Text from Friends of the San Juans grant to the Salmon Recovery Funding Board

By Shannon Davis

Creosote removal has been a priority for Washington State since 2002. While launching cleanup efforts through the "Puget Sound Initiative" Governor Gregoire identified creosote removal as a high priority and increased funding for this program. The WDNR fact sheet on Creosote Cleanup states that "*Toxins can have a cumulative affect on some species. The removal of creosote from the environment is essential in order to prevent long term impacts from the toxins existing within the environment and the food chain.*"

Creosote contains more than 50 known carcinogens to humans and is understood to be toxic to marine fish and other wildlife. Creosote is a pollutant of concern because of the presence of toxic polycyclic aromatic hydrocarbons (PAHs) that leach into water and sediments where they accumulate and impact marine and nearshore. Creosote is known to leach out of treated wood for many decades.

PAHs can be harmful to Pacific herring, English sole and salmonids, among other marine organisms that colonize treated wood or otherwise utilize contaminated nearshore environments (Vines et al. 2000, Myers et al. 2003, Casillas et al. 1995, 1998). Studies on the effects of creosote wood contamination on spawning Pacific herring show that PAH contamination from 40 year old pilings in surface waters caused significant reductions in hatching success and increased abnormalities in surviving larvae (Vines et al 2000, Stratus 2005a).

Impacts of PAH's in surface waters have also been studied for trout, with immune effects documented at the lowest observable concentrations (Karrow et al 1999, Stratus 2005a). Many studies have also investigated thresholds for biological effects of PAH concentrations in sediment. Effects on benthic fish included: liver lesions, spawning inhibition, infertile eggs and abnormal larvae (Stratus 2005a). Salmonids are potentially at risk of exposure from consumption of contaminated prey (Poston 2001). In addition, if emerging science shows that certain stocks of outmigrating juvenile salmon spend considerable time in shallower nearshore marine environments, direct impacts may occur in areas with high PAH's. Some laboratory exposure studies have shown developmental abnormalities in Pacific Northwest salmon species exposed to PAHs (Ostrander et al., 1988, 1989). Also, laboratory exposure experiments with model compounds and sediment extracts from contaminated Puget Sound sites also indicate that exposure to PAHs may suppress growth or alter the metabolism of juvenile salmon (Casillas et al., 1998a,b; Meador et al., 2006).

Studies have found that the concentration of creosote does increase the negative effects. A study conducted in the spring of 2005 at Western Washington University by Leah Paisano that compared toxicity to creosote in Pacific herring, topsmelt, and sea urchin bioassays. The research found that early life stages of Pacific herring are more sensitive to creosote than are topsmelt or sea urchins, and topsmelt were more sensitive to creosote than sea urchins. Survival of feeding topsmelt larvae was affected by creosote over a 10 day period at a 5% concentration, whereas herring larvae was affected at a concentration of 1.25%. Herring heart rates and lengths were also affected by very low concentrations of creosote. The author also found that as the percent concentration of creosote increased, so did the negative effects. Vines et al (2000) also found creosote effects to be concentration dependent.

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