

## Urban Runoff

Some unfortunate consequences of our “civilized” society, population growth, and the desire of people to live near the ocean are dense development with a lot of paved, impervious surfaces. All this paving makes for efficient flow of water (and pollutants carried by the water) to rivers, lakes, and the ocean. Even during extended periods of dry weather, continuous streams of water flow off of paved areas from activities such as landscape irrigation, car washing, hosing off sidewalks and driveways, and industrial discharges. Contrast this to the “pre-development” condition of no dry weather runoff, lots of areas where water could percolate into the ground, and natural wetlands to filter out and biodegrade the small amount of animal waste, and you can see why the ocean isn’t as clean as it used to be.

As an example of current regulatory agency thinking regarding urban runoff, the following are nearly verbatim findings from a recently enacted Municipal Waste Discharge Permit issued by the San Diego Region of the California Regional Water Quality Control Board:

1. **Urban runoff is a waste** that contains pollutants and adversely affects the quality of waters of the State.
2. **Urban runoff discharges from municipal storm sewer systems are a leading cause of water quality impairment throughout the United States.** There is a strong correlation between “urbanization” and impacts to receiving water quality. In general, the more heavily developed the area, the greater the impacts to receiving waters from urban runoff.
3. **Urban development increases pollutant load, volume, and velocity of runoff.** During urban development two important changes occur. First, natural vegetated pervious ground cover is converted to impervious surfaces such as paved highways, streets, rooftops, and parking lots. Natural vegetated soil can both absorb rainwater and remove pollutants, providing a very effective purification process. Because pavement and concrete can neither absorb water nor remove pollutants, the natural purification characteristics of the land are lost. Secondly, urban development creates new pollution sources as human population density increases and brings with it proportionately higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, and trash which can either be washed or directly dumped into municipal storm sewer systems leading to the ocean.
4. **Water quality degradation increases with percent imperviousness.** The increased volume and velocity of runoff from developed urban areas greatly accelerates the erosion of downstream natural channels. Numerous studies have demonstrated a direct correlation between the degree of imperviousness of an area and the degradation of its receiving water quality. Significant declines in the biological integrity and physical habitat of streams and other receiving waters have been found to occur with as little as a 10% conversion from natural to impervious surfaces. Today “% impervious coverage” is

believed to be a reliable indicator and predictor of the water quality degradation expected from planned new development.

5. **Urban runoff is a human health threat.** Human illnesses have been clearly linked to swimming or surfing near storm drains flowing to coastal beach waters that contain high concentrations of bacteria and viruses. Such flows often result in the posting or closure of local beaches. Pollutants transported to receiving waters by urban runoff can also enter the food chain, where they can “bioaccumulate” and “biomagnify” as predators eat lower life forms. This has occurred with pollutants including DDT, PCBs, and heavy metals.
6. **Urban runoff causes beneficial use impairment.** The discharge of pollutants and increased flows from municipal storm sewer systems can cause the concentration of pollutants to exceed receiving water quality objectives and impair or threaten to impair designated beneficial uses, causing habitat degradation. The discharge of urban runoff may also impact the physical habitat of receiving waters through erosion.
7. **A change in the storm water management approach is needed.** In contrast to the conventional “conveyance” approach, a more natural approach to storm water management seeks to filter and infiltrate runoff by allowing it to flow slowly over permeable vegetated surfaces. By preserving and restoring the natural hydrologic cycle, filtration and infiltration can greatly reduce the volume/peak rate, velocity, and pollutant loads of urban runoff. The greatest opportunities for changing from a “conveyance” to a more natural management approach occur during the land use planning and zoning processes and when new development projects are under early design.

Storm water systems, consisting of gutter drains, open storm water drainage channels and underground storm sewers, are designed primarily to prevent flooding problems. Water typically flows by gravity to a low spot, generally the ocean. A basic design principal of storm water systems is to get the rainwater and other urban runoff away from residential, commercial, and industrial areas as fast as possible, and discharge it to a creek, river, or directly into the ocean. Civil engineers design these systems to be water superhighways. The water receives no treatment before it enters the receiving water body, which might be your favorite beach. So any water running off the streets and gutters, off business properties, off of your lawn and driveway, carrying with it animal waste, pesticides, fertilizer, leaked automotive fluids, brake lining residues, and general litter, will end up at the beach.

During dry weather, any water flowing in a gutter or surface drain should be looked at with suspicion. Before humans arrived on the scene with our cities, associated infrastructure, and miles and miles of pavement, there was no dry weather urban runoff. Hence, there was no flow to flush pollutants down to the beach. Even in wet weather, undeveloped land and wetlands allowed infiltration and natural cleansing of runoff. Now, drainage channels have become ugly pseudo rivers that nearly always have water.

What can you do? The most important message for us is to simply turn off the tap. Use as little water as possible. Don't over-water your lawn. Adjust your sprinklers to avoid

watering the pavement (it won't grow). Commercial car washes generally contain and recycle their water. If you do wash your own car, use as little water as possible and try to divert it to non-paved areas. Fix fluid leaks from your car. Pick up your pet waste. Don't over-fertilize your lawn and avoid the use of insecticides and herbicides (weed killers). Use a broom instead of a hose. Encourage these practices by your friends. Be on the lookout for water flowing down the gutter and if you find the source, see if you can educate the perpetrator to use more environmentally-friendly practices.

Increasing concern about water quality problems caused by urban runoff, has lead the EPA, state, and local water quality regulators to issue tougher National Pollutant Discharge Elimination System (NPDES) permits to cities and counties. These new permits will force an increased scrutiny of the planning process for new development and redevelopment so that less urban runoff is generated. All aspects of our urban lifestyle and sources of runoff (from construction sites, industrial properties, commercial properties, and residences) will be evaluated and appropriate changes in planning, design, construction and daily modes of behavior will be mandated. You can help by setting an example for others and by becoming involved in the planning process for projects where you live.