The Monthly Dirt
A monthly newsletter on the California Construction General Permit

ASSESSING THE SOURCE

Be A Pollutant Detective

What's a big disconnect SWPPP writers have with their projects? While some SWPPP writers may have a good handle on erosion and sediment theory, when it comes to what happens on a construction site, they can be clueless. Their ignorance about construction activities and sources is primarily because they have never worked at a construction site, other than possibly performing a quick storm water inspection. In this edition of **The Monthly Dirt**, we hope to provide some links between the various trades involved in the construction industry, what they do, and the materials they use on the jobsite. This will then provide insight into the pollutant sources associated with each of these trades, which in turn will help a SWPPP writer associate specific pollutants to the activities and trades on site.

There are a lot of trades associated with a single construction project. For example, a housing subdivision project would involve heavy equipment operators, concrete workers, plumbers, carpenters, electricians, drywall installers, HVAC installers, roofers, glaziers, stucco installers, painters, flooring installers, masons, cabinetry installers, landscapers, and probably quite a few more not listed. A roadway project could include demolition contractors, heavy equipment operators, carpenters, steel workers, welders, crane operators, concrete workers, electricians, painters, and landscapers. Each of these trades come with their own set of pollutant sources and challenges to maintaining good water quality for construction site runoff. Do you see a common pollutant which could be associated with multiple trades? For instance, solid waste (or trash) is one of the most reoccurring pollutant sources. This is because every trade has a waste product of some sort, whether it is the wrapping around a pallet of material, the bag containing a powdery substance such as concrete, debris generated from demolition, the spent absorbent used to clean up an oil spill, or just the wrapper from the breakfast burrito that was consumed that morning. But it can get a bit confusing. Is trash a pollutant or a pollutant source? It is both. Trash itself is a pollutant. However, trash is also a pollutant source. The decomposition of paper trash can increase the Biological Oxygen Demand (BOD) in runoff water and lower dissolved oxygen content in the receiving water. Plastic waste will degrade into microplastics that threaten wildlife and even human health. But trash is a carrier for just about any pollutant found on a construction site, because solid waste comes into contact with most of the materials that are used or wastes that are generated at a project site. A residue of the previously stored material will remain on the packaging or items that came into contact with the pollutant. Whether trash is deposited on the ground or is placed in an uncovered waste bin, if exposed to storm water, the pollutant residue will be mobilized from the discarded items. While the generation of trash and solid waste cannot be eliminated from a construction project, actions can be taken to minimize the impact of solid waste on water quality.

Many of the trades' work involve materials or activities that may alter the pH of the storm water discharge. Some of these cause pH to be lowered by exposure to acids or materials that have a low pH. Acids are oftentimes utilized in concrete and masonry work to clean or prepare surfaces. Acid can also be used as a retarder in a concrete mixture to slow down the concrete hardening process. However, more often than not, pH is altered upward with the use of caustic materials on the project. Most cementitious materials will have a high pH or caustic properties. Obviously, concrete work has the potential to raise the pH of storm water runoff, but so does work involving stucco, tiling, masonry, and lime treating soils. Not only do new concrete materials cause pH to be altered, but old materials may also influence storm water pH levels when they are cut, ground, or demolished. This includes slurry and water runoff from concrete cutting and grinding operations. When it comes to erosion accelerators and sources of sedimentation, the finger of blame often gets pointed to the heavy equipment operators. While it is true that nothing can disturb soil like the giant wheeled scrapers or a tracked excavator, there are many other culpable parties present at a construction site when it comes to sedimentation issues. Every pickup truck or pair of work boots that crosses from an area of soil disturbance to a paved surface is a potential source of sediment track-out. For the various trades, there are a lot more pollutants like metals, solvents, cleaners, detergents, paints, adhesives, welding

compounds, lubricants, and a host of other things contractors might use in the performance of their jobs. If you want to get a better idea of what these materials might include, go visit your local hardware store and peruse the stocked shelves by department. There is a myriad of chemicals and products that are used for construction that you probably have never considered being present on a jobsite—and that is just in the plumbing section of the store! The degree to which these materials might be a pollutant source depends largely on their exposure to storm water: when and how they are stored, used, or discarded. An adhesive which arrives to the jobsite in the back of a van, contained in a tube, and used exclusively for interior construction may only be a concern as a solid waste when the empty tube is discarded. But a concrete colorant admixture contained in totes or buckets and stored and used outside will, therefore, have a much greater exposure to storm water. However, even with the most diligent site management, accidents do happen. Small and large spills of materials brought to the jobsite will occur. While many spills are accidental, some are due to negligence, others to ignorance, and some are even intentional.

As we discussed about trash, sometimes the pollutant is obvious and is one and the same as the pollutant source. But other times, we know we have a source of storm water pollution, but we are not quite sure what the actual pollutant is. In fact, there might be many pollutants that are associated with a single pollutant source. Take, for example, a leak or spill of gasoline. While it is quite easy to point to the source (spilled gasoline) and see the results on the surface of the storm water runoff (an oily sheen), it is not a simple matter to identify that actual pollutants, which are many and varied. Gasoline has at least 150, and for some blends up to 1,000, volatile organic hydrocarbon compounds (VOCs) and semi-volatile organic compounds (SVOCs). Similarly, if we are concerned about metals affecting water quality, we need to know which ones and in what form. There are more than twenty different metals (e.g., aluminum, antimony, barium, cobalt, copper, iron, mercury, silver, zinc, etc.) that can be present in water either in a dissolved state or as particulate matter. So, before we start the somewhat arduous process of identifying pollutants, let's categorize the pollutants by what they do to water quality. This will help us determine if the potentially present pollutants are a threat to the water quality of the site's runoff and the nearby receiving waters. The first thing to understand is that not all "pollutants" are actually pollutants but are conditions caused by other pollutants.

Common Pollutant Categories

Sediment: comes in two forms: settleable and suspended. Heavier particles will settle out when the flow of water slows. As water velocity decreases, the heavier and coarser materials will fall out first, then as water continues to slow, smaller and smaller particles will drop out. But not all sediment can or will be captured from traditional sediment control devices such as fiber roll or silt fence. Very fine particles, such as clays and silts, can stay in suspension for long periods of time.

pH Altering: pH is a condition caused by pollutants that are either acidic or basic (caustic). Acids may be present naturally in some soil types and organic materials. In certain regions, acid rains resulting from natural or environmental factors may also contribute to low pH of storm water runoff causing aluminum to leach from soil clay particles and having a negative effect on fish and wildlife. Bases may originate from natural sources, such as groundwater or springs, and certain soil types. While there is not too much that can be done to prevent these natural or regional pH altering sources, we do need to pay attention to construction-related sources of acids and bases. Acids may be used in cleaning surfaces (particularly concrete and masonry surfaces) and as a retarder for concrete hardening, and, of course, acids are present in vehicle and equipment batteries. Bases are far more commonly found on construction projects and come in the form of cements, stucco, grout, and other cementitious materials. Many cleansers and detergents are caustics that elevate pH. Soil conditioning amendments such as lime can also cause elevated pH.

Oxygen Consumers: These are pollutants that directly or indirectly cause low dissolved oxygen (DO) or elevated BOD or COD. This may come from oxidizer chemicals, such as peroxides, bleach, and chlorine, used on-site to sanitize drinking water systems or in cleaning products. Oxidizers will increase COD. Decomposing organic debris, compost, and paper trash can cause increased BOD. Fertilizers and other sources of ammonia, nitrates, and phosphates (nutrients) can promote algae growth that will consume more and more dissolved oxygen as its population increases.

Dissolved Solids: These are solids that will go into solution when added to water. They are typically dry and liquid forms of salts. On a construction site, salts may be found in concrete admixtures, fertilizers, some dust suppressants (such as magnesium chloride), and, in colder environments, deicing agents.

Metals: Metals come from a myriad of different sources at a construction site. They can be natural occurring or in the pre-construction soils present at the site. For example, clays tend to be high in aluminum and iron concentrations. But there are plenty of construction-related sources as well, including: grinding, drilling, cutting, pounding, sand blasting, and welding of metal surfaces and structures; wear and tear of brakes, tires, tracks, and other moving parts on heavy equipment; and the cutting and sanding of treated wood. Metals are also present in most new and used lubricants, surface coatings, roofing materials, cementitious materials, and concrete admixtures. They are literally everywhere on a construction site! Metals can occur in two different phases: dissolved and particulate. Although there most certainly will be an amount of dissolved metals present, particulate metals are far more abundant. For the most part, if you can control the particulate form, you will be able to effectively manage the dissolved form.

Oils: Sources of oil at a construction site include fuels, oils, and lubricants used for vehicles and equipment; oils used in paving; pipe cutting oils; form oil for concrete work; surface sealers; and lubricants, rust-inhibitors, and oil-containing chemicals used by various trades. Oil will be manifested as a pollutant by a visible rainbow sheen.

Toxics: Can include materials that are part the oil pollutant category but also include other chemicals that are typically found in solvents, admixtures, surface coatings, cleansers, detergents, antifreeze/coolant, pesticides, and other chemicals present on a construction site. Included in the toxics category are legacy pollutants such as DDT, asbestos, lead paint, or polychlorinated biphenyls (PCBs) that may be exposed to storm water via grading of contaminated soils or demolition of structures or surfaces that contain them.

Pathogens: Bacteria and viruses which come into contact with storm water from on-site sources, such as sewage and sanitary sewer lines, portable sanitation facilities, and contaminated soil and surfaces (including solid waste), as well as natural sources.

Please contact us if you have any questions ...

The Monthly Dirt

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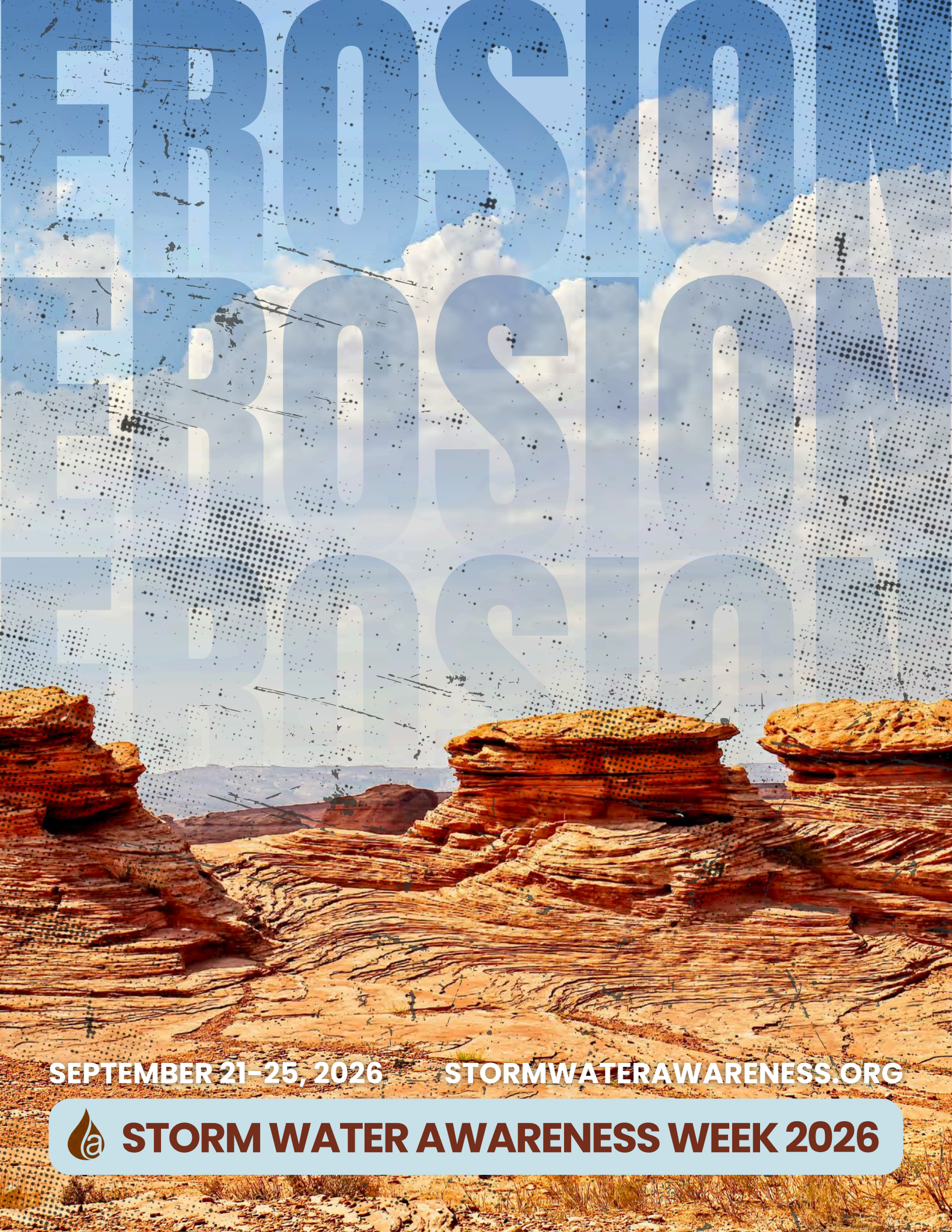
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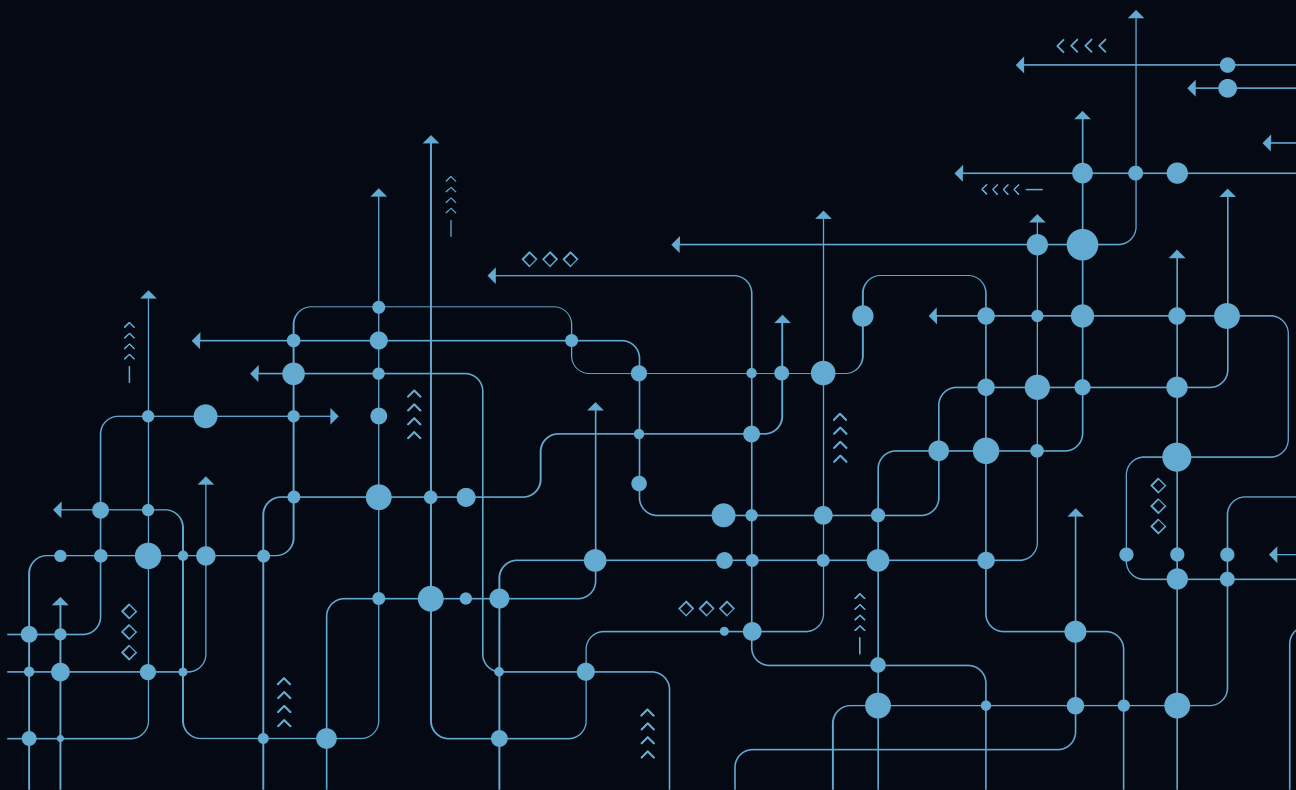

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