



ASSESSING THE THREAT OF PESTICIDES, HERBICIDES, AND PHARMACEUTICALS IN THE COLORADO RIVER

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When drugs are prescribed prophylactically or in response to an acute or chronic illness, only a portion of the active ingredient of the drug is metabolized. The non-metabolized parent compound, as well as the metabolites, enter the natural aquatic environment through waste discharges into receiving streams, which may reach downstream recreational lakes or even the intakes of drinking water treatment plants. Once pesticides reach water bodies, they can impact the whole ecological food chain, since other animals, including humans, feed on aquatic animals that may be contaminated. Another concern is the mixing of pesticides, in which case the mixture may be more toxic than any one single compound. This research provides insight about what pharmaceuticals, herbicides, and pesticides are present in the Colorado River located adjacent to Timberlake Biological Field Station. All 7 of the pharmaceuticals we were looking for in the Colorado River were found and identified. Gas chromatograph results show various pesticides and herbicides, though the leading results found was identified as Fluridone. Fluridone is an aquatic herbicide used to control invasive plants. Though plant and wildlife species may be unintentionally impacted during normal application of an aquatic herbicide as a result of a direct spray of the receptor or the waterbody inhabited by the receptor. The upper and lower regions of the Colorado River and the Bosque River had containments identified as pharmaceuticals and pesticides. The pharmaceuticals found in the river were pain relievers such as Tylenol, antibiotics, depression medicine and caffeine. We know these pharmaceuticals impose a threat to our ecosystem which can directly affect terrestrial and aquatic organisms. Selective serotonin reuptake inhibitors (SSRIs) which are prescribed as antidepressants are commonly detected in surface waters and known to alter growth, reproduction and behavior in aquatic invertebrates. Current water waste treatment technologies do not target pharmaceuticals for removal. A total of 14 pesticides were identified with 9 of the pesticides being herbicides, 3 fungicides, and 2 insecticides. Pesticides are not easily biodegradable so they cannot be removed in conventional drinking water treatment plants.

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