

# Air Force Installation & Mission Support Center

---



## Ellsworth AFB Environmental Restoration Program

Rita Krebs, AFCEC/CZOM

28 March 2023



## ***Purpose / Agenda***



- **To share information with the community on the following topics:**
  - **2023 Restoration Advisory Board (RAB) interest assessment**
  - **Status of PFAS in drinking water wells**
  - **Upcoming PFAS risk assessment**
  - **Ways to stay informed**



# ***2023 Restoration Advisory Board (RAB) Interest Assessment***



## **■ RAB:**

- Formal board made up of government and community members
- Follows formal procedures (like a city council meeting)
- Discusses the entire environmental restoration program at an installation

## **■ Ellsworth had a formal RAB in the 1990s**

- Dissolved sometime in the 2000s
- Public meetings continued under the “RAB Meeting” title; however, they were just regular public meetings (like what we’re having now)

## **■ RAB interest assessment required every 24 months**

- Ellsworth AFB commander responsible for decision to reinstate RAB
- Based on feedback from the community



# ***2023 Restoration Advisory Board (RAB) Interest Assessment***



- **Public meetings:**
  - Are more flexible than RABs
  - Can discuss a specific topic (like just PFAS)
  
- **RABs:**
  - Are costly to organize and host
  - Need ongoing commitment from the community
  
- **A RAB would divert costs away from current programs such as the quarterly newsletter**



# ***2023 Restoration Advisory Board (RAB) Interest Assessment***



- Interested in a formal RAB? By April 30, 2023, contact:
  - Rita Krebs at (605) 385-2688 / [rita.krebs.1@us.af.mil](mailto:rita.krebs.1@us.af.mil) or
  - Jens Christensen at (605) 385-6625 / [jens.christensen@us.af.mil](mailto:jens.christensen@us.af.mil)
- We want to hear from you!
  - Do you like the newsletter?



# What are PFAS?

- **Man-made chemicals found in commonly used products**
  - Fire fighting foam
  - Nonstick cookware (Teflon)
  - Stain-resistant fabric/carpet (Scotchgard)
  - Food packaging
- **Two most studied PFAS**
  - PFOS
  - PFOA
- **1970: Air Force began using aqueous film forming foam (AFFF)**
- **May 2016: EPA established Lifetime Health Advisories for PFOS/PFOA in drinking water**
- **November 2016: Ellsworth discontinued use of legacy AFFF**





# PFAS in Drinking Water Wells Interim Solution



- 117 drinking water wells sampled for PFAS
- 23 wells: PFOS/PFOA above 2016 Lifetime Health Advisories (HAs)
  - 4: Connected to municipal water
  - 16: Installed treatment systems
  - 3: Providing bottled water







# PFAS in Drinking Water Wells Long-term Solution



## ■ Completed

- B North: Connected to Box Elder (done)
- E: Purchased using Non-Environmental Restoration Program funds for wetlands banking for the new B-21 bomber mission (done)

## ■ In progress

- A/B: Connect to new watermain (late 2024)
- C: Connect to Sunset Ranch community water system (2023)
- D: Install replacement shallow well (2023)







# ***PFAS in Drinking Water Wells Quarterly Monitoring Program***



- **What is the Quarterly Monitoring Program?**
  - **For wells with combined PFOS/PFOA concentrations:**
    - **Less than 2016 Lifetime HAs (70 ppt) and**
    - **Greater than ½ the 2016 Lifetime HAs (35 ppt)**
  - **Goal: Ensure PFOS/PFOA concentrations in drinking water remain below the 2016 Lifetime HAs**
- **Quarterly Monitoring Program initially included 7 drinking water wells**



# ***PFAS in Drinking Water Wells Quarterly Monitoring Program***



## **■ Current status of the 7 wells**

### **■ Sampling discontinued at 6 wells**

- 3: Concentrations of PFOS/PFOA increased and exceeded the 2016 Lifetime HAs**
- 2: Remained below  $\frac{1}{2}$  the 2016 Lifetime HAs for 1 year**
- 1: Self-connected to municipal water**

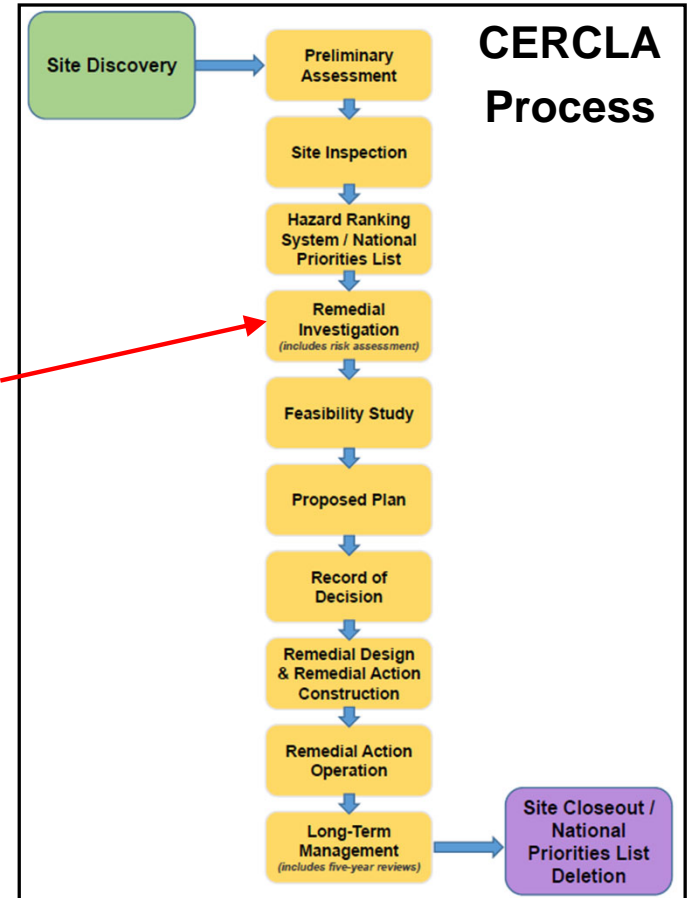
### **■ 1: Still in quarterly monitoring**



# PFAS Remedial Investigation



- Responding to PFAS in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or “Superfund”)
- Currently in Remedial Investigation stage for PFAS
- These steps were completed in the 1990s for Ellsworth AFB (did not included PFAS)





# ***Risk Assessment***



- **Risk Assessment Work Plan finalized in January 2023 (AR #8787 on the Administrative Record website)**
- **Risk Assessment Report will be included in the Remedial Investigation Report (May 2024)**
- **Risk Assessment:**
  - **Standardized way to determine risk from exposure to a contaminant**
  - **Used as a tool to assist decision-making at cleanup sites**
  - **Evaluating human health and ecological receptors**



# ***Risk Assessment Process***



- **Risk: Possibility of adverse effects from exposure to a stressor**
  - **Stressor = physical, chemical or biological agent that can cause an adverse effect**
  - **For environmental restoration projects, generally, stressor = contaminant**
  
- **Environmental Risk Assessment: Analysis of potential adverse health effects caused by exposure to site-related contaminants**



# What is "Risk Assessment"?



Something we all do...

Involves collecting and analyzing information...

To determine the likelihood something bad will happen

Using a chain saw

Crossing a busy street

Not using sunscreen

Eating 2-week-old leftovers

Skipping brushing your teeth



# ***Human Health Risk Assessment Objectives***



- **Evaluate possibility cancer or a noncancer health effect could result from exposure to site-related contaminants**
- **Provide information and data to:**
  - **Document the level of risk at a site, and the primary cause of the risk**
    - **Which contaminants in what media are contributing to the site risk?**
  - **Help determine if a remedial action is needed at a site**
  - **Identify preliminary cleanup goals**





# ***Risk Assessment Does and Does Not...***



**Does...** 

- **Estimate cancer risk and potential noncancer effects based on exposure**
- **Indicate populations we are concerned about and identifies how they can be exposed**
- **Identify site-related contaminants requiring evaluation**
- **Identify data gaps for further study**

**Does not...** 

- **Determine if health effects occurred in the past or will occur in the future**
- **Determine if an observed health condition is the result of exposure to site contaminants**



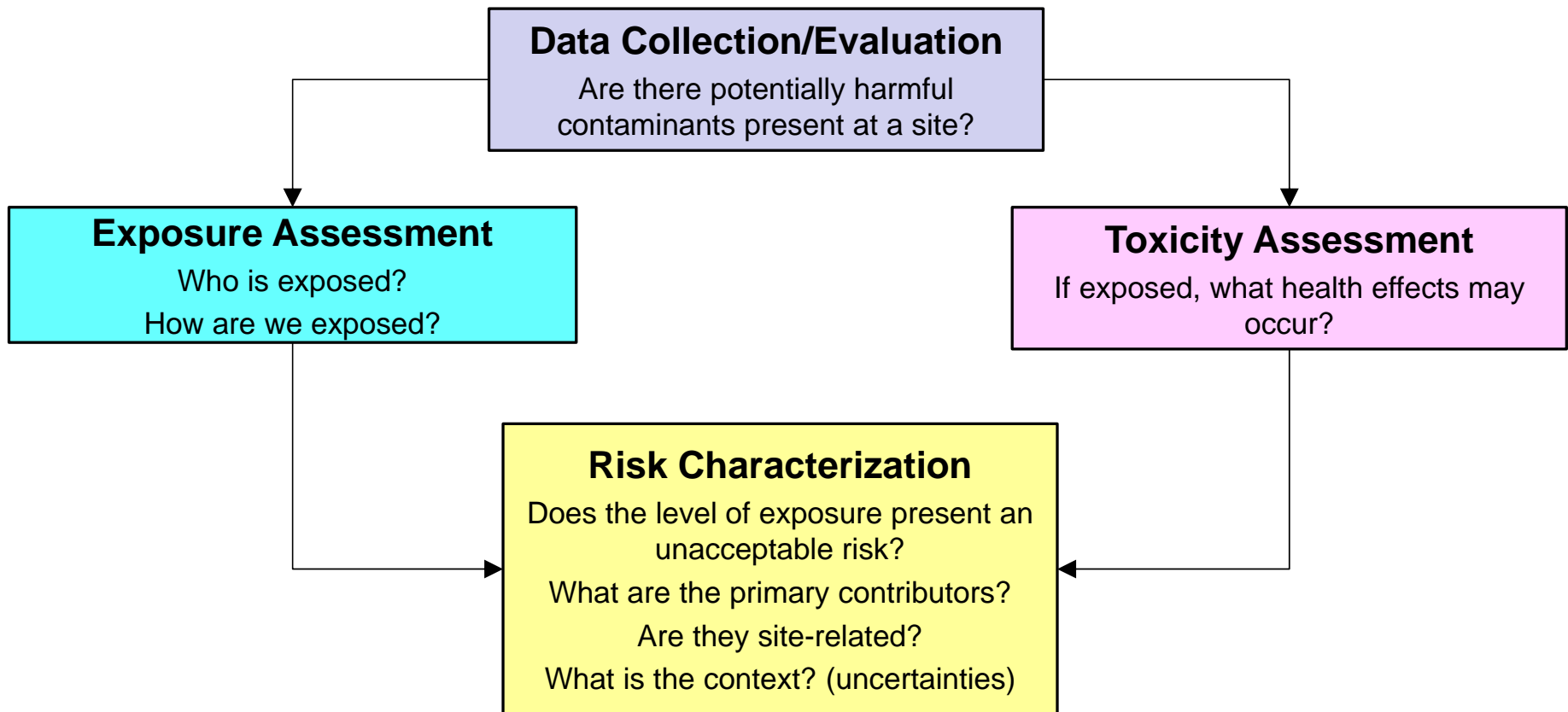
# *Elements of a Good Human Health Risk Assessment*



- **Represents site conditions**
  - Evaluates realistic and relevant land use and exposure
- **Reflects reasonable and defensible exposure factors**
  - Exposure concentrations are appropriate for current or future land use
- **Informs risk management decisions: Is a response warranted?**
  - If so, identify which chemicals, media, and areas present an unacceptable risk



# Risk Assessment – Basic Elements

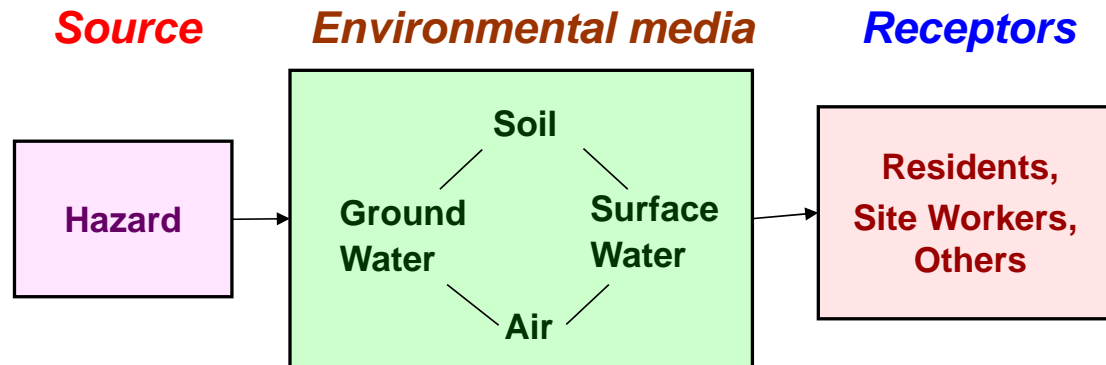




# Conceptual Site Exposure (CSM) Model

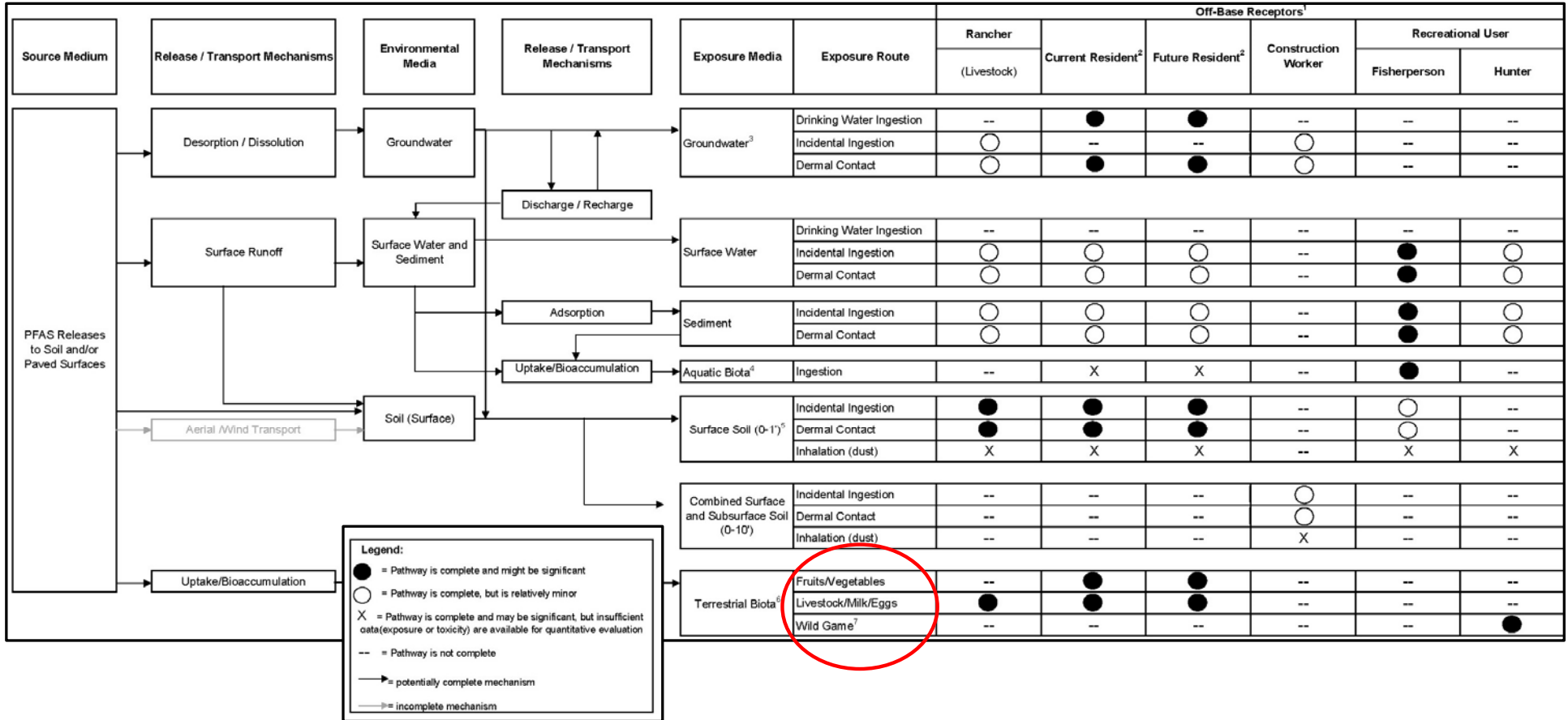


- Depicts how contaminants can move from a source to a receptor
  - Environmental setting and land use
  - Sources and release mechanism
  - Contaminant fate and transport
  - Potentially affected media and receptors



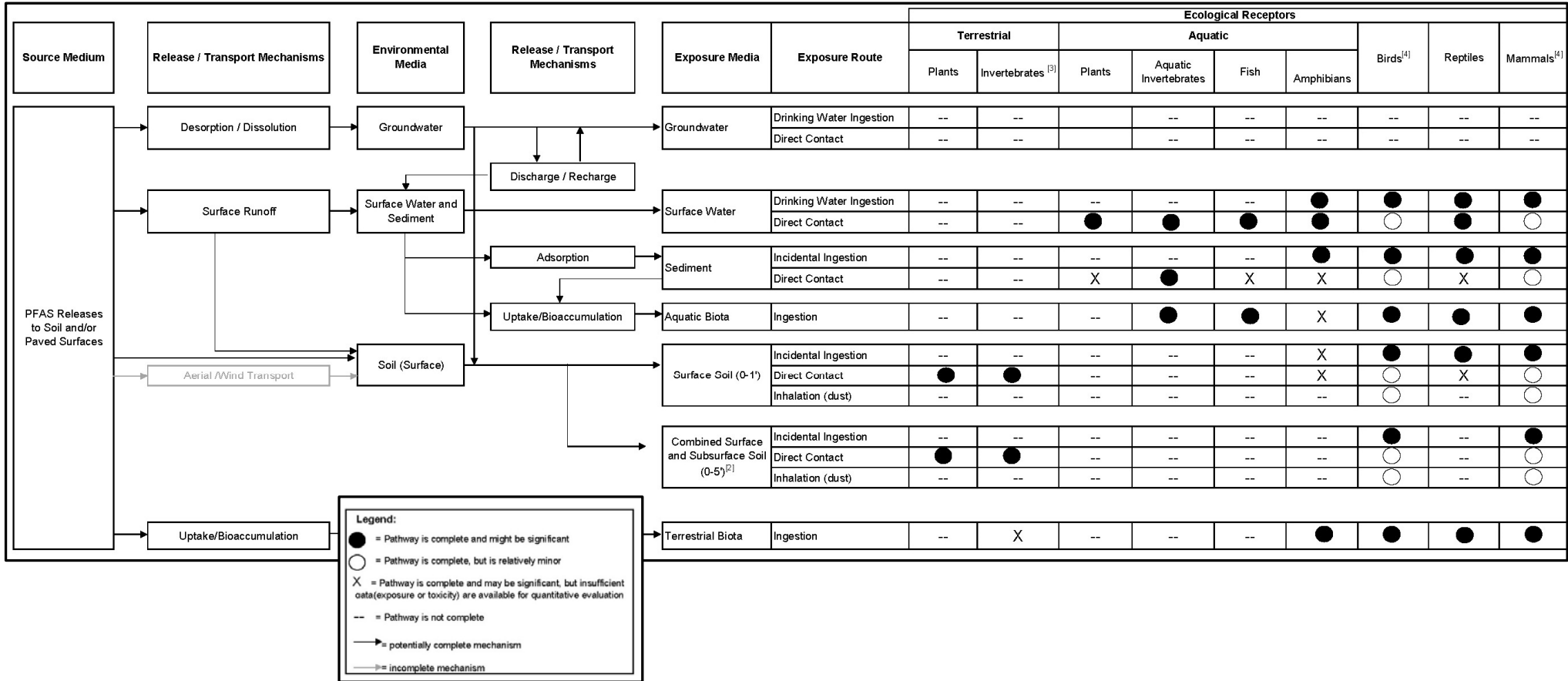


# PFAS Risk Assessment Human Health CSM





# PFAS Risk Assessment Ecological CSM





# Data Collection and Evaluation



## ■ Data Collection

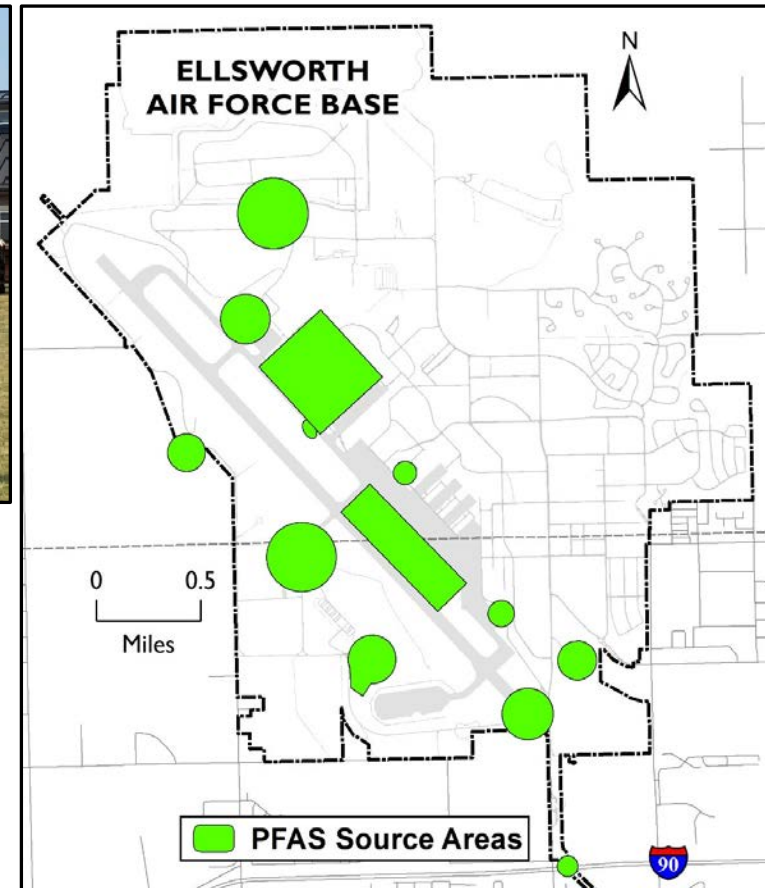
- Identify data needs
- Devise strategy for data collection – study design, data quality objectives

## ■ Data Evaluation

- Identify chemicals of potential concern



A drilling rig is used to collect soil and groundwater samples in 2021. The building shown was built over the former fire station where fire-fighting foam was used, stored, and spilled.







# Exposure Assessment

- **Magnitude, frequency, duration, pathway**
  - Who? Identify who your current and future receptors could be
  - What? Identify what media is impacted (e.g., soil or groundwater)
  - How? Identify the exposure pathways (e.g., groundwater ingestion or inhalation of dust)
  - Where? Identify the exposure point (e.g., impacted private well)
  - How much? Identify how long someone may be exposed
    - Resident vs worker vs recreator—distinct receptors will have different exposure profiles
- **Reasonable Maximum Exposure (RME)**
  - Highest exposure reasonably expected to occur – **Not the worst case**



# Toxicity Assessment



- After chemicals of potential concern are identified
  - Collect toxicity information for chemicals being evaluated
  - Identify applicable exposure periods (e.g., lifetime or short-term)
  - Identify toxicity values for cancer and noncancer effects
- Air Force selects toxicity values following USEPA's hierarchy





# Risk Characterization



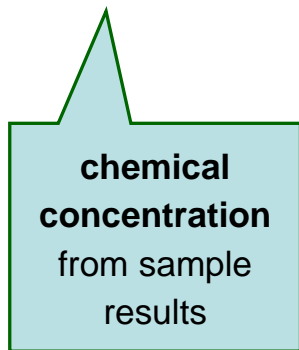
- **Combines Exposure Assessment + Toxicity Assessment**
- **Quantify pathway risks**
  - Estimate noncancer effects
  - Estimate cancer risks
  - Determine cumulative risk/hazard (all chemicals, all pathways...)
- **Evaluate uncertainty**



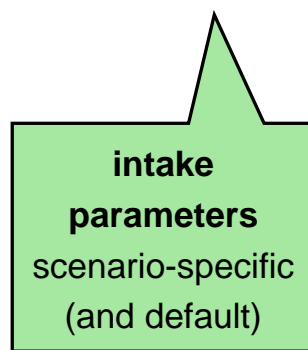


# Risk Equation: Combining Steps

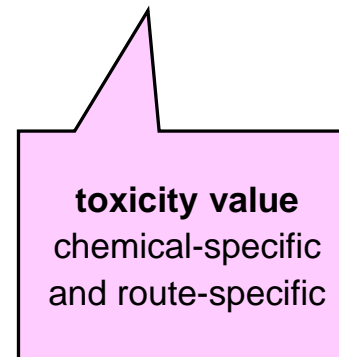
$$\text{Concentration} \times \frac{(\text{IR} \times \text{ET} \times \text{EF} \times \text{ED})}{\text{BW} \times \text{AT}} \sim \text{Toxicity Value} = \text{Risk}$$



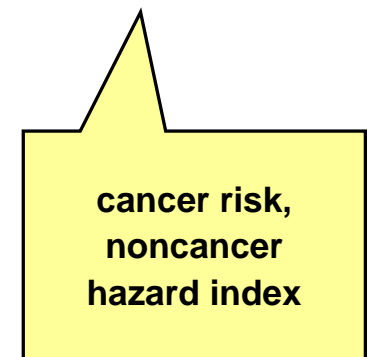
**Data Collection  
and Evaluation**



**Exposure  
Assessment**



**Toxicity  
Assessment**



**Risk  
Characterization**

IR = intake rate (e.g., mg soil/day)

ET = exposure time (hours/day)

EF = exposure frequency (days/year)

ED = exposure duration (years)

BW = body weight (kg)

AT = averaging time (days)

~ Multiply for cancer risk, Divide for noncancer hazard



# ***Risk Assessment Summary***



- Risk assessment is fundamental to the CERCLA process
- We involve our regulatory stakeholders in the risk assessment process to provide feedback on:
  - Sample design
  - CSM development
  - Risk Assessment Work Plan review
  - Final document review
- Standardized way to determine risk from exposure to a contaminant
- Air Force Goal: Technically defensible risk assessment to support decision-making
- Risk Assessment Report will be included in the Remedial Investigation Report, which will be posted on the Administrative Record



# Ways to Stay Informed

## ■ Quarterly Environmental Restoration Newsletters

- Mailed to 270+
- Posted to Administrative Record website
- Posted to Environmental Matters website

## ■ Want on our mailing list?

- Sign-up sheet
- Contact Rita Krebs: (605) 385-2688 or rita.krebs.1@us.af.mil





# Ways to Stay Informed

## Administrative Record

- <https://ar.afcec-cloud.af.mil/Search.aspx>
- Or search for “Air Force Administrative Record”

Google search results for "Air Force Administrative Record". The search bar shows the query and search icons. Below the search bar, it indicates "About 61,200,000 results (0.46 seconds)". The top result is a link to <https://ar.afcec-cloud.af.mil> titled "AF Administrative Record". A snippet below the link reads: "The AFCEC CERCLA Administrative Record Search website provides a means to search and review public documents regarding environmental testing and sampling ...".

U.S. AIR FORCE CIVIL ENGINEER CENTER ADMINISTRATIVE RECORD 3.0.0. The interface includes a search bar, filters for Active Duty, Air National Guard, and BRAC, and a list of installation sites. The "Ellsworth AFB, SD" site is selected. Search criteria include Subject or Title, Full Metadata Search, Full Document Search, Author, Recipient, and AR #. There are also dropdown menus for Sites, OUs, and RODs. A "Search" button is highlighted with a red circle. Below the search area, a table displays search results.

KBs	View	Subject or Title	Author / Author Affiliation	Document Date	AR #
1,695	Q	Engineering Evaluation and Cost Analysis, Non-Time Critical Removal Action for PFOS/PFOA in Residential Wells (2023 EE/CA)	AFCEC/CZOM	02/01/2023	8788
1,695	Q	Explanation of Significant Differences OU-11 Basewide Groundwater	OTIE/AECOM / OTIE/AECOM	01/30/2023	8789
14,235	Q	Final Human Health and Ecological Risk Assessment Work Plan, Presented as an Addendum to the July 2021 Final QAPP for Basewide PFOS/PFOA Remedial Investigation	BEM	01/20/2023	8787
187	Q	Restoration News Issue 23. Issues include an update on the community water system, the Air Force partnership with the South Dakota Ellsworth Development Authority, and the upcoming Community Town Hall to be hosted by Pennington County.	Krebs, Rita / AFCEC/CZOM	12/23/2022	8785

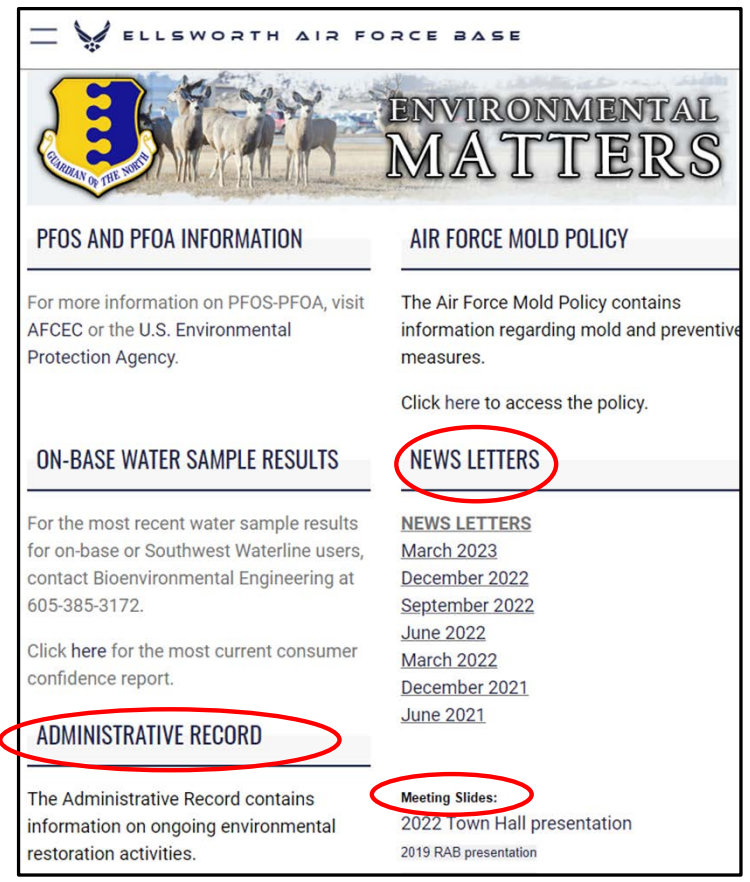
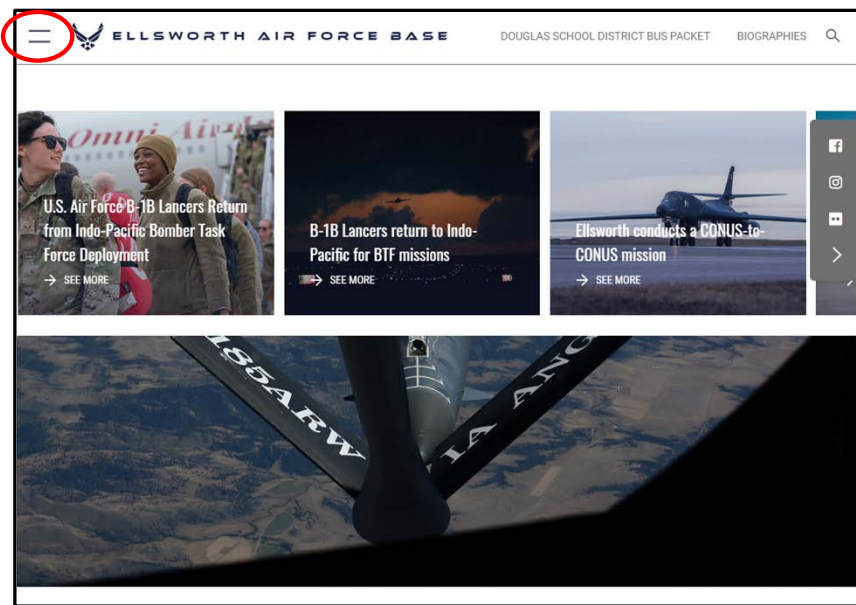




# Ways to Stay Informed

## ■ Environmental Matters Website

- <https://www.ellsworth.af.mil/About-Us/Environmental/>
- Or go to Ellsworth’s website at [ellsworth.af.mil](http://ellsworth.af.mil) and select “About us” and “Environmental”





## *Summary*



- **RAB interest assessment underway through April 30, 2023**
- **Quarterly PFAS sampling continues at 1 drinking water well**
- **A human health and ecological risk assessment is underway**
- **There are many ways for the community to stay informed**



***Your Success is Our Mission!***