

Toxic Environmental Exposures in West Virginia

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Introduction

- Why do we need to learn about these exposures?
- This is not an exhaustive talk!
- Certain exposures will be left out



Learning Objectives

- Understand how major toxic exposures are generated in West Virginia
- Understand the health risks of key toxic exposures
- Understand the difficulties of linking toxins to adverse health outcomes
- Understand current resources available for patients affected by toxic exposures
- Discover resources for additional education on toxic exposures



Disclosures

- No pertinent financial disclosures
- I am not speaking officially as a representative of the Department of Veterans Affairs or the Louis A. Johnson VAMC



Air



Indoor Air Pollutants

- Coal-fired stoves
- Wood stoves



Ethylene oxide

- Chemical Valley and Union Carbide



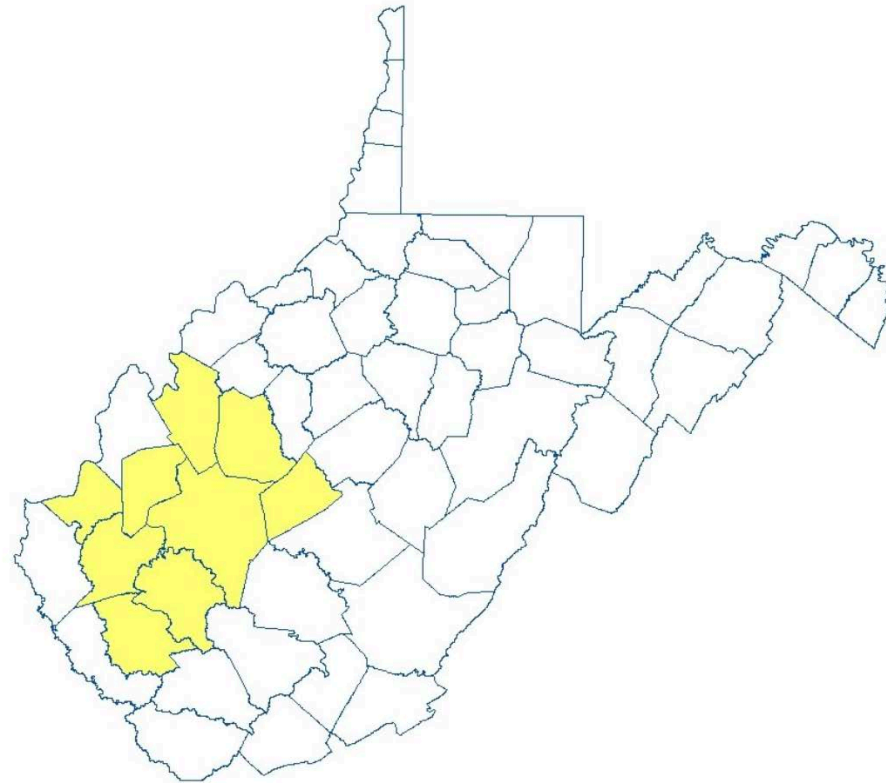
Union Carbide Plant at Institute
Courtesy of The Center for Land Use Interpretation

Water



The 2014 Elk River Spill

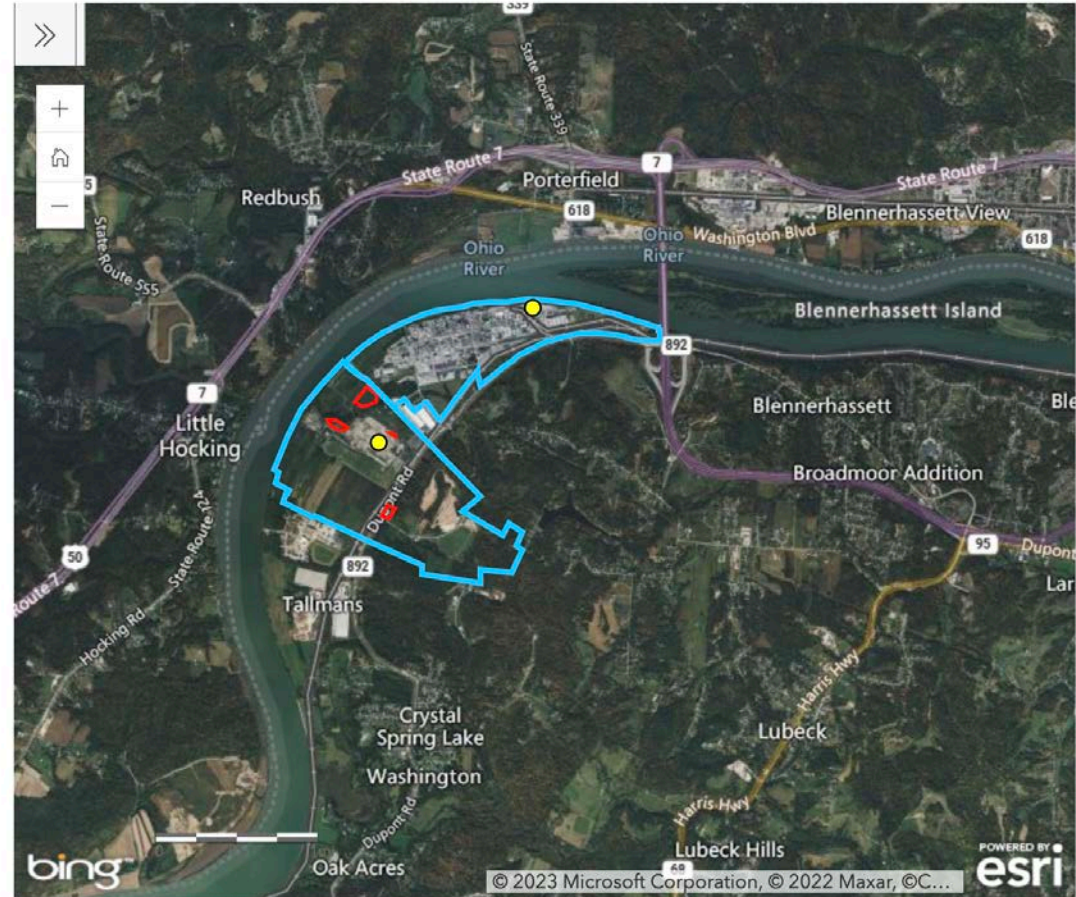
- Chemicals dumped into the Elk River, upstream of the intake for West Virginia American Water
- 300,000 people in the Charleston Metro area left without potable water



PFAS

- Polyflourylalykl substances
- Numerous manufacturing applications including Teflon and fire-fighting chemicals
- “Forever Chemicals”

Interactive Map of Chemours Company FC, LLC, Washington, West Virginia



Courtesy EPA



Health Effects of PFAS

- Infertility
- Gestational hypertension
- Low birth weight
- Renal cell carcinoma
- Prostate cancer
- Hyperlipidemia
- Obesity



Mine Waste

- Hundreds of millions of dollars spent yearly in cleanup efforts: almost \$1 billion in 2022 alone
- Heavy Metals
- Particulate matter



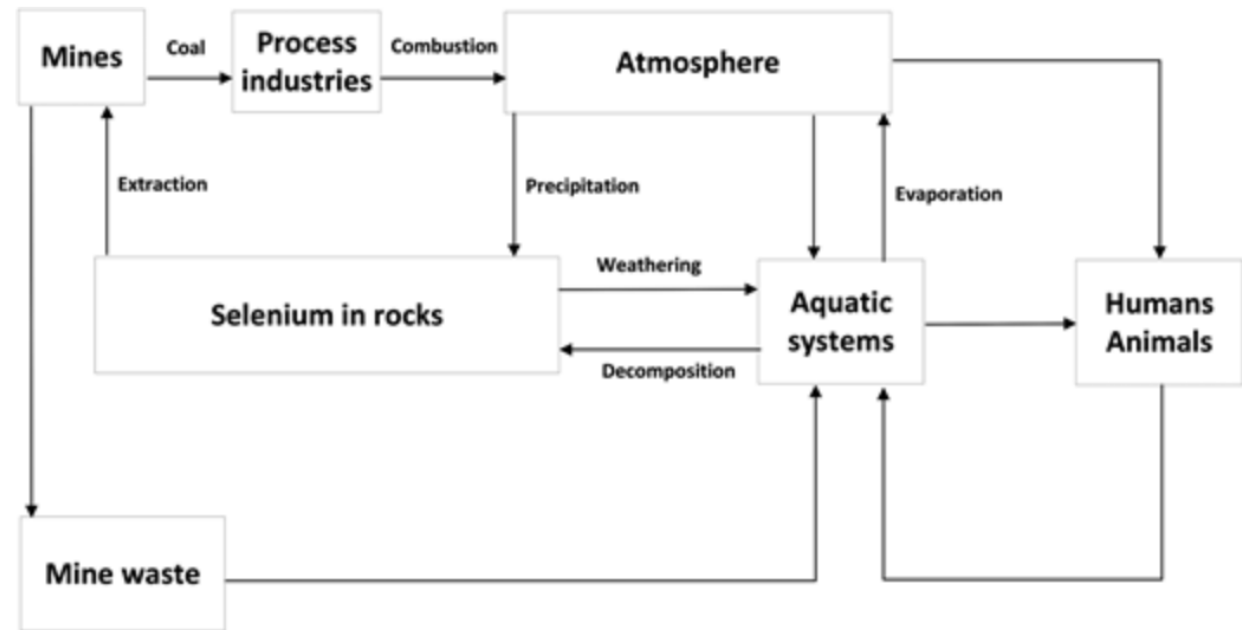
Bluegill, the only fish I can ever catch
Picture courtesy WV DNR



Selenium

- Naturally occurring element
- Needed in human bodies
- "The dose makes the poison"

Figure 1

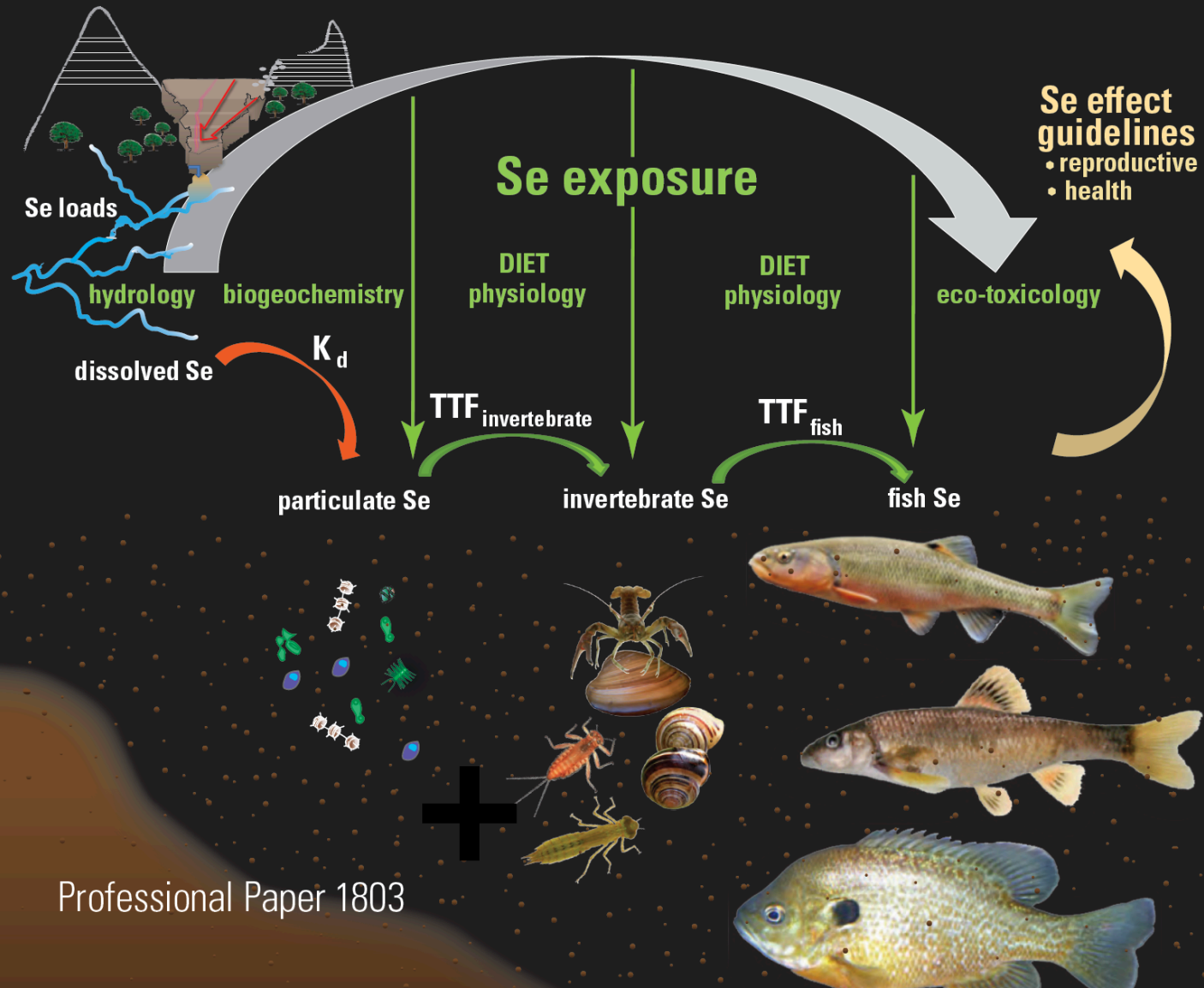


Selenium

- Infertility
- Cancer
- Developmental anomalies
- Concentrated in food chains and webs



Selenium in Ecosystems within the Mountaintop Coal Mining and Valley-Fill Region of Southern West Virginia— Assessment and Ecosystem-Scale Modeling



Military Exposures



Agent Orange

- Vietnam-era herbicide
- Vietnam combat locations, field hospitals, and other places



Raymond Young, Oak Hill native and combat medical photographer during Vietnam



Agent Orange Presumptive Conditions

- Chloracne
 - Diabetes
 - Hypertension
 - Hypothyroidism
 - Ischemic heart disease
 - Parkinson's
 - Porphyria cutanea tarda
- Cancers:
 - Bladder
 - Chronic B-Cell leukemia
 - Non-Hodgkin's
 - Multiple myeloma
 - Lung cancer
 - Prostate cancer
 - Some soft tissue sarcomas



Camp Lejeune/Marine Corps Air Base North Carolina

- Large Marines base in North Carolina, near Wilmington
- Contaminated drinking water supply for the base
- August 1953 to December 1987
- Military and civilian exposures





Camp Lejeune Presumptive Conditions

- Adult leukemia
- Aplastic anemia
- Bladder Cancer
- Kidney cancer
- Liver cancer
- Multiple myeloma
- Non-Hodgkin's lymphoma
- Parkinson's



Burn Pits

- Iraq and Afghanistan/War on Terror
- Military waste burned in open pits





Burn Pits Presumptive Exposures

- Chronic sinusitis and rhinitis
- Respiratory diseases
 - COPD
 - Asthma
 - Sarcoidosis
 - Obliterative bronchiolitis
 - Pulmonary fibrosis
- Cancers
 - Head and Neck
 - Gastrointestinal
 - Kidney
 - Lung and trachea



Diagnostics

- Difficult
- Few blood tests available, with no reference ranges set for even those
- Many exposures don't leave clear signs behind



Help for Patients

- PACT Act in the VA
- Lawsuits



Environment or Lifestyle?

- Lung cancer
- COPD
- Asthma
- Bladder cancer
- Prostate cancer
- Low birth weight
- Infertility
- Obesity
- Hyperlipidemia
- Diabetes
- Peripheral neuropathy
- Hypothyroidism
- Gestational hypertension
- Gastrointestinal cancer
- Renal cell cancer
- Lung cancer
- Ischemic heart disease



What can your friendly neighborhood family physician

do?

- Watch for unusual patterns
- Maintain a degree of suspicion
- Ask about exposures
- RESEARCH



Additional Resources

- ExposureEd app
- EPA
- CDC: Agency for Toxic Substance and Disease Registry (ATSDR)
- *Ailing in Place: Environmental Inequities and Health Disparities in Appalachia* by Michele Morrone



Thank You!

