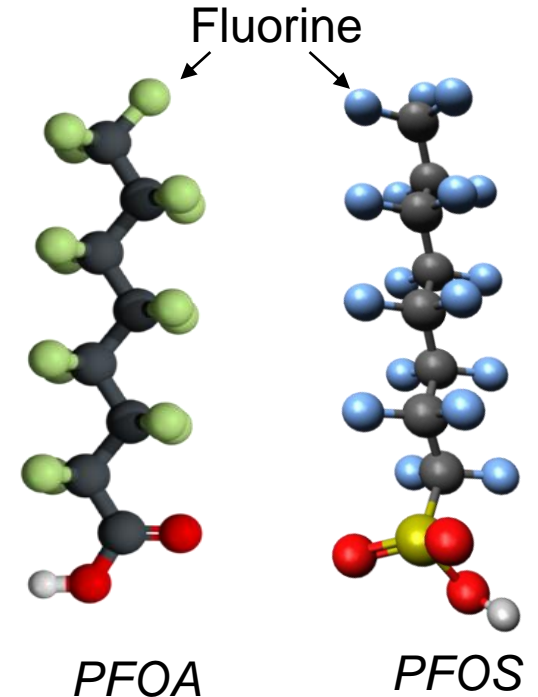


KDHE Perspective on PFAS

Leo G Henning | March 6th, 2025

- **Class of manmade chemicals**
 - Chains of carbon atoms surrounded by fluorine atoms with different endings
 - Thousands of PFAS compounds identified
 - Carbon-fluorine bond is incredibly strong
- **Most PFAS are:**
 - Persistent in the environment
 - Bioaccumulate in organisms
 - Toxic at relatively low levels
- **PFAS commonly viewed as “forever chemicals”**
- **Bioaccumulation**
 - Long chain PFAS are difficult for animal metabolism to break down; therefore removal from the body is very slow
 - PFAS can accumulate in the blood, organs, and muscle tissues
 - PFAS concentrations increase up the food chain



- **Consumer Products**

- Cookware, food wrappers, paper plates, popcorn bags, pizza boxes, oven safe paper like muffin cups and parchment paper
- Polishes, waxes, and paints
- Cleaning products
- Water/stain repellents for carpets and clothing
- Cosmetics
- Textiles and upholstery
- Dental floss



- **Industrial/Household Uses**

- Dust suppression for chrome plating
- Electronics manufacturing
- Hydraulic fluid, fuel additives
- Fire fighting foam
- Spot cleaners, dishwashing liquid, floor polish
- Plastics, resins and rubber

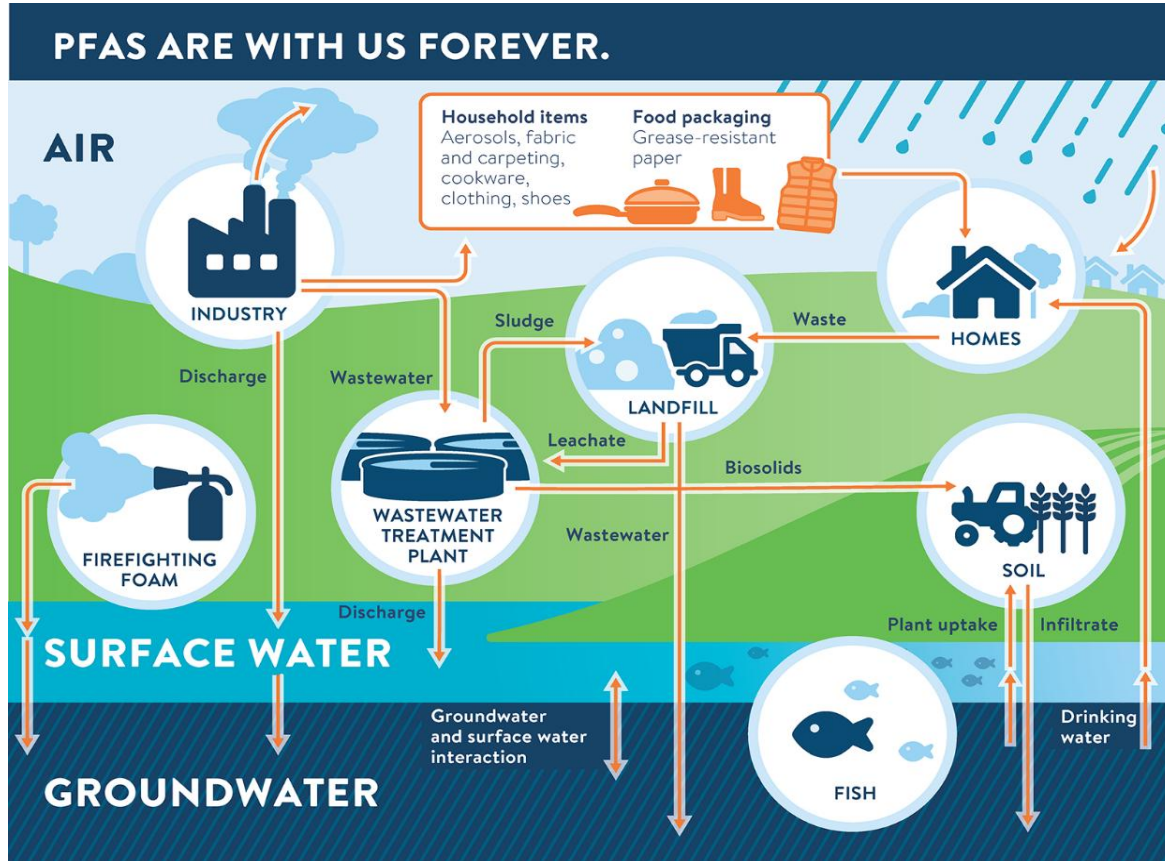


Potential Health Effects

- Immunological (decreased vaccination response, asthma)
- Liver (cholesterol, elevated liver enzymes)
- Developmental (low birth weight)
- Thyroid
- Reproductive (decreased fertility)
- Cardiovascular
- Cancer (testicular, kidney)
 - Considered “possibly carcinogenic” to humans by the International Agency for Research on Cancer (IARC)
 - Considered to have suggestive evidence of cancer potential for humans by the US Environmental Protection Agency (EPA)

Sources: <https://www.health.state.mn.us/communities/environment/hazardous/docs/pfashealth.pdf> and <https://www.atsdr.cdc.gov/pfas/health-effects/index.html>

Routes of Exposure to PFAS (EPA):



- Drinking water
- Food supply (biosolids), food packaged, fish, wildlife
- Air, soil, and dust
- Skin, consumer products such as carpet and clothing, fire suppressant aqueous film forming foam (AFFFs)
- Working in occupations, firefighting military and civilian, chemical manufacturing and processing

Source: Upper Republican NRD (urnrd.org)

- ✓ Drinking Water (MCL) – April 2024
- ✓ Cleanup at Remedial Sites (CERCLA/Superfund) – April 2024
- Water Quality Standards – Human Health
- Water Quality Standards – Fish Consumption
- Wastewater – Permitted Effluent Limits
- Biosolids – Field Application Guidelines and Alternate Disposal
- RCRA – Hazardous Waste Listing
- Landfill leachate – Monitoring and Treatment
- Air – Hazardous Air Pollutants

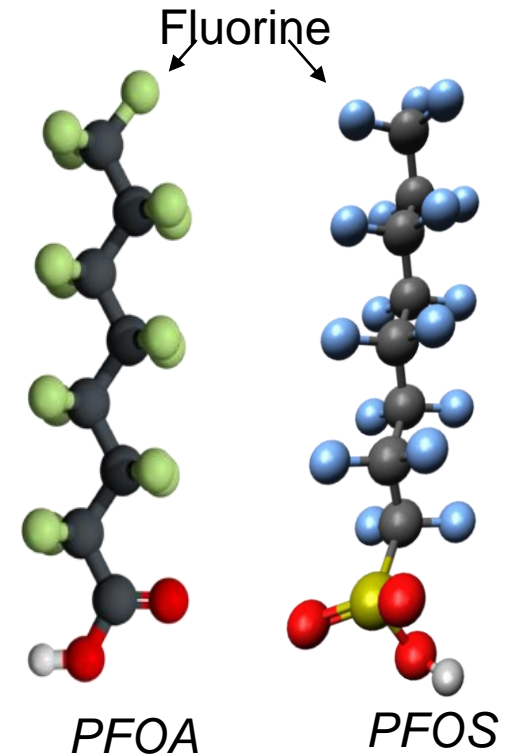
- Six PFAS compounds subject to regulation
- Current Federal standards four or ten **parts per trillion**, depending upon the PFAS compound
- Monitoring from now to April 2027
- Compliance Monitoring over 2027 – 2029
- MCL Compliance by April 2029

- EPA's Monitoring Results to Date in Kansas:
 - Many utilities see detects of PFAS compounds
 - Few are the six regulated compounds
 - Two out of 40 utilities may have compliance issues



EPA now Focusing on Wastewater

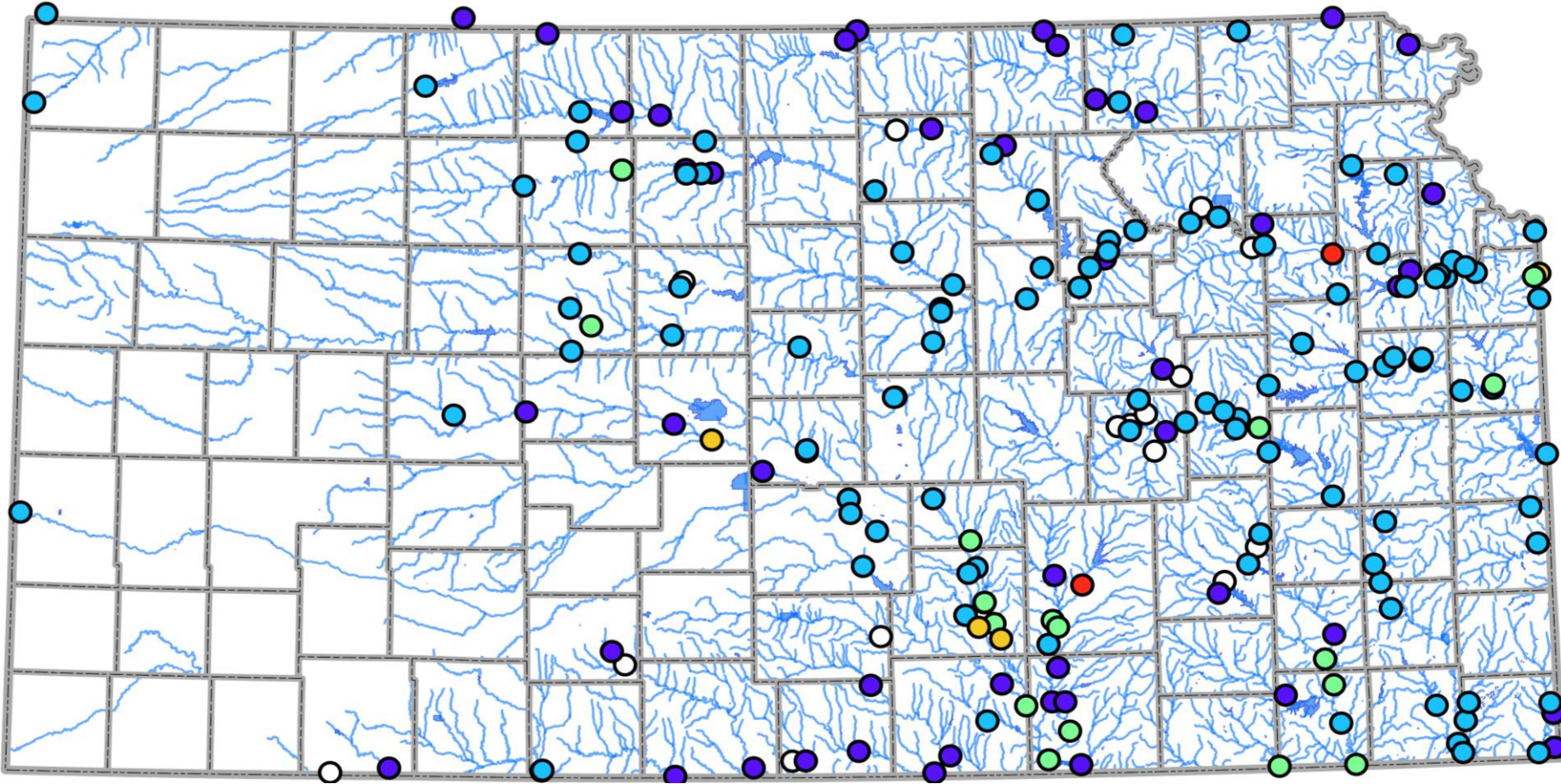
- Pre-Treatment Requirements - Industrial Wastewater Limits
- Monitoring Requirements for All Dischargers
- Surface Water Quality Criteria Being Established
 - Aquatic Life Protecting Fish & Macroinvertebrates Finalized
 - PFOA – .3,100,000 ppt acute; 100,000 ppt chronic
 - PFOS – 71,000 ppt acute; 250 ppt chronic
 - But draft Human Health Criteria are in parts per quadrillion



Manageable, But Fish and Drinking Water Complicates

- Must meet most stringent standard:
 - Surface water standards for aquatic life are in parts per **million**
 - Wastewater effluent in parts per **trillion**
 - Human Health Criteria for water and fish consumption likely parts per **quadrillion**
- Mixing Zones Important to Maintain Distance
 - From Outfall to Intake
- Source Water Protection
 - Most Reservoirs detected PFBA only
 - Clinton Lake Has Mix, Including PFHxS and PFOS (MCL substances)

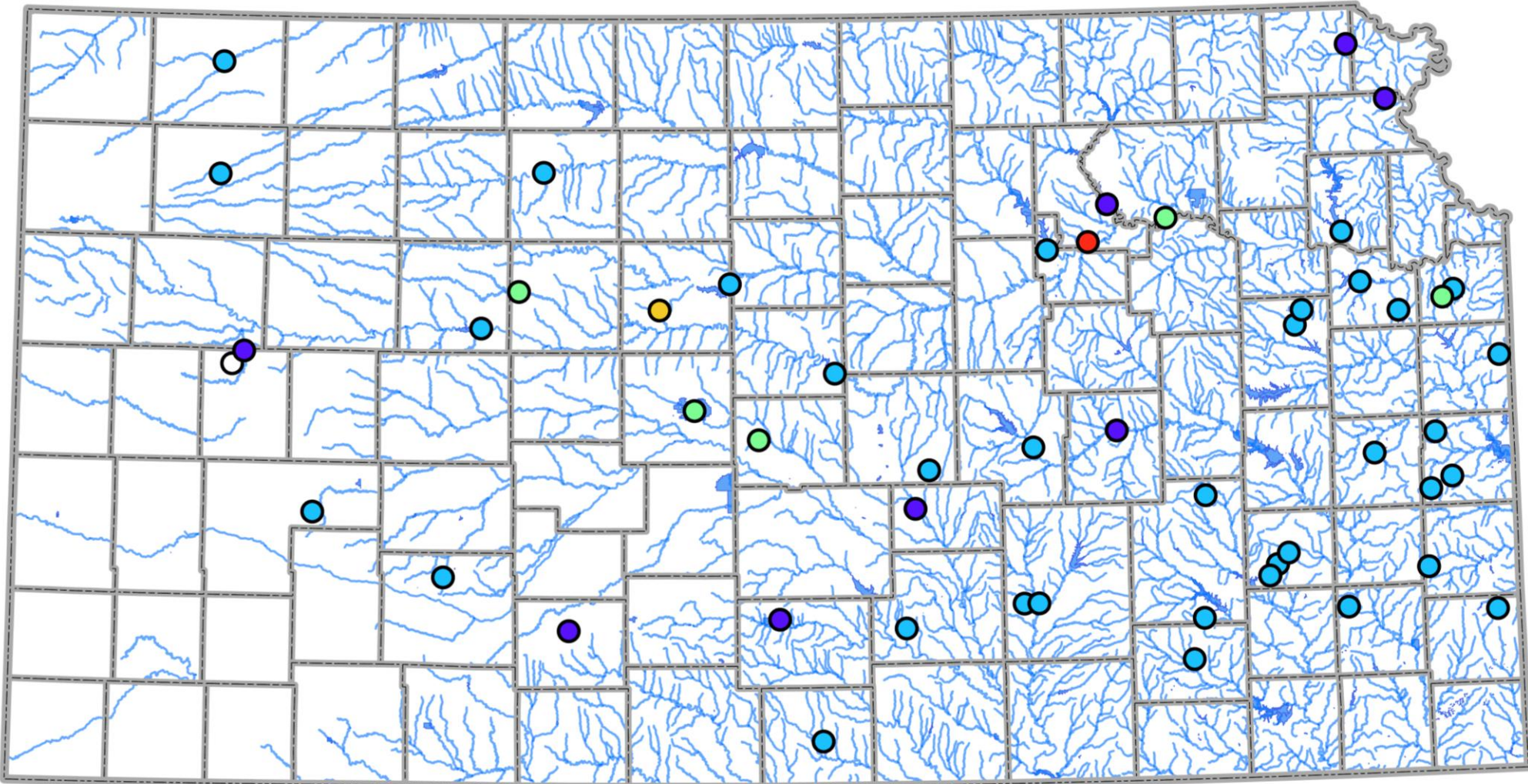
Monitoring PFAS in Rivers and Streams



**Total PFAS, Streams
(ng/L, or ppt)**

	Non-detect
Blue	≤ 4
Light Blue	≤ 30
Light Green	≤ 70
Yellow	≤ 150
Red	≤ 240

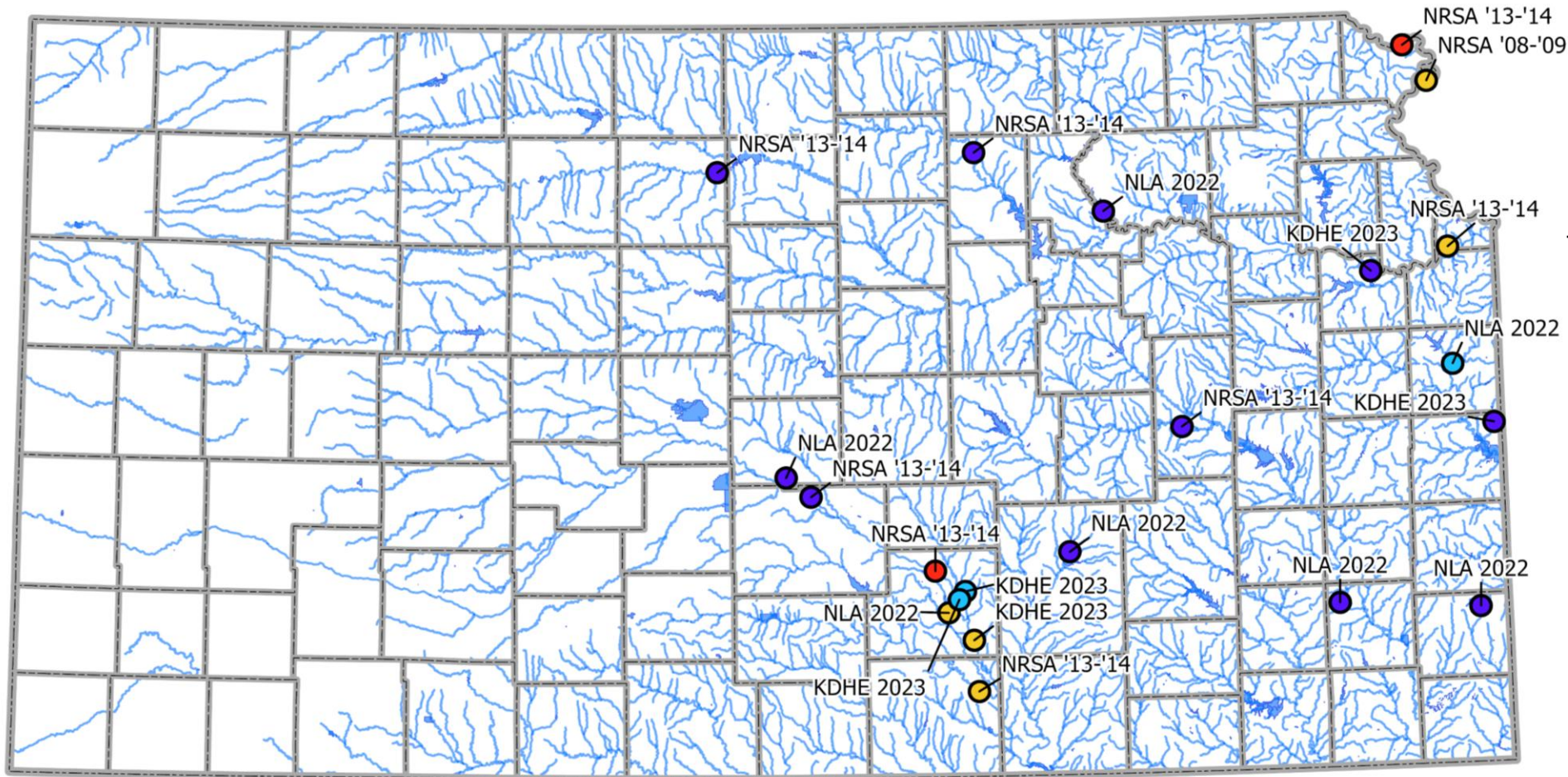
Monitoring PFAS in Lakes and Wetlands



**Total PFAS, Lakes
(ng/L, or ppt)**

	Non-detect
Purple	≤ 4
Light Blue	≤ 20
Light Green	≤ 50
Yellow	≤ 150
Red	≤ 300

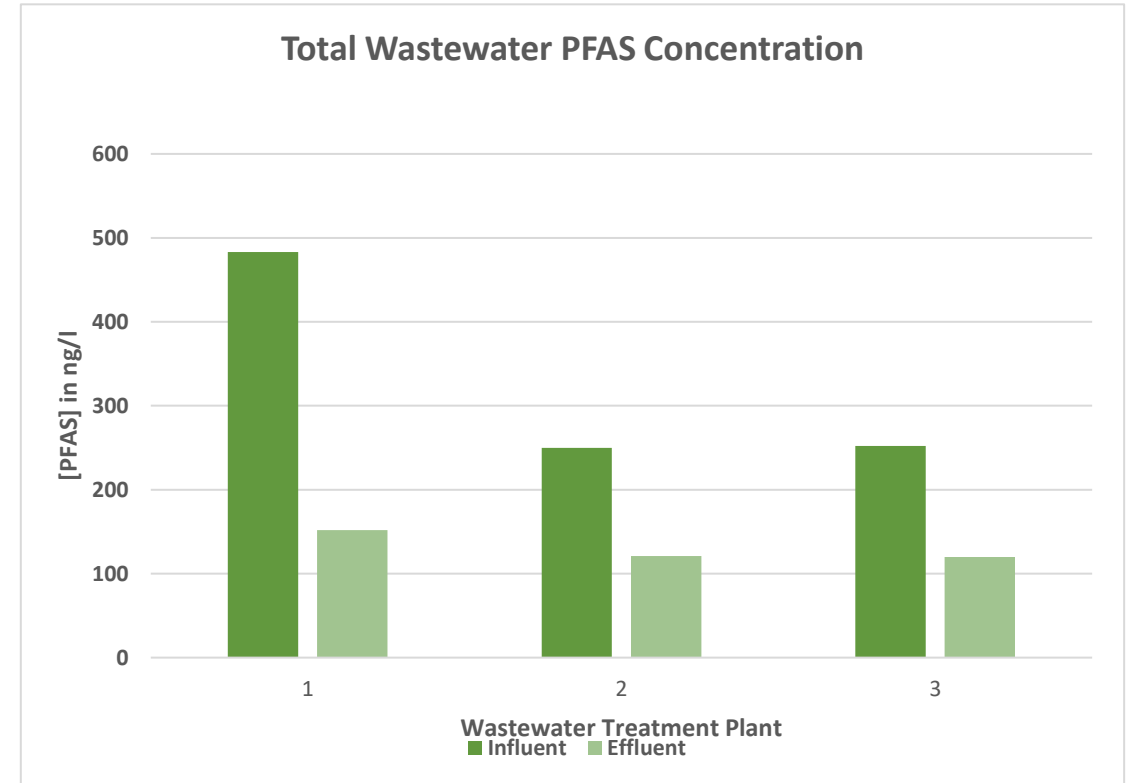
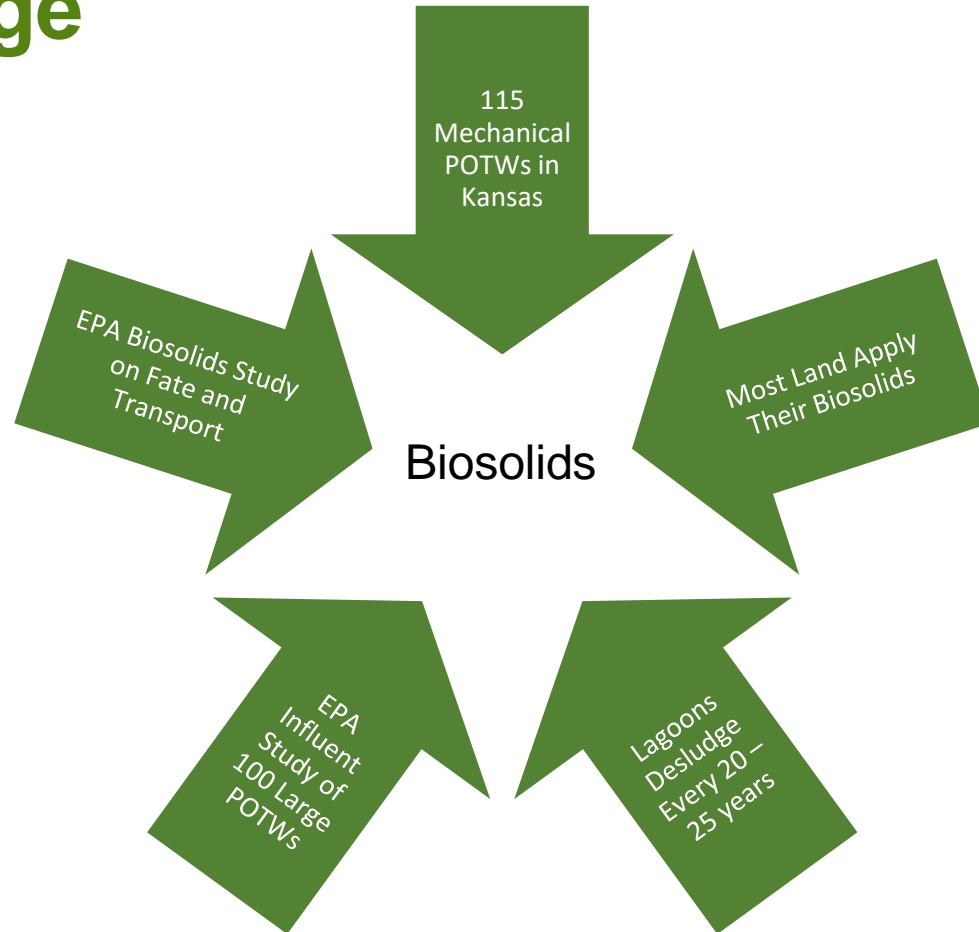
Monitoring PFAS in Fish Tissue



**PFOS, Fish Muscle
 Tissue ($\mu\text{g}/\text{Kg}$, or ppb)**

	≤ 3
	≤ 6
	≤ 25
	≤ 50

Wastewater Treatment Plants Remove PFAS, Settles in Sludge



- Tying Permit Limits to Fish Tissue Accumulation or Human Health Criteria
- Lab Capacity and Capability for PFAS Analyses
 - KHEL has stood up Method 533 for Drinking Water
 - KHEL has yet to stand up Method 1633 for wastewater, biosolids, soils, fish
- Handling Leachate from Landfills
 - One sample – 900 parts per trillion PFOA; 140 parts per trillion PFOS
- Biosolids Management
 - One sample > 6000 parts per trillion
 - Land Application
 - Landfills and Monofills
 - Incineration
 - Deep Disposal

- KDHE’s cleanup authority requires a contaminant to be listed as a “hazardous substance” under federal CERCLA law (Superfund), K.S.A. 65-3452a
- Two PFAS chemicals were designated as a “hazardous substance” under a final rule in April 2024
- EPA also issued a “PFAS Enforcement Discretion and Settlement Policy” that exempted:
 - Community water systems and publicly owned treatment works
 - Municipal separate storm sewer systems
 - Publicly owned municipal solid waste landfills
 - Publicly owned airports and local fire departments
 - Farms where biosolids are applied to the land

- Update the Risk-Based Standards for Kansas (RSK) Manual to incorporate PFAS
- Perform background study of PFAS in soil - focus on urban areas
- Assess existing contaminated sites and new sites
- Assess long term sites during Five Year Reviews
- Orphan Sites Program will conduct PFAS assessment and remediation at sites without viable responsible parties
- Costs to responsible parties and the State cannot be determined at this time

- Assist Utilities with PFAS Monitoring of Drinking Water
- Adopt Kansas PFAS MCL Regulations
- Contract with Kansas State to analyze wastewater, biosolids and fish tissue with Method 1633
- Stand up KHEL with Method 1633 by July 2026
- Stay abreast of EPA developments on biosolids and human health criteria
- Investigate cause and effect at stream and reservoir hot spots
 - Lower Arkansas River, Walnut River, Shunga Creek
 - Clinton Reservoir, Ogden City Lake, Fossil Lake (Russell)