

Tijuana River Contamination from Urban Runoff and Sewage: A Public Health Crisis at the Border

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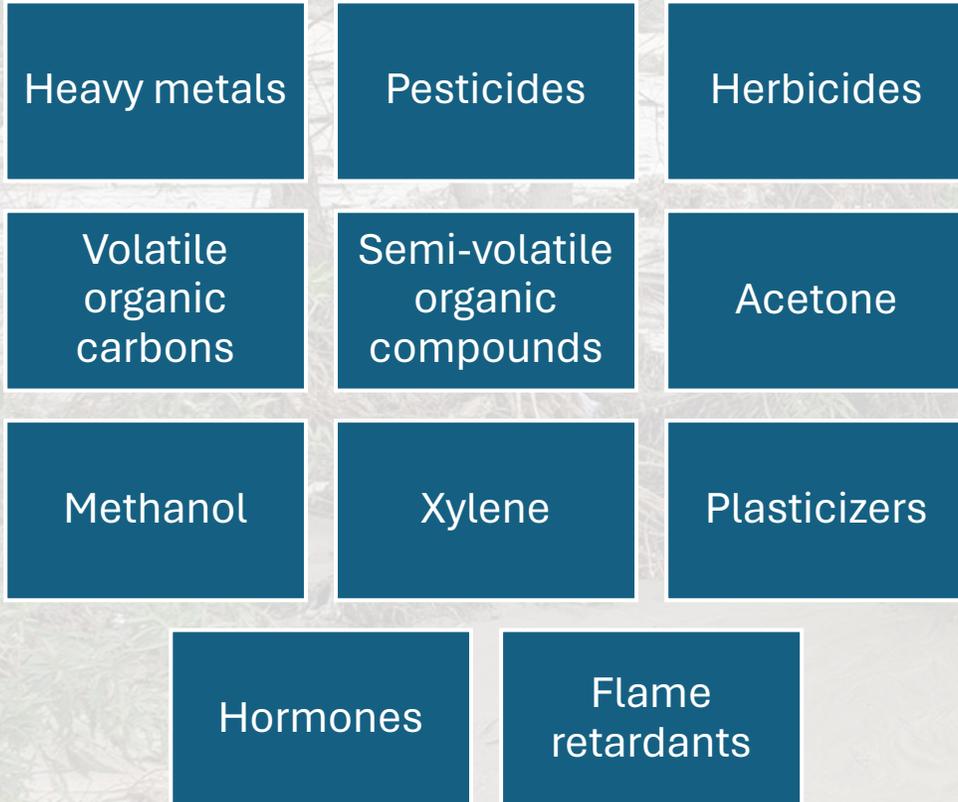
What is in the Report?

- Previously published data
- Over 60 papers, reports and research were reviewed
- Focus on chemical and biological pollutants in water, air and soil

***Does not include any health data and is limited to published data only**



Chemical Contaminants in the Water



392 identified chemicals:

224 appear on a regulatory list

175 appear in the U.S. EPA Toxic Substance Control Act.

A substantial number of **contaminants of emerging concern** were detected in the water for the first time *

*Espinoza J. *Identification and Assessment of Constituents of Emerging Concern in the Tijuana River Stormwater*: Masters Thesis, San Diego State University; 2023.

Biological Contaminants in the Water

- Metagenomic analysis findings:
 - Elevated levels of microbes carrying antibiotic-resistant genes such as *E. coli* and *Legionella*
 - Bacteria such as *Salmonella*, *Vibrio*, *Streptococcus*, *Mycobacterium tuberculosis* and *Listeria monocytogenes*,
 - Parasites and viruses such as *Trichomonas vaginalis*, *Hepatitis*
- Presence of microbial species that are not routinely monitored such as *Acrobacter cryaerophilus*, which can cause severe gastrointestinal illness

Allsing N, Kelley ST, Fox AN, Sant KE. Metagenomic Analysis of Microbial Contamination in the US Portion of the Tijuana River Watershed. *International Journal of Environmental Research and Public Health*. 2022;20(1):600.

Shahar SA. *Metagenomic Analysis of Microbial Communities in the Tijuana River, Antibiotic Resistance Genes, and Potential Sources*: Masters Thesis, San Diego State University; 2023.



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Research Letter

Systemic Erysipelas Outbreak among Free-Ranging Bottlenose Dolphins, San Diego, California, USA, 2022

“Increase in the number of stranded dolphins in the region, indicating that changes in their environment or exposures to contaminated water could be causing illness and subsequent death.”

Danil K, Colegrove KM, Delaney MA, Mena A, Stedman N, Wurster E. Systemic Erysipelas Outbreak among Free-Ranging Bottlenose Dolphins, San Diego, California, USA, 2022. *Emerging Infectious Diseases*. 2023;29(12):2561

Contaminants in the Air

Bacterial and Chemical Evidence of Coastal Water Pollution from the Tijuana River in Sea Spray Aerosol

Matthew A. Pendergraft*, Pedro Belda-Ferre, Daniel Petras, Clare K. Morris, Brock A. Mitts, Allegra T. Aron, MacKenzie Bryant, Tara Schwartz, Gail Ackermann, Greg Humphrey, Ethan Kaandorp, Pieter C. Dorrestein, Rob Knight, and Kimberly A. Prather*

- Limited data but water to air transfer of contaminants can occur
- More research is needed to determine levels of pollutants of concern and how far they travel

Pendergraft MA, Belda-Ferre P, Petras D, et al. Bacterial and Chemical Evidence of Coastal Water Pollution from the Tijuana River in Sea Spray Aerosol. *Environmental Science & Technology*. 2023;57(10):4071-4081.

Contaminants in the Soil

- 170 organic chemicals and inorganic elements including
 - Polycyclic aromatic hydrocarbons (PAHs), banned pesticides such as chlordane and DDT, polychlorinated biphenyls (PCBs), heavy metals, and phthalates
 - High levels of arsenic, cadmium and bisphenol A and triclosan

Galvez NIL. *Soil analysis of organic and inorganic contaminants in Goat Canyon (Cañon De Los Laureles), at the US-Mexico border*: Masters Thesis, San Diego State University; 2014.

Exposure Pathways and Health Risks

1

Contact

Direct contact with contaminated water can lead to serious health issues.

2

Inhalation

Airborne contaminants could be inhaled by residents and workers, but but we have limited knowledge and need more more research in this area.

3

Resuspension

Contaminants in soil and and water could also become airborne, increasing increasing exposure risks. Climate change can can play a role in increasing increasing exposure risks.

Public Health Significance and Limitations

- Quantity of contamination increases exposure risk
- Populations at higher risk for complications need to be considered– older adults, pregnant women, immunocompromised
- Limited health data – e.g. self-limiting illnesses, lack of access to healthcare, seeking care in Tijuana
- Occupational Health concerns

Environmental Justice

San Ysidro and Imperial Beach face increased risks to health, including mental health, and their economic livelihoods due to dealing with contamination issues.

Local youth feel outdoor environments are unsafe due to contamination.

Holliday E. *Place-Based Environmental Education and Environmental Justice in Imperial Beach, California*, San Diego State University; 2020.

What's next?

- Funding needed to stop the pollution
- Research needed to understand community and environmental health impacts
- Baseline data collection and monitoring for both environmental and human health
- Rebuilding trust in the community and cleaning up the mess

Thank you!

Scan QR code to download the report

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