Pastorok, Robert A., Daniel C. Peek, Jennifer R. Sampson, and Michael A. Jacobson. "Ecological Risk Assessment for River Sediments Contaminated by Creosote." ***Environmental Toxicology and Chemistry*** **13 (1994): 1929-1941.** (Reviewed by Niko Hoskins)

Creosote, a chemical produced by the distillation of coal tar, is commonly used to preserve wood. This study's aim was to assess the ecological risk posed by creosote contamination in sediments, particularly those around the McCormick & Baxter Creosoting Company site along the Willamette River in Portland, OR. The sediments surrounding the site were known to be contaminated by creosote but the effects weren't known. Over two phases of testing, samples were taken from 57 different locations around the site as well as five equally spaced sites directly upstream, one site 32 miles upstream, and one site a mile downstream. The testing revealed that sediments were contaminated with several potentially toxic chemicals, including polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo- p -dioxins (PCDDs), polychlorinated dibenzofurans (PDFs), and a variety of metals.

This study chose to focus on PAHs, PCDDs, and PCDFs because they were the most frequently found chemicals that were also found substantially above the reference levels.

The indicator species chosen here were crayfish (*Pacifastacus lenuisculus*) and the large-scale sucker, *Catastomus macrocheilus*. Crayfish were used as a representative benthic invertebrate for tissue analysis because of their habit of burrowing into sediments, their potential importance in local food webs, and their suitability for tissue contamination studies. The large-scale sucker was chosen as a representative fish species because the other dominant species, the northern pike minnow, doesn't provide a good indication of high-quality riverine habitat due to high tolerance levels for organic pollution, high temperatures, and sediment loading.

To test sediment toxicity levels, sediment bioassays based on *Hyalella azteca* mortality and Microtox (*Photobacterium phosphoreum*) bioluminescence were used. Crayfish and large-scale sucker tissues were tested for PAHS, PDDs and PCDFs and large-scale sucker livers were tested for abnormalities.

The tests showed high toxicity levels within 300 feet of the McCormick and Baxter loading dock and especially high toxicity levels within 200 feet. However, the habitats of both representative species expanded beyond that region so acute toxic effects weren't observed.

The study suggests that creosote contamination in sediments can be toxic for sedentary, benthic species near creosoting companies.

Critique

This article is proof, as far as I'm concerned, of how much humans have accepted the sacrifice nature must make for modern living to continue. As noted above, there is a high toxicity level surrounding the McCormick and Baxter loading dock with an especially high level within 200 feet. The findings of the

Hyalella azteca mortality bioassay showed a mortality rate of 100% at the closest site to the docks. In addition, those sites falling within the 200-300 feet range, the region that is only highly toxic, had mortality rates in the range of 20% and 30%. Yet the authors of this study deemed that, since the toxic effects fell in such a localized area, it didn't adversely affect the local ecology. In addition, they also noted that since most fish in the area exhibited behavioral avoidance of areas with extremely high concentrations of PAHs, acute toxicity to fish was unlikely. In effect, the authors were accepting that the fish would take care of themselves by restricting their habitat.

This study showed that the area surrounding a creosote offloading dock can be highly toxic yet the authors deemed that since the effects on mobile fish was low the toxicity didn't pose an ecological threat.

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