

**1 - Title: Stormwater quality associated with a full silt trap discharging into an urban watercourse**

Author(s): Scholz M, Zettel S

Source: WATER AND ENVIRONMENT JOURNAL 18 (4): 226-229 NOV 2004

**Abstract:** The aim of this project was to assess the influence of a full silt trap on the quality of stormwater which was discharged into an urban watercourse. The average SS concentrations of the outflow were 2.0 and 34.1 mg/l during dry-weather and wet-weather conditions, respectively, and SS concentrations of up to 141.6 mg/l were recorded during storms. Treated stormwater SS concentrations were often high, compared with secondary sewage-treatment standards of less than or equal to 30 mg/l. Pollutants accumulated in the silt trap.

**Reaction** – This is one is a about a very specific trap. so it might meet our criteria of focusing on a general BMP.

**2 - Title: Runoff capture and delivery curves for storm-water quality control designs**

Author(s): Guo JCY, Urbonas B

Source: JOURNAL OF WATER RESOURCES PLANNING AND MANAGEMENT-ASCE 128(3): 208-215 MAY-JUN 2002

**Abstract:** A storm-water quality control system consists of trickle channels and water quality control basins (WQCB). To be economical, a WQCB is often designed to capture rainfall events smaller than extreme events. In current practice, the design rainfall statistics and runoff capture rates for sizing a WQCB have to be derived from the local long-term continuous rainfall record. Such a rainfall-runoff simulation process is lengthy and time-consuming. In this study, the analyses of 30- to 40-year continuous rainfall data recorded from seven metropolitan areas in the United States indicate that the frequency distribution of rainfall event-depths can be described by an exponential decay function. Applying the exponential distribution to a complete rainfall data series, the normalized runoff capture curve is derived in this study to describe the nonexceedance probability distribution of runoff depths. Similarly, the normalized runoff delivery curve is also developed to describe the nonexceedance probability distribution of runoff rates. These two curves provide necessary and important design information by which both the trickle channel and the WQCB can be sized on a consistent basis of overflow risk.

**3 - Title: Seasonal first flush phenomenon of urban stormwater discharges**

Author(s): Lee H, Lau SL, Kayhanian M, Stenstrom MK

Source: WATER RESEARCH 38 (19): 4153-4163 NOV 2004

**Abstract:** California's climate, typified by winter and spring precipitation and summer drought, is often called a Mediterranean climate, and creates a long period for pollutant build-up. The initial storms of the winter season usually have higher pollutant concentrations, which is called a seasonal first flush. To investigate the existence of a seasonal first flush, we analyzed four major data sets, collected over the 1999-2000 to 2002-2003 wet seasons. Trends in seasonal loads were quantified by plotting pollutant concentrations or cumulative pollutant load versus cumulative rainfall or cumulative runoff volume. Pollutant concentrations in the first part of the wet season were ranged from 1.2 to 20 times higher than concentrations near the end of the season, and mass emission rates were similarly higher at the beginning of the season. A seasonal first flush existed for most cases and was strongest for organics, minerals and heavy metals except lead. This result suggests that applying treatment Best Management Practices (BMPs) early in the season could remove several times more pollutant mass than randomly timed or uniformly applied BMPs.

**Reaction** – This isn't about rivers but it talks about first flush... which is a very important urban runoff issue.

**4 - Title: Determining urban storm water BMP effectiveness**

Author(s): Strecker EW, Quigley MM, Urbonas BR, Jones JE, Clary JK

Source: JOURNAL OF WATER RESOURCES PLANNING AND MANAGEMENT-ASCE 127 (3): 144-149 MAY-JUN 2001

Abstract: The goal of this U.S. EPA-funded cooperative research program with the ASCE is to develop a more useful set of data on the effectiveness of storm water best management practices (BMPs) used to reduce pollutant discharges from urban development. BMP monitoring data gathered at a particular site should not only be useful for that site, but also need to be useful for comparing the effectiveness of similar and different types of BMPs at other locations. Most BMP effectiveness studies in the past have provided data that is difficult, if not impossible, to use in comparing BMP design effectiveness and in the selection among individual BMP types to meet desired goals. This paper describes some of the comparability problems encountered between different BMP effectiveness studies. Also discussed are considerations that affect data transferability, such as methods used for determining efficiency and statistical significance. It outlines the efforts used to establish and analyze the currently available data and proposes protocols for future analyses, when more studies that have data are available. Finally, it recommends that effluent quality appears to be a much more robust measure of BMP efficiency than the currently used "percent removal" metrics.

**Reaction** – This isn't about rivers but it talks about first flush... which is a very important urban runoff

**5 - Title: Hydrological and fiscal impacts of residential development: Virginia case study**

Author(s): Bosch DJ, Lohani VK, Dymond RL, Kibler DF, Stephenson K

Source: JOURNAL OF WATER RESOURCES PLANNING AND MANAGEMENT-ASCE 129 (2): 107-114 MAR-APR 2003

Abstract: This study examined hydrological and fiscal effects of residential growth patterns in Virginia. Eleven scenarios that consider a fixed increase in population and vary housing arrangement within a tract (tract form), tract arrangement within the watershed (tract pattern), and shared open space land cover were examined. The analytical tools included a geographic information system, a statistical land value model, tract development budgets, and a hydrological model (HSPF). Low density development has the greatest hydrological impact due to highest per capita impervious area. Varying tract form has more impact on land values and tax receipts than varying tract pattern. Low density development has the highest increase in revenues net of public sewer, water, and education (bus transportation) costs. Higher density settlements reduce hydrological impacts but bear a high cost to local governments in reduced property tax revenues.

**Reaction** – This is a Virginia case study... it brings fiscal impacts into it... interesting!

**6 - Title: Changes in runoff due to stormwater management pond regulations**

Author(s): Fennessey LAJ, Hamlett JM, Aron G, LaSota D

Source: JOURNAL OF HYDROLOGIC ENGINEERING 6 (4): 317-327 JUL-AUG 2001

Abstract: A continuous simulation stormwater management model (with 33 years of historical precipitation) was used to determine how the design criteria from five different stormwater management pond ordinances changed the runoff from a 7.77 ha watershed following a hypothetical development scenario. All five evaluated ordinances required that the postdevelopment runoff rates from the site be less than or equal to the predevelopment runoff rates for each return period (a zero increase criteria). However, none of the five ordinances were effective at limiting the increase in runoff peak rates for the 1- and 2-year return periods for the annual runoff series, the 1-year return period for the annual exceedance (partial) runoff series duration, or more frequent precipitation events. To better control the lower frequency runoff events from stormwater ponds, the 1- and 2-year return periods should always be analyzed for a basin's design. Additionally, there was a radical change in the frequency of small and moderate runoff events occurring from the watershed following the hypothetical development.

**Reaction** – Interesting paper... evaluating stormwater regulations.

**7 - Title: Dynamics of stormflow generation - A hillslope-scale field study in east-central Pennsylvania, USA**

Author(s): Srinivasan MS, Gburek WJ, Hamlett JM

Source: HYDROLOGICAL PROCESSES 16 (3): 649-665 FEB 28 2002

Abstract: A 40 m x 20 m mowed, grass hillslope adjacent to a headwater stream within a 26-ha watershed in east-central Pennsylvania, USA, was instrumented to identify and map the extent and dynamics of surface saturation (areas with the water table at the surface) and surface runoff source areas. Rainfall, stream flow and surface runoff from the hillslope were recorded at 5-min intervals from 11 August to 22 November 1998, and 13 April to 12 November 1999. The dynamics of the water table (0 to 45 cm depth from the soil surface) and the occurrence of surface runoff source areas across the hillslope were recorded using specially designed subsurface saturation and surface runoff sensors, respectively. Detailed data analyses for two rainfall events that occurred in August (57.7 mm in 150 min) and September (83.6 mm in 1265 min) 1999, illustrated the spatial and temporal dynamics of surface saturation and surface runoff source areas. Temporal data analyses showed the necessity to measure the hillslope dynamics at time intervals comparable to that of rainfall measurements. Both infiltration excess surface runoff (runoff caused when rainfall intensity exceeds soil infiltration capacity) and saturation excess surface runoff (runoff caused when soil moisture storage capacity is exceeded) source areas were recorded during these rainfall events. The August rainfall event was primarily an infiltration excess surface runoff event, whereas the September rainfall event produced both infiltration excess and saturation excess surface runoff. Occurrence and disappearance of infiltration excess surface runoff source areas during the rainfall events appeared scattered across the hillslope. Analysis of surface saturation and surface runoff data showed that not all surface saturation areas produced surface runoff that reached the stream. Emergence of subsurface flow to the surface during the post-rainfall periods appeared to be a major flow process dominating the hillslope after the August rainfall event.

**Reaction** – Brings in hillslopes. Interesting site and research.