Polyaromatic Hydrocarbons and Elements in Sediments Associated with a Suburban Railway

In metropolitan areas, more freight and public transit is needed to accommodate growing populations. The U.S. Environmental Protection Agency (USEPA) states that diesel freight trains have a smaller carbon footprint than diesel freight trucks. The carbon footprint could be even less for public transit trains operating on electricity from renewable energy sources like wind and solar power.

Regardless, the environmental impacts of trains must be considered such as:

- diesel exhaust;
- abrasion of brakes, wheels, and rails;
- dust from transport of minerals;
- treated railroad ties; and
- impacts from infrastructure such as bridges, culverts, powerlines, and sign posts.

These impacts can be detrimental to the quality of soil and water bodies near railways as well as aquatic and terrestrial life. Although soil and water contamination near railways has been well documented prior to this study, not much was known about the impacts on the biota near railways. To investigate these impacts, ISTC's senior chemist, John Scott, collaborated with other members of the Prairie Research Institute, particularly the Illinois Natural History Survey.

The team collected sediments from streams, ditches, and ponds near or underneath a railway in suburban Chicago, and analyzed the sediments for polyaromatic hydrocarbons (PAHs) and metals. They found that total PAH levels in sediments were greater downstream of the railroad than upstream and were more highly concentrated near the railway. A few specific PAH congeners exceeded the effect threshold for aquatic life. In addition, nickel and mercury levels exceeded the lower effect levels, and vanadium concentrations exceeded the chronic toxicity level in a few locations.

The researchers recommended that the cause of these specified contaminants be identified to prevent future environmental contamination near railways.

Meet the Scientists

John Scott

Publications

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One Hazelwood Drive, MC-676
Champaign, IL 61820
p: 217-333-8940
Email us

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