Best Management Practices:

- **Scheduling** will reduce the amount of soil exposed and the duration of its exposure to wind, rain and vehicle tracking.
  - **Scheduling:**
    - Incorporates the use of a schedule or flow chart to layout the construction plan.
    - Works out the sequencing and time frame for the initiation and completion of tasks such as site clearing, grading, excavation, pouring foundations, installing utilities, etc.
    - Incorporates erosion and sediment control BMPs.
    - Minimizes land disturbing activities scheduled between October and April. Extra BMPs should be implemented during these months to protect the site from erosion.
    - Should avoid major grading operations between October and April.
    - Should allow enough time before rainfall begins to stabilize soil with vegetation or physical means (i.e. installing temporary sediment trapping devices).
  - **Limitation:**
    - None
- **Erosion Control Blankets** decrease soil compaction, protect disturbed soil from rain impact, increase water infiltration, protect seeds from runoff and moderate soil temperature to enhance vegetation growth.
  - **Application:**
    - Erosion control blankets or geotextiles should be used on slopes steeper than 3:1 and where the erosion hazard is high.
    - Make sure that the blanket or textile is properly anchored.
    - They definitely should be used on slopes adjacent to sensitive areas such as streams, wetlands or other bodies of water.
    - The blankets or geotextiles should be used in disturbed areas where the plants are slow to develop.
    - All blankets and geotextiles should be periodically inspected throughout the course of construction.
    - They should be inspected after heavy rain events for erosion and undermining. Any failures should be repaired immediately.
    - If a washout or breakage occurs, repair damage to the slope and then re-anchor or re-install.
    - The benefit of erosion control blankets as opposed to hydraulic seeding or mulch is that they're effective immediately.
  - **Limitation:**
    - They're usually more expensive than other erosion control measures because of high material and labor costs.
- **Hydro-mulching/Hydroseeding** is a planting technique that employs a wet slurry of seed, mulch fiber, fertilizer and water allowing for rapid plant growth on disturbed areas.
  - **Application:**
    - Mulch is mixed in a tank along with water seed and fertilizer.
    - When sprayed on the ground or on a slope, a continuous blanket will form that will hold seeds in place and retain soil moisture.
    - On steep slopes and slopes susceptible to wind, the mulch should be hydraulically applied or straw mulch should be appropriately anchored.
    - To prevent displacement by wind, hydraulic fiber mulches and/or tackifying agents are useful.
    - When applying, make sure the coverage is consistent. All areas should look the same.
    - Different types of mulches include: vegetable fibers, wood bark chips, hydraulic mulches from recycled paper, hydraulic mulches from wood fiber and hydraulic bonded fiber matrices.
  - **Limitation:**
    - Hydraulic mulches and seeding take 24 to 48 hours before they're effective as erosion control measures.
- **Fiber Rolls** are composed of biodegradable fibers stuffed into a photo-degradable open weave netting. They allow water to pass through the fibers and trap suspended sediment, increase filtration rates, slow runoff and reduce erosion.
  - **Application:**
    - Fiber rolls can be used along the face of exposed slopes to shorten slope length and decrease flow velocity.
    - They are very useful at grade breaks where slopes transition to a steeper slope.
    - They also can be used along stream banks to assist stabilization and in drainage swales to slow flows.
    - They should follow the contour lines of the slope and be overlapped.
    - Any split, torn, unraveled or slumping fiber rolls should be repaired or replaced.
    - During prolonged rainfall, they should be inspected daily and repaired when necessary.
    - In most cases, fiber rolls do not need to be removed and can be abandoned in place.
    - If they are not excessively soiled after landscaping is in place, they can be removed and reused.
  - **Limitation:**
    - Fiber rolls are not effective for high surface flows or long and steep slopes.
    - Their primary purpose is not sediment control, although they do provide some sediment removal.
    - They should be used along with other sediment control measures.

## Erosion Control BMPs (continued)

- **Slope Grading** reduces erosion potential by decreasing runoff velocities, trapping sediment and allowing an increase in water infiltration into the soil.
  - *Application:*
    - In order to facilitate the long-term stabilization of vegetation, all construction slopes should have the surface roughened, stair-step graded or terraced.
    - Surface roughening will benefit seeding, planting and mulching.
    - Stair step grading is applicable to gradual slopes of non-sandy soils.
    - Any sort of terracing is usually permanent. Therefore, terracing should be designed based on the site conditions and approved by a registered engineer.
  - *Limitation:*
    - Roughening may increase costs and result in sloughing with certain soil types.
    - Relying solely on roughening for temporary erosion control can result in limited effectiveness during intense rain events. Therefore, roughening should be used in conjunction with other erosion control measures such as seeding and mulching.
    - For sandy soils or very shallow or steep slopes, stair-step grading may not be practical.
- **Construction Site Entrance/Exit** should be stabilized to reduce the tracking of mud onto public roads by construction vehicles.
  - *Application:*
    - Stabilized construction site access should be created for any sites where mud or dirt can be tracked onto public roads, where dust can be problematic during dry weather and on sites adjacent water bodies.
    - A stabilized construction entrance is a pad of aggregate underlain with filter cloth.
    - The purpose is to reduce or eliminate sediment being tracked onto public roadways by construction vehicles.
    - They are moderately effective in removing sediment from vehicles leaving a construction site.
    - If sediment is still being tracked onto public roadways after the entrance has been stabilized, a tire wash should be considered. A tire wash is a ditch filled with aggregate and underlain with a fiber cloth.
    - A drainage ditch needs to be built to convey water from the tire wash to a sediment trapping area.
    - A hose with an automatic shutoff nozzle should be used to wash off tires.
  - *Limitation:*
    - A stabilized entrance requires periodic top dressing of additional stones.
    - They can be expensive especially when used in conjunction with a tire wash because a sediment trap of some kind must be provided to collect runoff.
    - Another limitation of a tire wash is that a double wide access is required to avoid having non-construction vehicles driving through the tire wash.
- **Water Conservation Practices** on construction sites reduces the potential for erosion and the transport of pollutants off site.
  - *Application:*
    - All water equipment should be kept in good working condition.
    - All water equipment should be inspected at least twice weekly. Repair all water leaks immediately.
    - Irrigation controllers need to be reset according to seasonal needs. Avoid using water to clean construction areas.
    - Sweep paved areas whenever practical.
    - All construction water runoff should be directed to areas where it can be soaked into the ground.
    - When washing vehicles and equipment, a commercial washing facility should be used whenever possible.
    - Washing of equipment on the construction site should be discouraged. If vehicle and equipment washing is done on site, minimize water use, retain all runoff on-site and do not use soaps or chemicals.
  - *Limitation:*
    - None
- **Landscape Management** can reduce erosion, decrease sediment runoff and prevent pollution. The proper use of soil, materials and chemicals used in landscaping can decrease the discharge of pollutants and sediment into the storm drains and waterways.
  - *Application:*
    - Native, non-invasive, drought tolerant and pest tolerant vegetation should be used whenever possible.
    - Minimize the use of chemicals by purchasing less toxic alternatives and using only the minimum amount necessary.
    - Landscaping materials should be stored under tarps to protect them from wind and rain.
    - All landscape related grading and excavation should be scheduled for dry weather.
    - All areas being revegetated should be inspected for establishment of new vegetation and replanted when necessary.
    - Check dams or ditches should be used to divert runoff away from storm drains.
    - Storm drains inlets should be protected with sediment control measures.
  - *Limitation:*
    - Native, non-invasive, drought tolerant and pest tolerant vegetation may not be readily available from suppliers.
- **Preservation of Existing Vegetation** serves as an effective form of erosion and sediment control.
  - *Application:*
    - Before any project begins, efforts should be made to preserve existing vegetation.
    - Clearly mark areas not to be disturbed with construction fencing at all times.
    - All contractors on site should be notified where these areas are.
    - Any damage to these areas must be repaired in accordance with the landscaping plan.
  - *Limitation:*
    - Protecting existing vegetation requires planning and may restrict the area available for construction activities.