

Dec 11th, 8:30 AM

Concentrations of Lead in Germany's Tap Water

Kirby E. Townsend

Loyola Marymount University

Townsend, Kirby E., "Concentrations of Lead in Germany's Tap Water" (2016). *Research & Exhibition*. 1.
<http://digitalcommons.lmu.edu/honors-research-and-exhibition/2016/section-t1/1>

This Event is brought to you for free and open access by the Honors Program at Digital Commons @ Loyola Marymount University and Loyola Law School. It has been accepted for inclusion in Research & Exhibition by an authorized administrator of Digital Commons@Loyola Marymount University and Loyola Law School. For more information, please contact digitalcommons@lmu.edu.

Concentrations of Lead in Germany's Tap Water

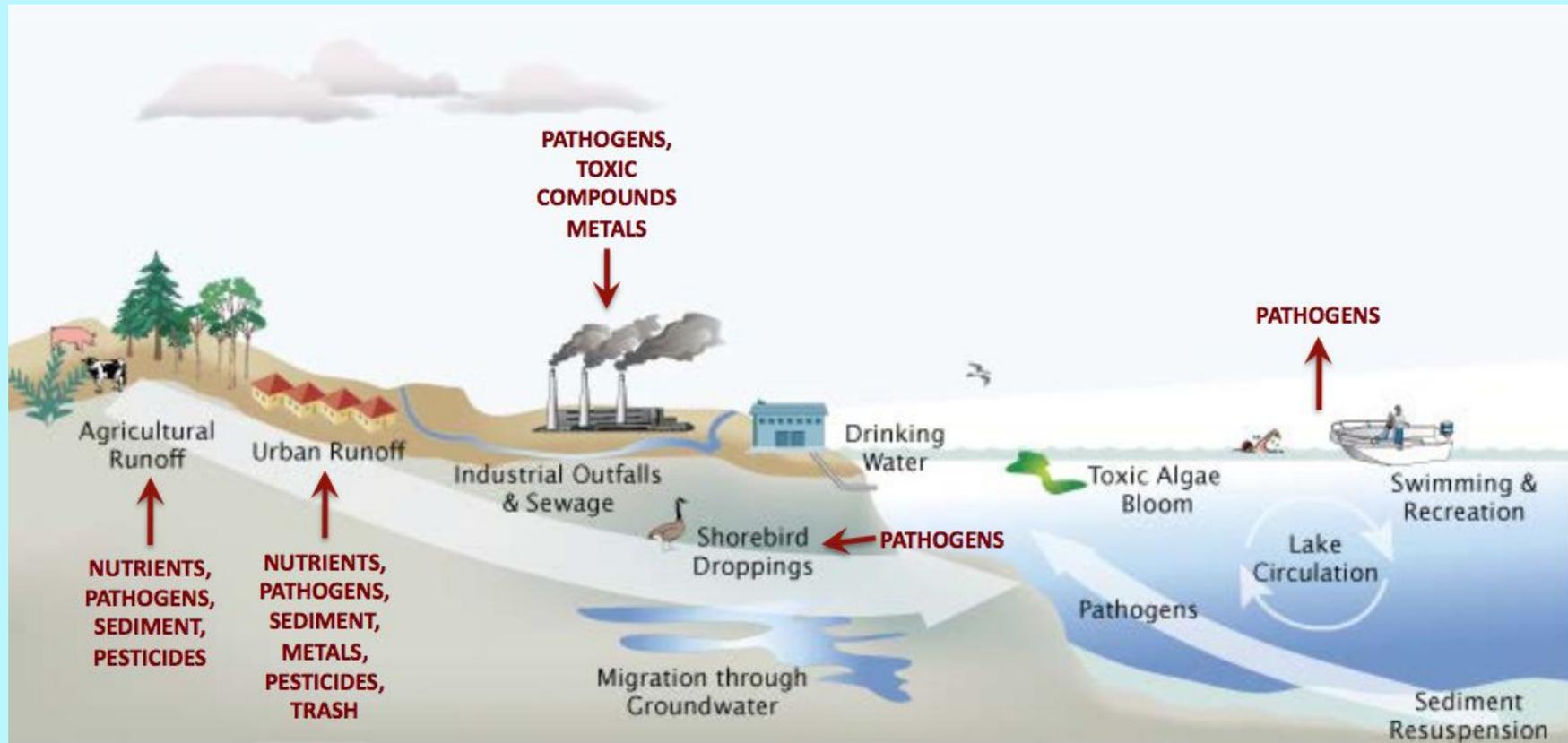
Kirby Townsend

Mentor: Dr. Rachel Adams

LMU Department of Civil Engineering and
Environmental Science

When was the last time you thought about where your tap water is coming from or what is in this water you are drinking?

Contaminating factors include urban runoff, industrial sewage, and toxic algae (Dorsey). This is why different types of tap water sources need different treatments.



Source: Dorsey, "Contaminated Water and Treatment".

Ground Water

Groundwater may only need prophylactic disinfection in which an agent such as chlorine is used for the prevention of disease and infection. Deeper groundwater may also need aeration and may require removal of methane, hydrogen sulfide, iron, manganese or excess carbon dioxide (Flem et al.).

Surface Water

Surface water may need coagulation and sedimentation to remove Al and Fe, water softening, pH and hardness adjustments, disinfection, fluoridation, and addition of phosphate to reduce plumbosolvency (Flem et al. and Dorsey).

Treated Water

Once this water is treated, it moves through piping systems to be delivered to homes. Piping systems are usually made out of cast iron, copper, or steel. However older piping systems can be made with lead.

Even though water might be leaving the water plants clean, it still contains inorganic compounds some of which can be a concern, one being lead. As the water moves through these pipes, lead can be released due to several factors such as water hardness, amount of time water is in the pipes, pH, temperature, and whether the water is soft or acidic (Le Bot et al.).



Source: Dodson, *The Bay City Times*.

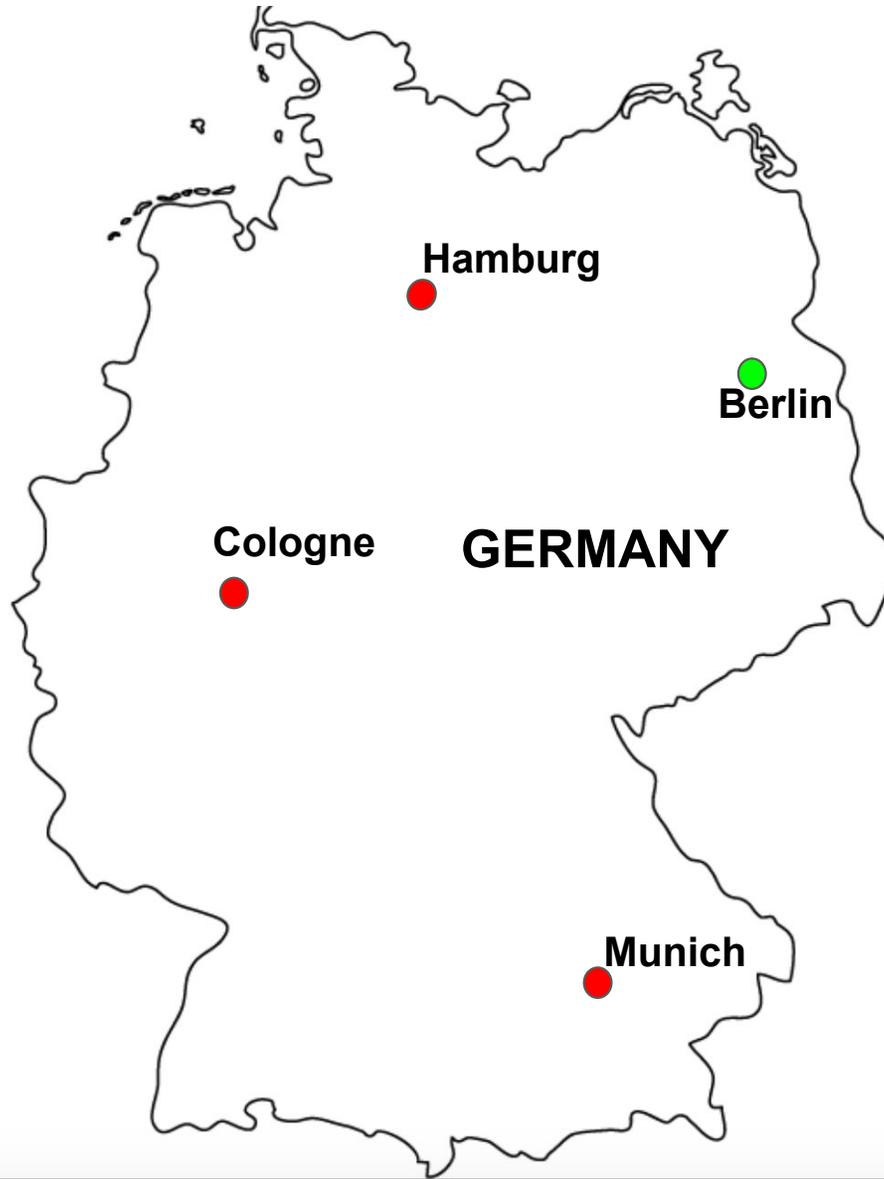
Lead concerns

It has been found that the hematopoietic system (bone marrow and blood cells), central nervous system, and kidney are most sensitive to lead toxicity which is most concerning when it comes to children because they absorb up to 70% of lead consumed orally (Bard et al.). Lead can also be a concern for pregnant women because the fetus can be exposed to lead via maternal blood (Bard et al.).

Germany and Lead- Research Question

Germany is known for their clean drinking water (The Local De). However, since it is an older country, in certain homes and buildings lead piping still exists.

This is why I propose that I want to go to different areas around Germany and measure concentrations of lead in tap water from homes and restaurants in these areas in order to see where lead may be a concern



Hamburg

Berlin

Cologne

GERMANY

Munich

References

Bard, Denis et al. "Opinion on Lead Standard in Drinking Water." SCHER (Scientific Committee on Health and Environmental Risks), 11 January 2011. Web. 18 Oct. 2016.

Dodson, Andrew. "5,000 Lead Water Lines would Cost \$9 Million to Replace in Bay City." *The Bay City Times*. 18 February 2016. Web.

Dorsey, John. "Contaminated Water & Treatment." Biology for Engineers class. Loyola Marymount University, Los Angeles. April 2016. Lecture.

Flem, B. et al. "Inorganic Chemical Quality of European Tap-Water: 2. Geographical Distribution." *Applied Geochemistry* 59 (2015): 211–224. *CrossRef*. Web.

Le Bot, Barbara et al. "Exposure of Children to Metals via Tap Water Ingestion at Home: Contamination and Exposure Data from a Nationwide Survey in France." *Environment International* 94 (2016): 500–507. *CrossRef*. Web.

"Tap or bottle? How clean is our drinking water?" Web blog post. The Local De, 28 July 2010. Web. 7 Oct. 2016.