

**Changes of Salt Levels Responding to Road Salt Application in Winter Runoff  
Water and the Trend of Salt Level in the Delaware River**

**Kelli Lucarino and Hongbing Sun**

**Department of Geological, Environmental and Marine Sciences, Rider University,  
2083 Lawrenceville, Lawrenceville, New Jersey 08648.**

Twenty two runoff water sample sites of 6 transects along one side of interstate highway 95, NJ and two local sidewalks of Rider University campus were set up to collect the runoff water. These sites were sampled on 12/4/2006 for the pre-salt application data and on 2/27 and 3/30/2007 for the post-salt application data. Comparing the data of pre- and post salt application, chloride level increased by 70 to 495 times along the 15 feet three transects of I-95 and increased by 5 to 650 times along the 10 feet transects of sidewalk on Rider campus. The sodium increased by as much as 326 times along the highway, but less than 10 times along the sidewalk. Also magnesium and calcium increased by more than 200 times in the runoff water along the side of I-95. Apparently, road salts, which predominately are sodium chloride, are transported mainly by splash and spray from the highway and sidewalks. On a larger scale, the national sale of highway deicing salt increased by 2.6 times over the period of 1975 to 2005. The road salt application in the Delaware River Watershed was estimated to increase by about 2.8 times from 1980 to 2005, based on the data collected in the district 6, PA and the proportions of the road lane mileage in district 6 to that of the whole basin. Not surprisingly, along with the increase in the road salt application, the annual average chloride concentration in the Delaware River has increased from the 1975 to 2005 period. It increased by 2.4 times at the downstream Trenton Station, 2 times at the middle stream Riegelsville station (from year 77 to 05), 1.1 times at the upper stream Montague Station, NJ. The increases of sodium show a similar but slightly lesser amount at the above corresponding stations during the same period. Elevated sodium and chloride levels in soils affect the osmotic pressures in the cell system of many plants and inhibit certain plant root growth. The accumulation of sodium chloride in watersheds has been proved to pose risks to aquatic ecosystems and water quality.