

Why It Took Decades of Blaming Parents Before We Banned ~~Lead Paint~~

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- Policy for science
- Science for policy



Three Big Ideas about Science and Public Policy

- Connect the dots/policy decisions are part of a larger system
- Science is subjective/knowledge is social construct
- Policy is story telling/ narrative coherence

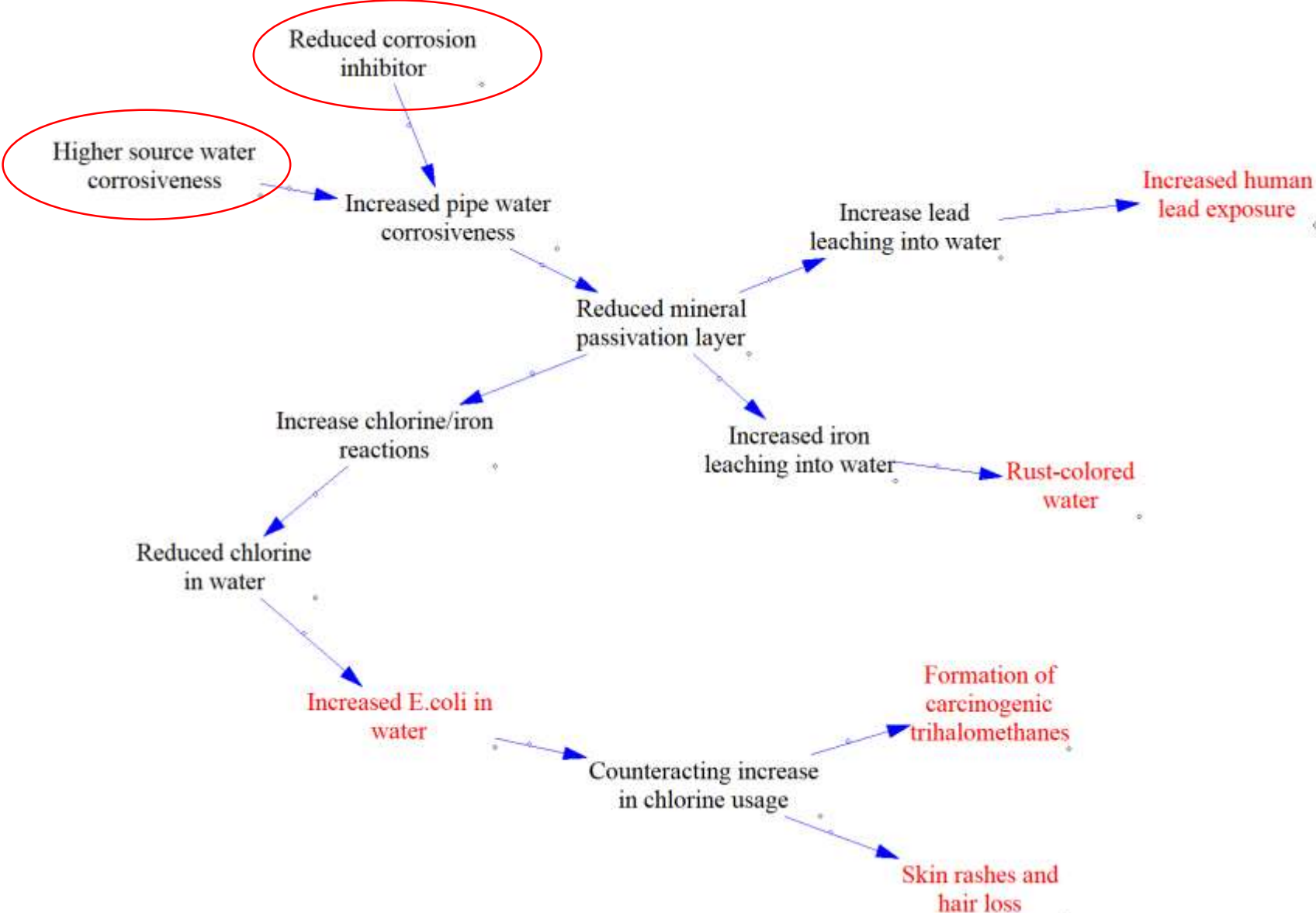


Complex Adaptive Systems

- *...is a system in which a perfect understanding of the individual parts does not automatically convey a perfect understanding of the whole system's behavior.*
- Occur in many fields—social, physical, and natural sciences—but share general properties:
 - Composed of **heterogeneous, adaptive** actors
 - **Multi-level**, with important **feedback** effects
 - **Dynamic**, with **nonlinearity** and strong **interdependence** between factors
 - Non-trivial **spatial** structures
 - Emergence, Tipping, Path-dependence

Problem: Public policy decisions
are part of a larger system

Not all water is created equal



Impacts in Flint

- Public Health Effects
 - Lead poisoning, cases of Legionnaires disease, increase in stress and anxiety
- Economic Effects
 - \$15 million to reconnect to Detroit Water/GLWA, \$30 million reimbursement to Flint residents for purchasing water, \$ millions to replace lead pipes..
- Broken trust
 - Even after federal officials label the water as safe and end subsidies, many residents do not trust the water.

Problem: Public expectation that science provides objective proof for decision making

Clarifying the Distinctions

Scientific Research

- “Process of discovering new knowledge through research.”
- “Inquiry aimed at understanding the physical, biological, social and mathematical world around us.”

Science-Policy Assessment

- “Process by which scientific and technological evidence is marshaled for the purpose of predicting, projecting, or otherwise characterizing the consequences of alternative courses of action.”

Science Policy Choices: Are they “objective” or “subjective”

Dioxin

- Cancer vs non-cancer
- high or low levels of exposure
- Causation of cancer or “mere” promotion of cancers

Aldrin/Dieldrin

- Tumors in 2 more animal species and existence of cancer in humans
- OR
- Identified by either animal studies or human studies
 - Production of tumors in one animal species is assumed to be carcinogenic to humans

Knowledge is social construct

- “Objectivity” is defined within our disciplines
- “Scientists have epistemological affinities and chauvinisms, based on education and training, personal affiliations and loyalties”
- Different experts weigh evidence differently

“Epidemiology and toxicology studies suggest there is evidence for adverse health outcomes associated with chlorpyrifos exposures below levels that result in 10% RBC AChE inhibition (i.e. toxicity at lower doses).”



Problem: If proof is not a precondition for policy action then what?

Narrative Coherence

- “Science helps furnish and bound a solution space”
- Context – institutional mission and mandate
- Weight-of evidence model as the narrative framework
- Strength of the policy product is a function of overall coherency, plausibility and “compellingness” of the narrative

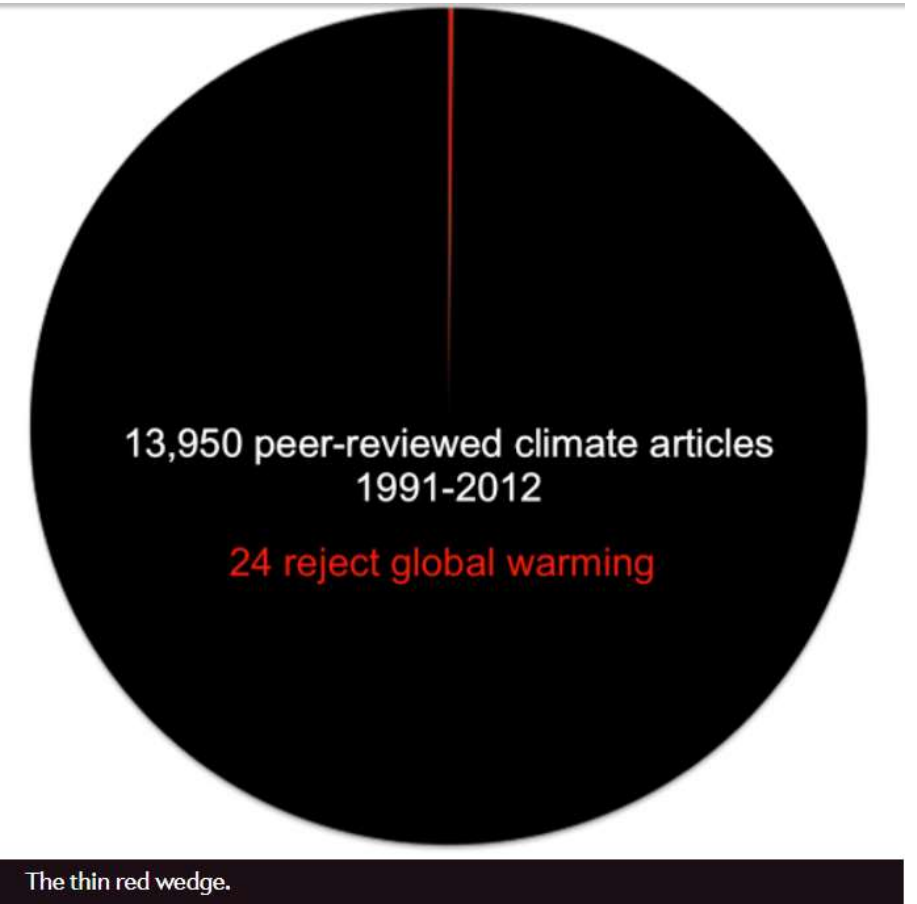


Image credit: James Lawrence Powell

“All scientific work is incomplete – whether it be observational or experimental....That does not confer upon us a freedom to ignore the knowledge we already have or to postpone the action that appears to demand at a given time.”

-Sir A. Branford Hill, 1965