Water survey finds drugs, chemicals

March 9, 2002

Experts will unveil a study next week of 'emerging contaminants' in rivers and streams

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The Orange County Register

The first sweeping study of "emerging contaminants" -- such as pharmaceuticals -- in America's rivers and streams will be unveiled Wednesday, after more than two years of intensive water sampling and number crunching.

The results: Dozens of contaminants were found in American streams and rivers from sea to sea, including antibiotics, reproductive hormones and prescription and nonprescription drugs. The chemicals were found in extremely small concentrations, but even low concentrations have been found to cause sex reversal in male fish in European and Canadian studies.

The chemicals' effects on humans -- and the consequences of mixing the different chemicals -- are unknown. "There are emerging water-quality issues we need to address," said Herbert T. Buxton, coordinator of the Toxic Substances Hydrology Program for the U.S. Geological Survey.

How do these chemicals get into surface waters? Many pass through the human body and are not removed from waste water by sewage-treatment technology. Others flow from agricultural and industrial waste water.
During 1999 and 2000, USGS researchers traversed 36 states, collecting samples from 142 streams, 55 wells and seven effluent sources as part of a "national reconnaissance effort."

In California, six rivers and streams were sampled, including the Sacramento River at Freeport, Cucamonga Creek in Upland, a Turlock Irrigation District Lateral near Patterson, San Timoteo Creek and Cucamonga Creek near Edison.

"We looked for stream sites downstream from intensive urban areas and areas of intensive animal and industrial production," Buxton said.

Results will be published Wednesday in the March 15 issue of the journal Environmental Science & Technology.

While no Orange County waters were sampled, chemicals from waste water are known to flow in waters here.

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Dele Ogunseitan, a professor with the University of California, Irvine's, Department of Environmental Analysis and Design, researched caffeine in waste water from the Irvine Ranch Water District. He believes caffeine could be used as a chemical marker to help determine if there's been a sewage spill.

The Santa Ana River -- a major source of Orange County's drinking water -- is primarily waste-water effluent for much of the year, courtesy of sewage-treatment plants in Riverside and San Bernardino counties.

Last year, the Orange County Water District hired Stanford University researchers to run some tests on river water upstream of the Prado Dam in Riverside. They tested for the estrogen 17 beta-estradiol; ibuprofen; naproxen and ketoprofen (anti-inflammatory drugs used to treat arthritis); and carbamazepine (an anti-convulsant drug used to treat epilepsy).

Found upstream from the water district's Prado wetlands were ibuprofen, naproxen and carbamazepine, at concentrations of less than one part per billion, according to preliminary results. But downstream, at the inflow to the water district's Prado wetlands, none of the compounds were detected. They may have been removed by photochemical breakdown from sunlight or by microbiological degradation.

Every day, Orange County's sewage-treatment plants pump about 270 million gallons of waste water into the ocean; no requirements to screen for the presence of pharmaceuticals exist.

But chemicals from waste water work their way into drinking water: USGS researcher Larry Barber traced a chemical used in shampoo from a sewage-treatment plant in Los Angeles to well water used by people in Pico Rivera and Whittier. The chemical isn't dangerous, Barber said, but it shows that these chemicals are entering the drinking-water supply.

Safety questions have helped derail "toilet to tap" projects in Los Angeles and San Diego, but Orange County officials say that won't happen to a similar program that's begun here.

Orange County's project will use the latest treatment technology and create water that's cleaner than what's currently imported from the State Water Project and the Colorado River -- and water that's far cleaner than the effluent-rich Santa Ana River, officials said.

Last year, the Orange County Water District and the Orange County Sanitation District decided to spend $352 million on the first phase of a $600 million groundwater-replenishment program. It will purify 70 million gallons of sewer water a day and pump it into the underground aquifer for use as drinking water, slated to begin in 2005.