

Effect of Onsite Wastewater Treatment Systems on Total Nitrogen and Base Flow in Urban Streams of Metropolitan Atlanta, Georgia

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Abstract. Onsite Wastewater Treatment Systems (OWTS) are widely used in the southeastern United States and it is estimated that 37% of the homes in Georgia are on OWTSs (EPA, 2002). OWTS can be a source of nitrogen pollution of surface and ground waters as a result of poor maintenance or high density. As droughts persist, the extent to which water use by OWTS represents consumptive use (defined here as water that does not return to streams) has been debated. The overall goal of this study was to determine the impact of OWTSs on stream water quality and quantity in urban watersheds in metropolitan Atlanta. Out of the 24 selected watersheds ranging in area from 0.18 to 8.8 Km², twelve were characterized as having high density and twelve are characterized as having low density of OWTSs. Three times a year under base flow conditions, stream flow was measured. Among those streams, 4 streams were equipped with ISCO automated samplers and programmed to sample during storms as a function of gage height. Of these four sites two were from high density and two from low density watersheds. All water samples were analyzed for nitrate, ammonium, and total Kjeldahl nitrogen. Base-flow yields were not significantly different in various seasons. The contribution from OWTS may be off-setting the lower yield expected due to increased impervious surface with urbanization. Total nitrogen and nitrate concentrations increased significantly with OWTS density above a threshold density of about 100 systems km⁻² during base-flow conditions. On average, in storm flow condition 58% of total N load was in the form of TKN (failing OWTS, livestock, and leaves) and 42% was nitrate (fertilizer, OWTS, and livestock).