Naval Facilities Engineering Systems Command
EXWC Engineering and Expeditionary Warfare Center

Evaluation of PFAS Sources under the Watershed Contaminated Source Document (WCSD) Process

Wendy Rose Hovel
Geosyntec Consultants

RITS 2026

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Information in this presentation is current as of 10 April 2026.

EXWC: Engineering and Expeditionary Warfare Center
NAVFAC: Naval Facilities Engineering Systems Command

Speaker Introduction

Wendy Rose Hovel

Senior Scientist
Sediment and Ecological Risk

(Hovel n.d.)

- BA Biology, MS Marine Science, PhD Toxicology
- 20 years of consulting at sediment sites
  - Pearl Harbor, San Diego Bay, Los Angeles/Long Beach Harbor, Puget Sound, Lake Washington, San Francisco Bay, Sacramento/San Joaquin Rivers, Willamette River, Duwamish Waterway, Victoria Harbour, Terry Creek (Georgia), Toronto Waterfront Area, lakes in Northern/Southern California, reservoirs in various states, Hudson River
- Characterization, delineation, litigation support, risk assessment, RI/FS, beneficial use evaluations, background studies, sediment TMDLs, CERCLA/RCRA and state cleanup sites, dams, ponds, lakes, quarries, and ecological risk assessment

BA: Bachelor of Arts
CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
MS: Master of Science
PhD: Doctor of Philosophy
RCRA: Resource Conservation and Recovery Act
RI/FS: remedial investigation/feasibility study
TMDL: total maximum daily load

Presentation Overview

- Introduction
  - What is a WCSD?
  - When is a WCSD required?
- Steps for Developing a WCSD
  - Steps 1 to 7
- Considerations for a PFAS WCSD
  - Literature review
  - Conceptual site model
- Case Studies
  - Case Study #1: St. Mary's River WCSD—PFAS Example
  - Case Study #2: Apra Harbor WCSD—Other Contaminants Example
- WCSD Activity
- Key Takeaways

Introduction

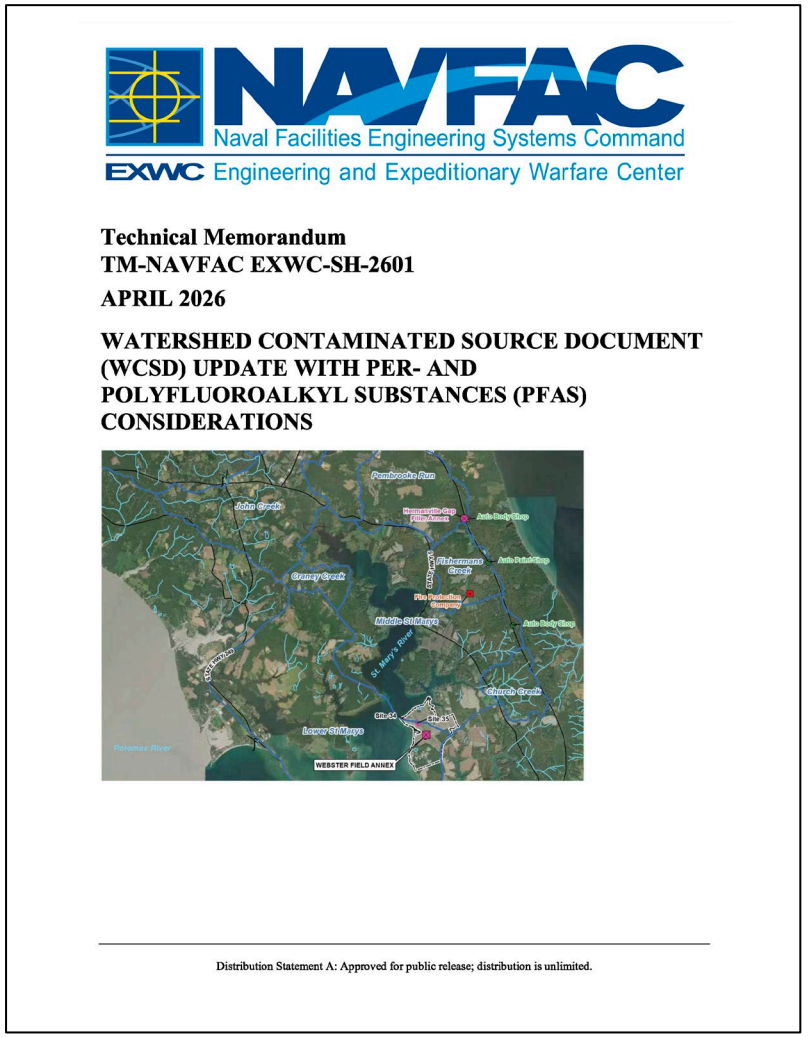
Watershed Contaminated Source Document (WCSD)

- **<u>Concise summary report</u>** that documents both Navy and non-Navy contaminant sources within drainage area that could have impact on sediments associated with Navy IRP or BRAC site*
- Follows CNO Policy on *Sediment Site Investigation and Response Action*

* WCSD can also benefit CSM development at groundwater or surface water sites.

BRAC: Base Realignment and Closure
CNO: Chief of Naval Operations
CSM: conceptual site model

IRP: Installation Restoration Program
Navy: Department of the Navy



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Technical Memorandum
TM-NAVFAC EXWC-SH-2601
APRIL 2026

WATERSHED CONTAMINATED SOURCE DOCUMENT (WCSD) UPDATE WITH PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) CONSIDERATIONS

Distribution Statement A: Approved for public release; distribution is unlimited.

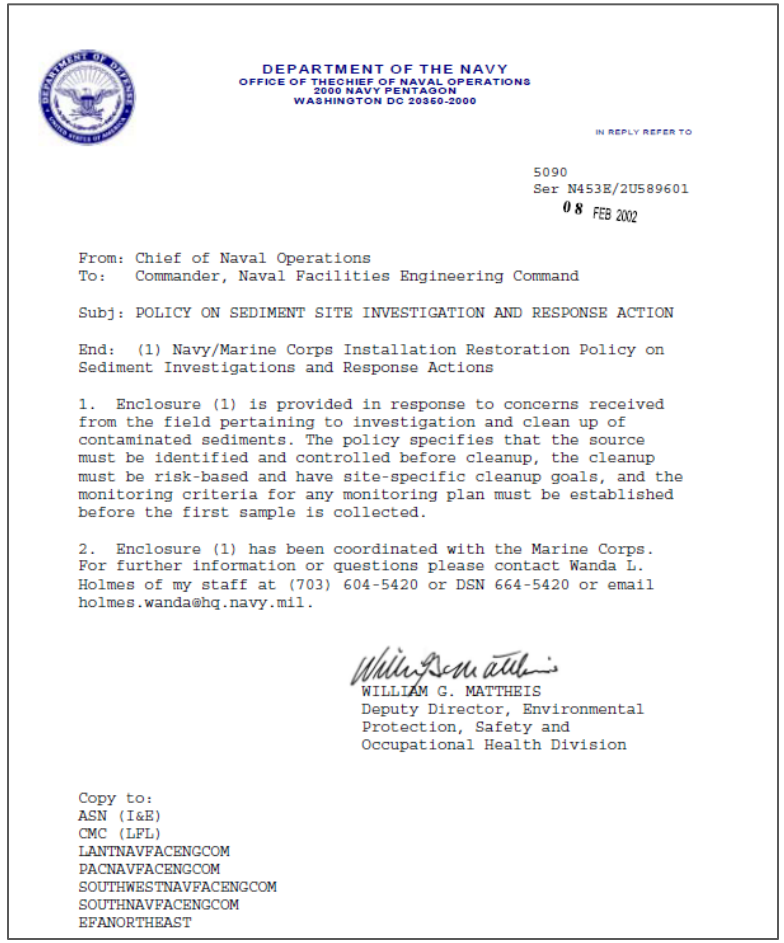
(NAVFAC EXWC 2026)
Available Here!

Basis for the WCSD

CNO policy requires this document if there is potential for non-Navy impacts (*moderate to significant*) to sediment adjacent to a Navy site.

KEY POINT

Sediment contaminant investigations must be directly linked to Navy releases.



DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON DC 20350-2000

IN REPLY REFER TO

5090
Ser N453E/2U589601
08 FEB 2002

From: Chief of Naval Operations
To: Commander, Naval Facilities Engineering Command

Subj: POLICY ON SEDIMENT SITE INVESTIGATION AND RESPONSE ACTION

End: (1) Navy/Marine Corps Installation Restoration Policy on Sediment Investigations and Response Actions

1. Enclosure (1) is provided in response to concerns received from the field pertaining to investigation and clean up of contaminated sediments. The policy specifies that the source must be identified and controlled before cleanup, the cleanup must be risk-based and have site-specific cleanup goals, and the monitoring criteria for any monitoring plan must be established before the first sample is collected.

2. Enclosure (1) has been coordinated with the Marine Corps. For further information or questions please contact Wanda L. Holmes of my staff at (703) 604-5420 or DSN 664-5420 or email holmes.wanda@hq.navy.mil.

WILLIAM G. MATTHEIS
Deputy Director, Environmental Protection, Safety and Occupational Health Division

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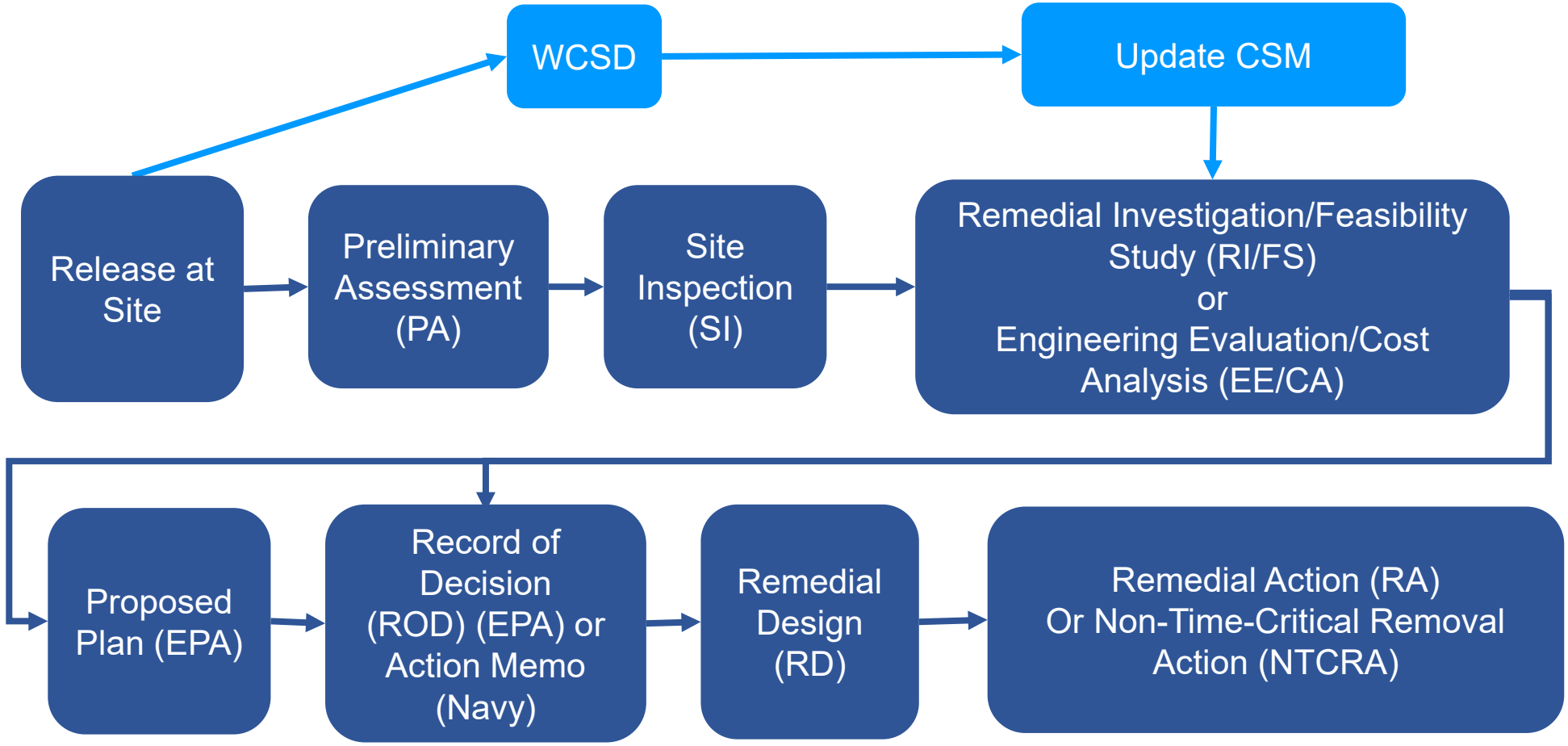
(CNO 2002)

How the WCSD Fits into CERCLA* Process

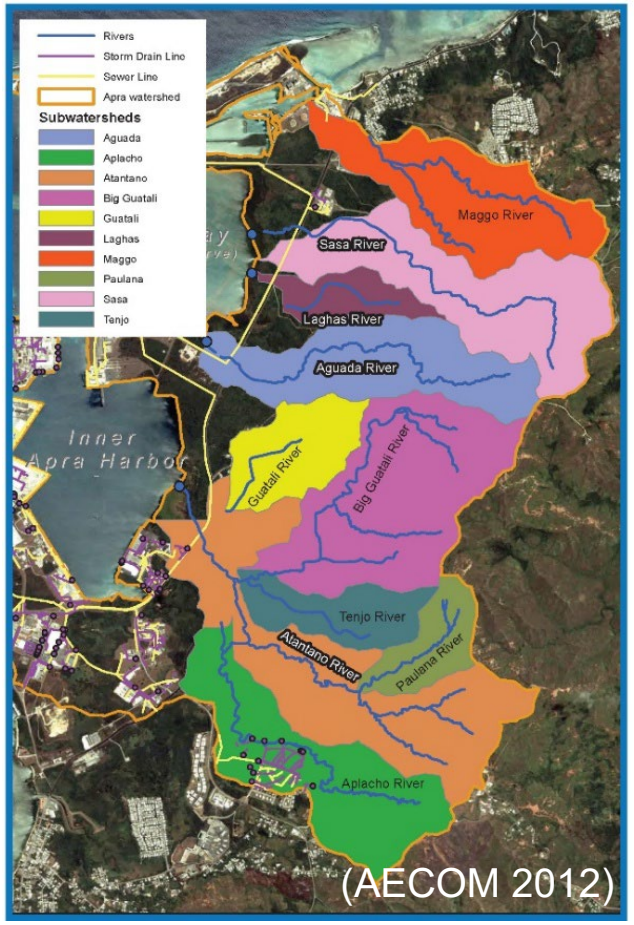


* Similar Process for RCRA; expedited for TCRAs

EPA: United States Environmental Protection Agency
TCRA: time-critical removal action

Elements of the WCSD

- **Identify WCSD scope and area**
  - Limited to area/activities with most impact on Navy sediment investigation area
- **Watershed contaminant source map**
  - Crux of WCSD; watershed-based map of scoped area with locations of potential sources most likely to contribute contaminants to sediment investigation area*
- **Graphic CSM map**
  - Describes sources, transport mechanisms, exposure pathways, and receptors relevant to investigation area
- **Conclusions**
  - Summarizes results of WCSD, indicating whether there are non-Navy sources with potential to impact sediment in investigation area



Example of watershed area map

* Consider potential sources to groundwater, surface water, and sediment in investigation area.

When is a WCSD Required?

- WCSD determination is project-specific
- Use professional judgement
  - **Likely needed** where potential non-Navy sources are significant, or historically have been significant, to contamination at Navy IRP-related sediment investigation area and waterbody receives runoff from non-Navy sources
  - **Not likely needed** where Navy is only potential source and waterbody is within Navy property or does not receive runoff from non-Navy property

KEY POINT

WCSD is required where potential non-Navy sources are (or were) significant to Navy IRP area sediment contamination.

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Steps for Developing a WCSD: A Concise Summary

Step 1: Determine need for WCSD

Step 2: Define WCSD scope and area

Step 3: Conduct literature search on potential sources

Step 4: Develop preliminary watershed contaminant source map

Step 5: Conduct watershed visit to confirm source accuracy

Step 6: Develop graphic CSM

Step 7: Write WCSD

Step 1: Determine Need for WCSD

- **Likely needed** where potential non-Navy sources are significant, or historically have been significant, to contamination at Navy IRP-related sediment investigation area and waterbody receives runoff from non-Navy sources
  - Example: Lake with Navy IRP sediment area and both Navy and non-Navy (industrial) potential sources surrounding the lake
- **Not likely needed** where Navy is only potential source and waterbody is within Navy property or does not receive runoff from non-Navy property
  - Example: Bay with Navy IRP sediment area, with potential upland Navy sources, but in an area with no major industrial sources or riverine inputs
- **Gray area:** Navy IRP sediment area in a river with nearby Navy base; upstream – some non-Navy potential sources but they are not found along the riverbank.

KEY POINT

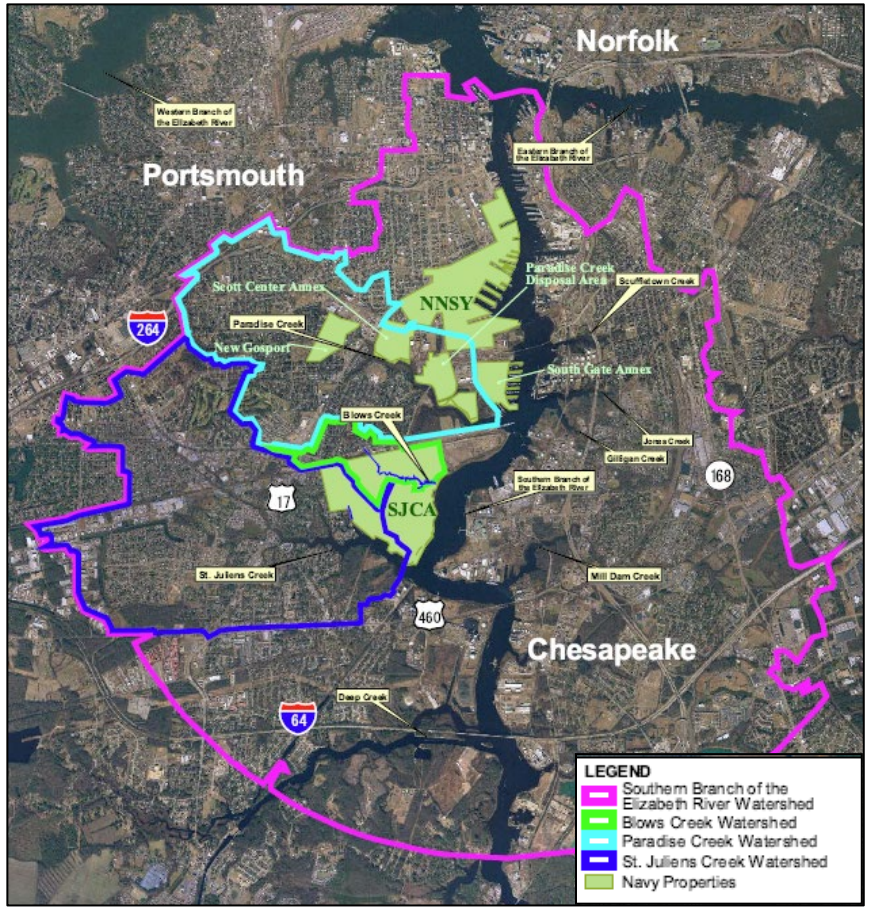
Ultimately, this is a project-specific decision using best professional judgment and the Navy decides whether WCSD is necessary.

Step 2: Define WCSD Scope and Area

- Involves development of geospatial map showing watershed to which WCSD applies along with other key information (IRP/BRAC site locations, adjacent sites, Navy and non-Navy drainage areas, stormwater/ storm drains, surface waters, land use types)
- **Note: there may be Controlled Unclassified Information considerations if showing infrastructure**

CRITICAL STEP

Define scope and area for WCSD. Refine scope as needed during WCSD development.*



(CH2M 2005)

* Note: If it is a large watershed, may need to focus on a sub-watershed.

Step 3: Conduct Literature Search on Potential Sources

- Comprehensive literature and data search where publicly available databases and documents are searched for potential Navy and non-Navy sources (both point and non-point sources) within watershed
- Consider potential sources not only to sediment but also to groundwater and surface water

Surface Waters Section 303(d) Listings, Federal and State TMDLs

https://www.epa.gov/tmdl

Superfund Enterprise Management System

https://enviro.epa.gov/envirofacts/sems/search

EPA Envirofacts Data Warehouse

https://www.epa.gov/enviro/envirofacts-overview

Environmental Database Reports

Various service providers can prepare these reports for a fee; impacted sites within a given radius.

NPDES-permitted Discharges

https://www.epa.gov/hydrowq/metadata-permit-compliance-system-pcs

Other Search Engines

- Google Earth

State Cleanup Sites

Washington: https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-sites

Maryland: https://mde.maryland.gov/programs/land/MarylandBrownfieldVCP/Pages/remediationsites.aspx

California: https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=Sacramento

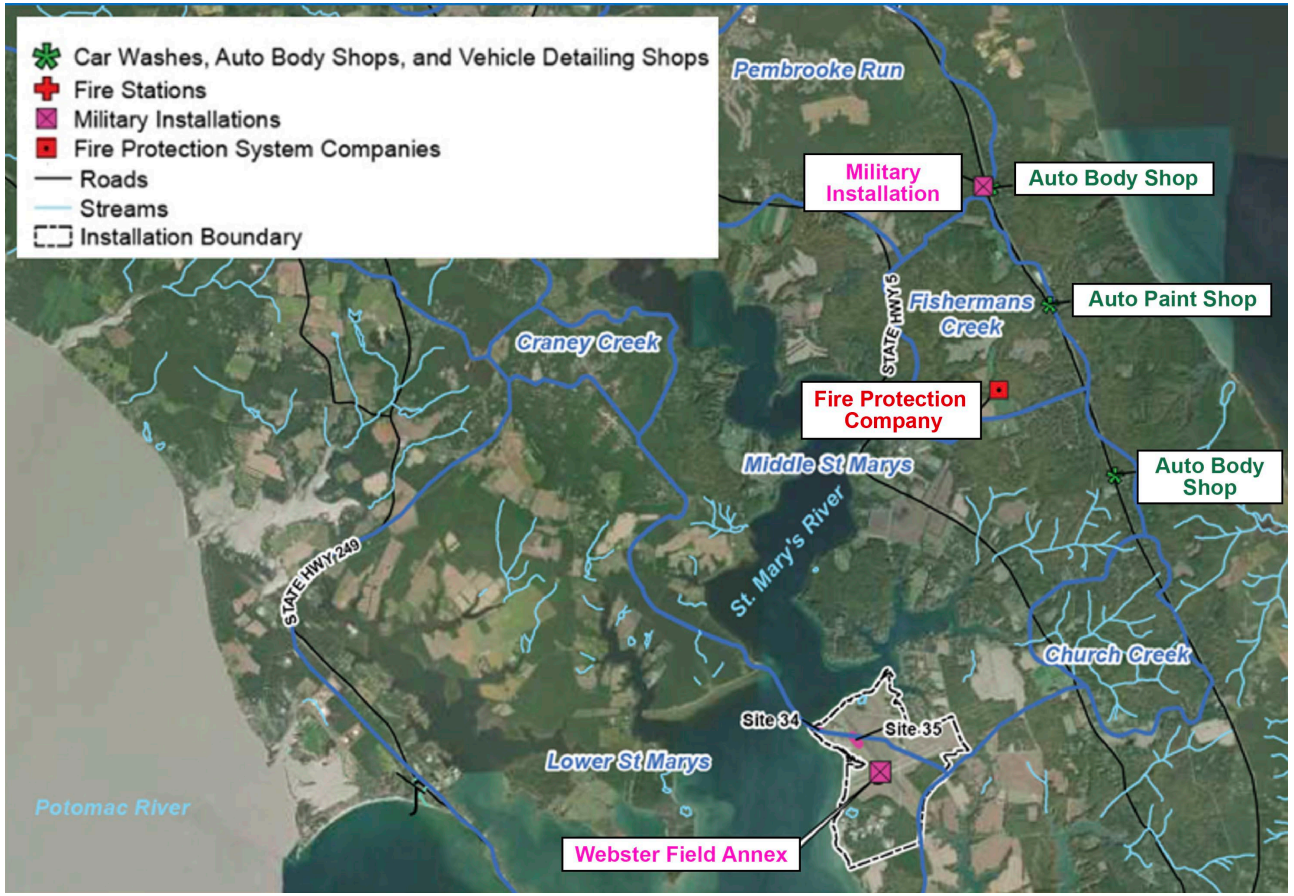
NPDES: National Pollutant Discharge Elimination System

Step 4: Preliminary Watershed Contaminant Source Map

- Geospatial map development in Step 2 is refined to establish preliminary watershed contaminant source map that identifies the following:
  - WCSD scoped area
  - IRP/BRAC site
  - Location of nearby sediment area
  - Locations of potential Navy and non-Navy sources

* Note: Potential PFAS release areas are NOT definitive evidence that a release of PFAS occurred at these addresses unless otherwise noted in this document.

PFAS: per- and polyfluoroalkyl substances



Example of a Watershed Contaminant Source Map
(CH2M 2024)

Step 5: Watershed Visit

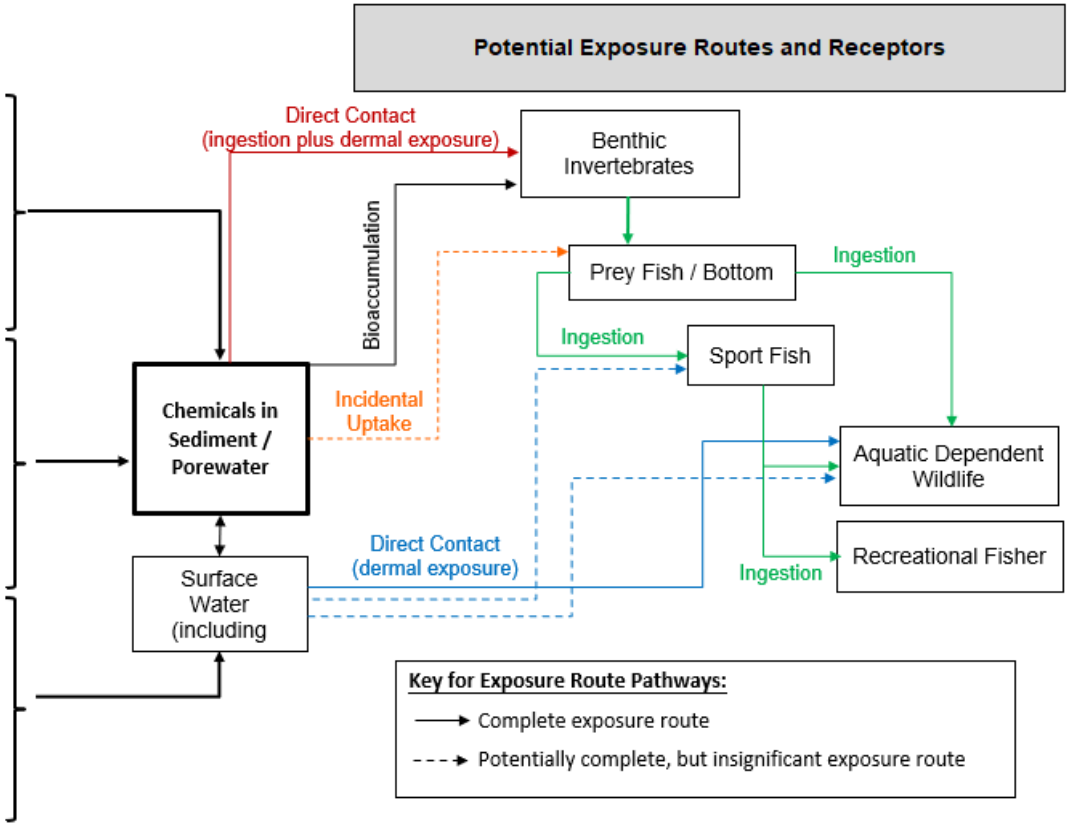
- **Conduct watershed visit to confirm source accuracy**
- When potential sources have been identified, watershed information should be confirmed by watershed visit, updates to watershed contaminant source map, and further literature searches if necessary
- Look for literature review potential sources, pathways to Navy IRP sediment area

(Microsoft 365 2026)

Step 6: Graphic CSM

- Develop a graphic CSM to illustrate potential sources and releases (both Navy and non-Navy) and possible transport mechanisms, exposure pathways, and receptors

Area	Historical or Ongoing Activities & Transport Routes	Data Indicate Potential Source
IR Site	IR Site soil erosion / groundwater leachate	Yes
	Direct discharges/spills/liquid releases of wastes	Yes
	Direct discharges of stormwater	No
	Dry Dock Discharges	Unclear
	Creosote pier pilings	Unclear
	In-water activities	Yes
Non-Navy Point Sources	RCRA / CERCLA / contaminated soil - erosion and groundwater leachate	Yes
	Industrial Discharges	Yes
	Direct discharges of stormwater	No
	Dry Dock Discharges	Yes
	Creosote pier pilings	N/A
	In-water activities	Yes
Non-point Sources (Navy & Non-Navy)	Transport of contaminated sediment into site	Unclear
	Runoff from Roads / Impervious Surfaces	Unclear
	Combustion / Aerial deposition	Unclear
	Agricultural inputs / runoff	Unclear
	Stormwater runoff	Unclear
	Upstream/upgradient Industrial discharges	Unclear



Example Conceptual Site Model Illustrating Potential Sources and Releases (both Navy and Non-Navy), Transport Mechanisms, Exposure Pathways, and Receptors
(NAVFAC EXWC 2026)

Step 7: Write the WCSD

Concise document describing all identified potentially significant Navy and non-Navy sources to sediments in the waterbody

- Present watershed area map showing WCSD scoped area
- If available, review and briefly summarize existing analytical data
- Present watershed contaminant source map with all notable potential sources
- Present CSM showing complete and significant pathways
- Present conclusions
  - Numerous point and non-point sources from both Navy and non-Navy sites to sediments
  - Navy is not the only source, so Navy/non-Navy contribution should be considered on site-specific basis
  - Background studies might be valuable; involve other stakeholders

* Recommend stakeholder and regulator engagement, but it is not required.

WCSD Example Summary Table

A Summary Table Can Be Useful

Example Summary Table for WCSD Showing Potential Sources of Chemicals from Navy and Non-Navy Sources

Primary sources are highlighted

Types of Sources	Navy	Non-Navy
Watershed Point Sources		
EPA-Designated Sites		
IR Sites	10	10
Toxic Releases	1	7
Water Dischargers	1	2
Air Emissions	1	5
State Sites of Concern		
Sites		5
Releases of hazardous substances		20
USTs/LUSTs		22
NPDES Stormwater Discharges		15
Watershed Non-Point Sources		
Naturally Occurring Metals		2
Agriculture		numerous
Impaired Waterbodies (Clean Water Act Section 303[d])		2
Storm Drains and Outfalls	numerous	numerous
Other Sources		
Brownfield Sites		1
General Urbanization		numerous
Oil Spills	1	1

IR: installation restoration
LUST: leaking underground storage tank
UST: underground storage tank

(Earth Tech, Inc. 2025)

Test your knowledge!

Quiz Question #1

Put the Steps of the WCSD in Order

A. Conduct watershed visit to confirm source accuracy
B. Determine need for WCSD
C. Develop graphic CSM
D. Conduct literature search on potential sources
E. Develop preliminary watershed contaminant source map
F. Write WCSD
G. Define WCSD scope and area

Answer

B. Step 1: Determine need for WCSD

G. Step 2: Define WCSD scope and area

D. Step 3: Conduct literature search on potential sources

E. Step 4: Develop preliminary watershed contaminant source map

A. Step 5: Conduct watershed visit to confirm source accuracy

C. Step 6: Develop graphic CSM

F. Step 7: Write WCSD

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Considerations for PFAS WCSDs*

- PFAS sediment overview
- *Specific considerations pertain to Step 3 (Literature Search), Step 6 (CSM), and Step 7 (WCSD)*

**** PFAS focus only affects certain steps.***

PFAS Review and Characteristics Relevant to WCSDs

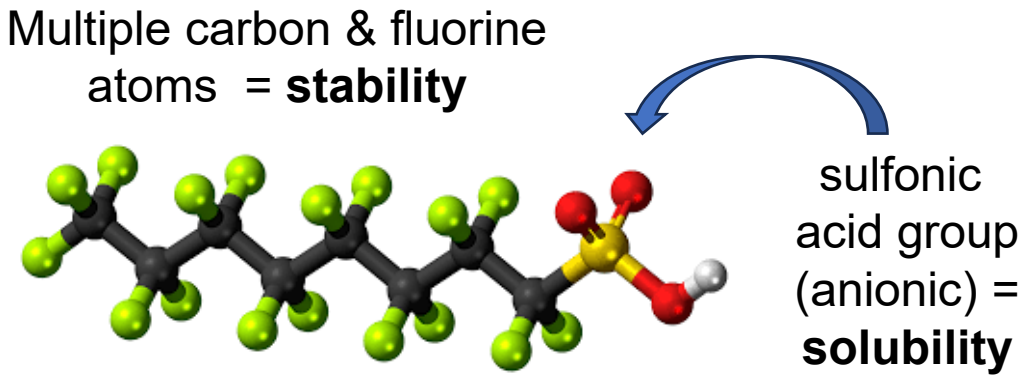
1. PFAS: per- and polyfluoroalkyl substances

- Family of synthetic organic compounds

2. Characteristics most important for PFAS WCSDs

- **Surfactants** with a charge (anions, cations, zwitterions)
- Hydrophobic, somewhat soluble
- **Persistent** in environment
- Can **travel long distances** (miles!) quickly in water
- **Accumulate** in sediment, bioaccumulate in biota
- **Can be toxic** at environmentally relevant dose

Example: PFOS



(Wikimedia Commons 2011)

PFOS: Perfluorooctanesulfonic acid

Why Does it Matter for WCSD?

- PFAS are found in AFFF
- Major PFAS release mechanism
  - Often thousands of liters discharged per use
  - 1%–10% PFAS by weight

Fire-Related Activities	Manufacturing & Materials	Industrial/Commercial Operations	Waste and Applications
• Historical fires where AFFF used • Fire stations/engine maintenance • Airports • Fire protection companies • Fire training areas • Tank farms / facilities with fire suppression systems	• Pesticides • Countertops and coating • Outerwear and shoes • Low volatile organic compound paint • Carpet and stain resistant treatments • Food packaging, coated paper, and cookware	• Military installations • Chromium plating shops • Wastewater treatment plants • Car washes, auto body shops, and vehicle detailing shops	• Landfills • Spills from transformers • Bilge waste disposal areas • Biosolids land application areas • AFFF spray testing areas

(NAVFAC EXWC 2026)

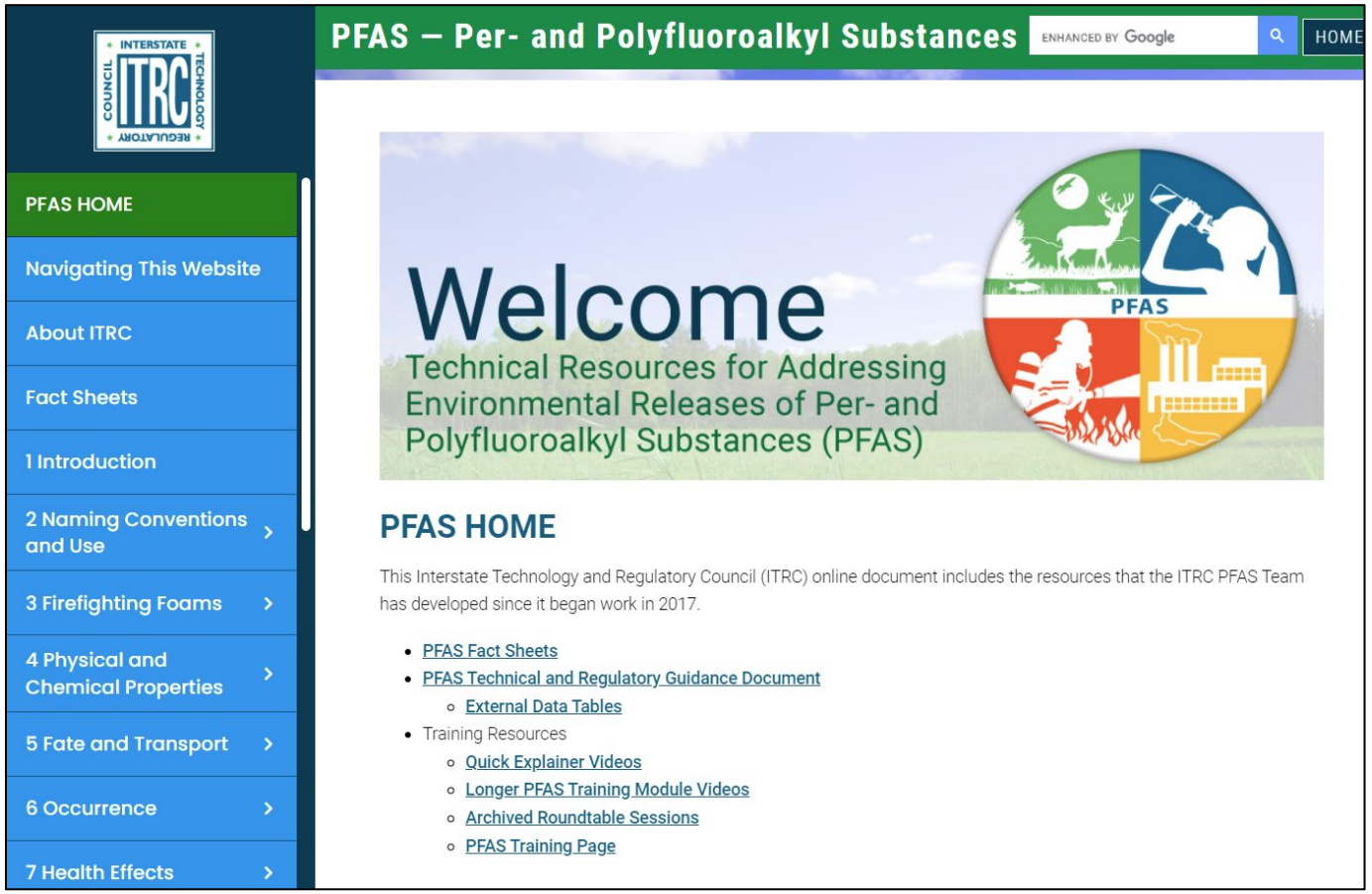
But there are many non-AFFF sources

AFFF: aqueous film-forming foam

For the PFAS Literature Review: Reference Website

Search “ITRC PFAS”

https://pfas-1.itrcweb.org/



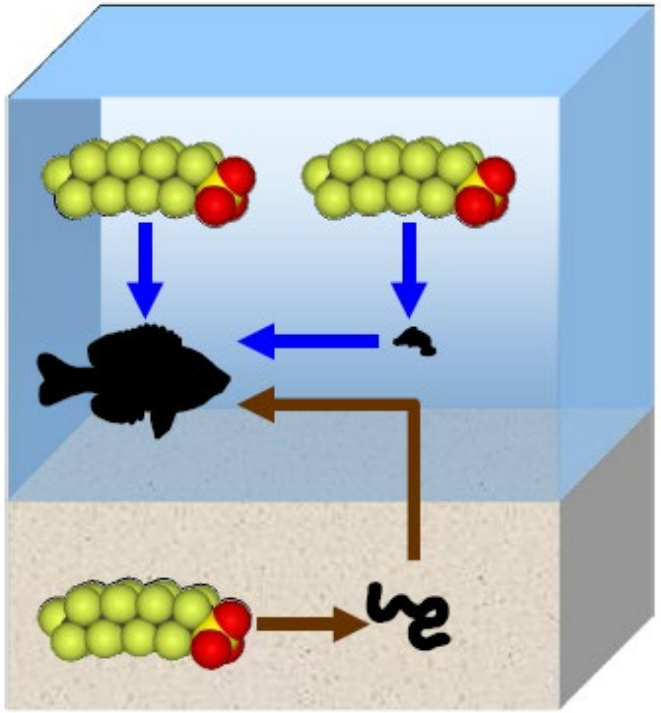
(ITRC 2026)

ITRC: Interstate Technology and Regulatory Council

But is Sediment PFAS a Problem?

Potentially, because of the following

- PFAS can travel long distances quickly
- Like most organic chemicals, PFAS like to sorb to organic carbon
- They are surfactants: lipid-loving tail and anionic/cationic head
- PFAS bioaccumulate into food webs (sediment -> invertebrate -> fish -> human and wildlife fish/invertebrate consumers)



(Conder 2018)

Step 3: PFAS Literature Search

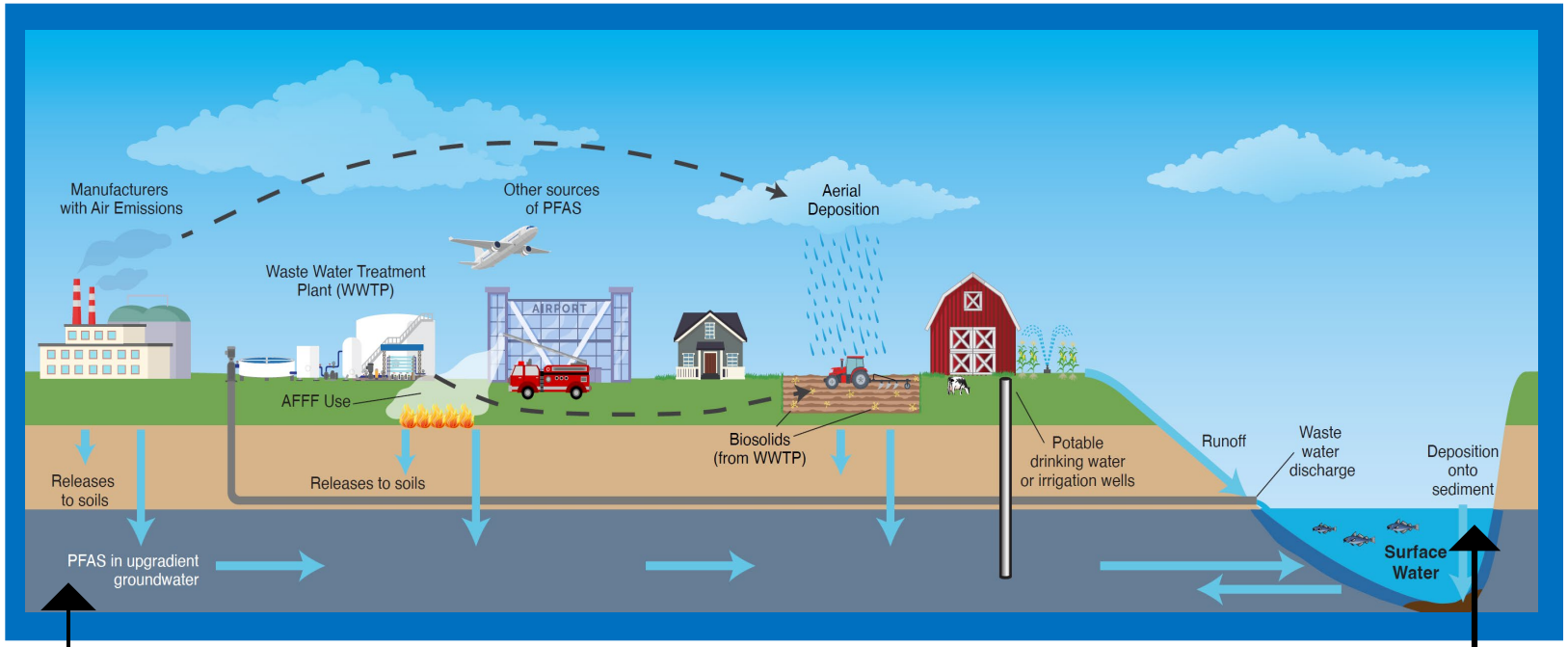
Look for potential PFAS sources, particularly in manufacturing of these and related products

(VectorMine 2024)

Step 6: PFAS WCSD Graphic CSM

Include PFAS-specific elements of CSM.
Consider the following

- Various and diverse non-Navy PFAS sources
- Fate and transport pathways of importance to PFAS(soil to GW, GW to SW, aerial deposition, discharge from WWTP, SW to sediment)
- Exposure pathways of concern for WCSD (sediment to fish, fish to humans)



(NAVFAC EXWC 2026)

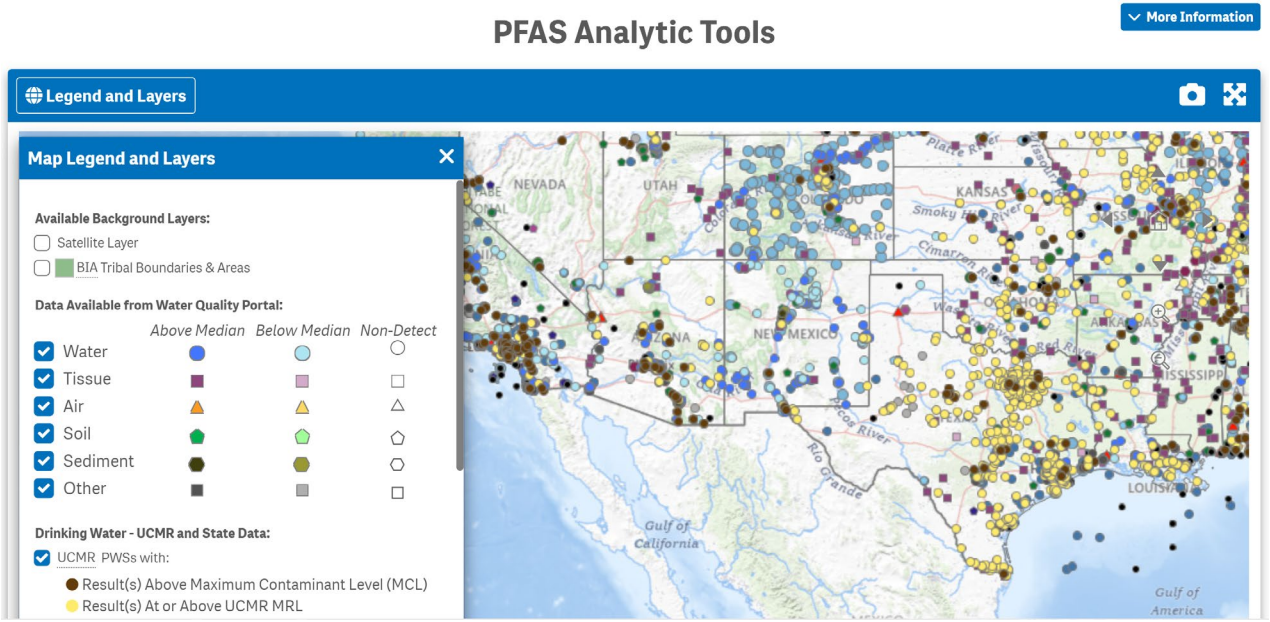
Background, non-Navy sources

GW: groundwater SW: surface water WWTP: wastewater treatment plant

Step 7: WCSD—PFAS Sites: Resources

Agency Resources:

- **EPA PFAS Analytic Tools**: https://echo.epa.gov/trends/pfas-tools/
- **State-specific reports** or inventories of PFAS. For example, the New York State Department of Environmental Conservation https://dec.ny.gov/environmental-protection/site-cleanup/database-search

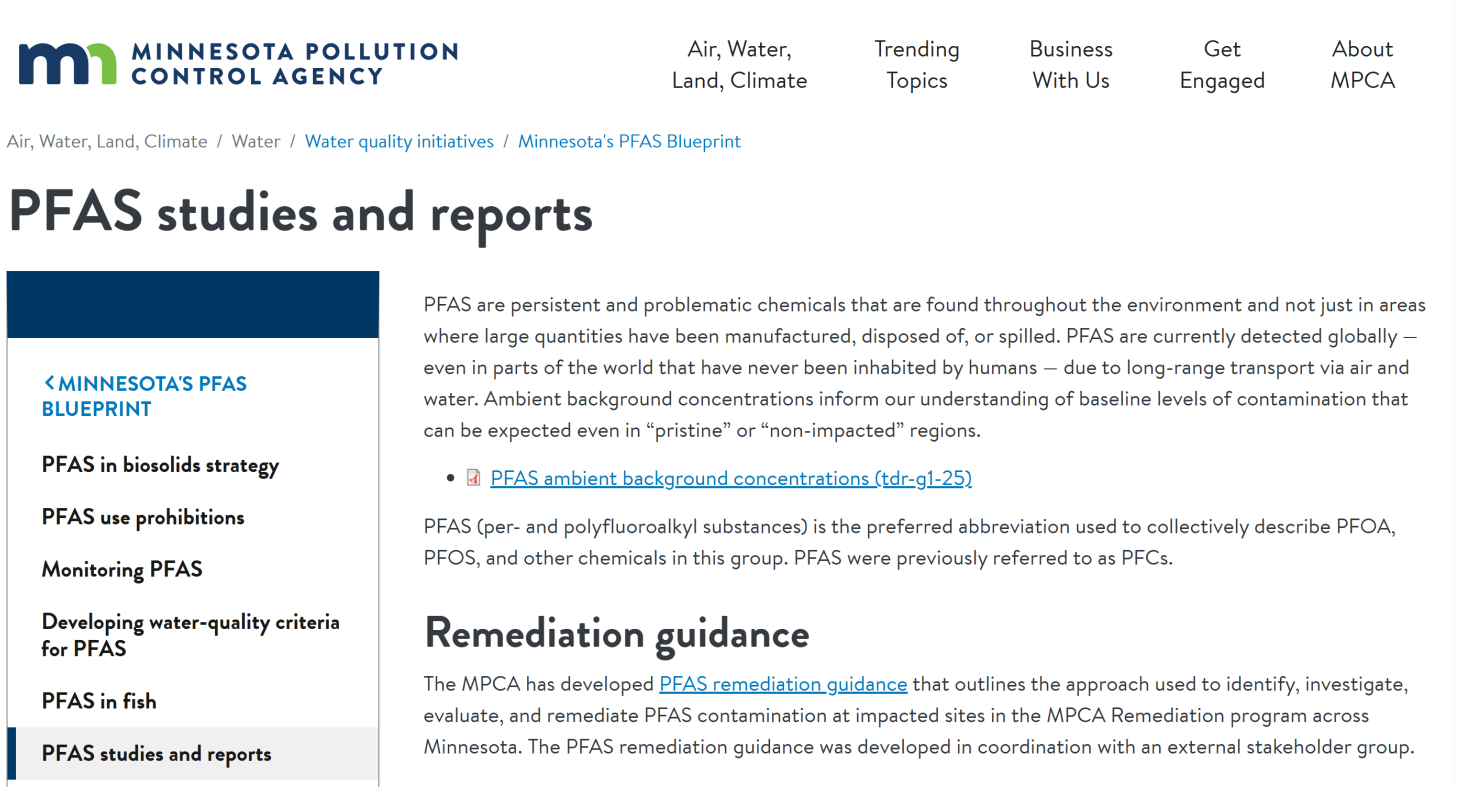


(EPA n.d.)

Step 7: WCSD—PFAS Sites: Resources

More Agency Resources

- **Regulatory agency surveys/reports** to characterize ambient concentrations of PFAS in the environment
- **State databases on biosolids land application** (e.g., Pennsylvania https://www.arcgis.com/home/item.html?id=65aaa8fadf9e4a88b2635a60ad935e7b)

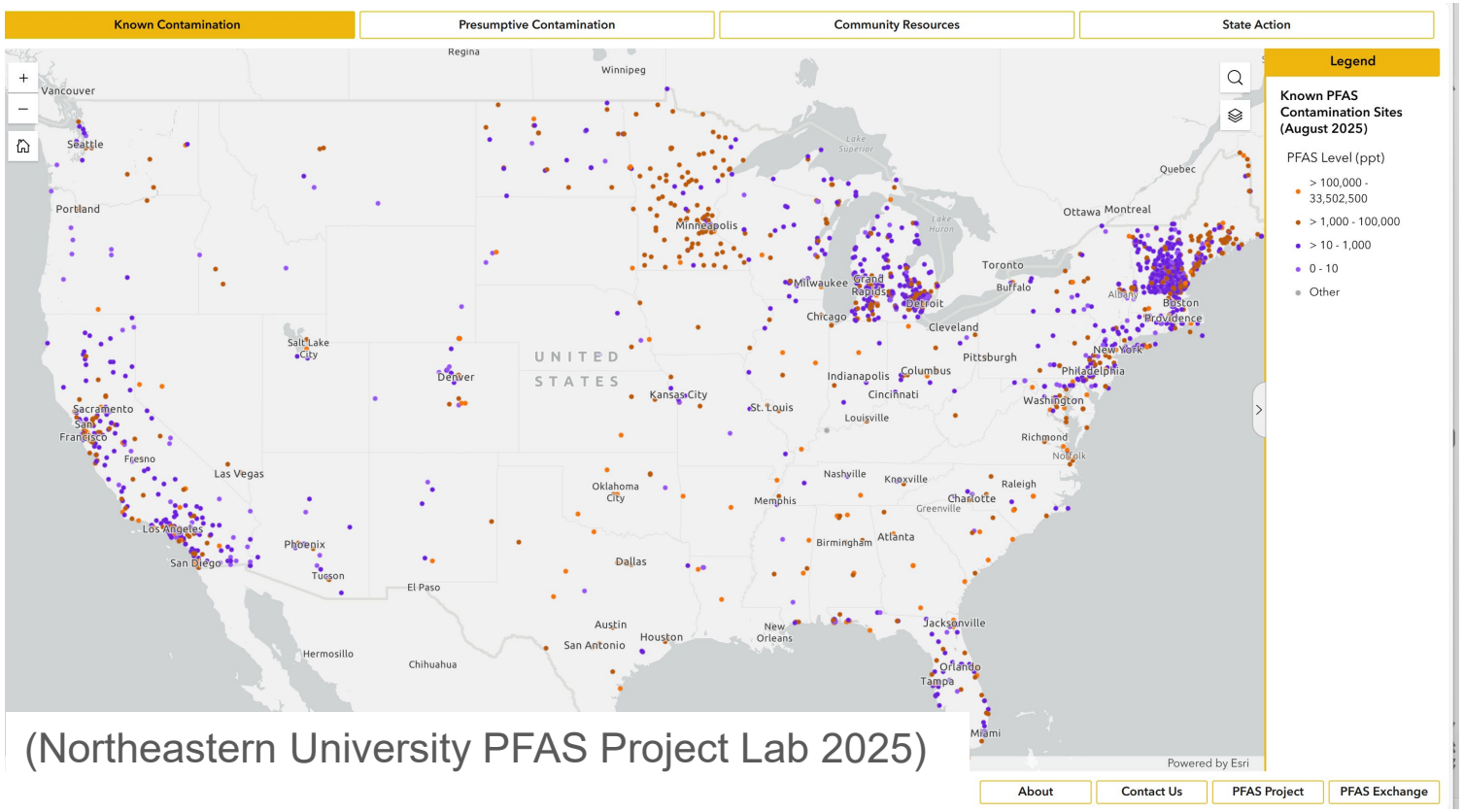


(Minnesota Pollution Control Agency n.d.)

Step 7: WCSD—PFAS Sites: Resources

Non-Agency Resources

- PFAS Project Database: https://pfasproject.com/pfas-sites-and-community-resources/
- **Environmental database reports (EDRs)** focused on facilities that used or produced PFAS (e.g., chromium plating shops)



(Northeastern University PFAS Project Lab 2025)

EDR: Report that compiles and summarizes information from federal, state, and local environmental databases to identify known or potential environmental conditions, regulatory listings, and compliance considerations relevant to a site or project area

Step 7: WCSD—PFAS Sites: Resources

Non-Agency Resources

- **Salvatore, et. al. (2022)** (potential businesses at which PFAS may have been used)

Environmental Science & Technology Letters

pubs.acs.org/journal/estlcu

Letter

Presumptive Contamination: A New Approach to PFAS Contamination Based on Likely Sources

Derrick Salvatore, Kira Mok, Kimberly K. Garrett, Grace Poudrier, Phil Brown, Linda S. Birnbaum, Gretta Goldenman, Mark F. Miller, Sharyle Patton, Maddy Poehlein, Julia Varshavsky, and Alissa Cordner*

Cite This: *Environ. Sci. Technol. Lett.* 2022, 9, 983–990

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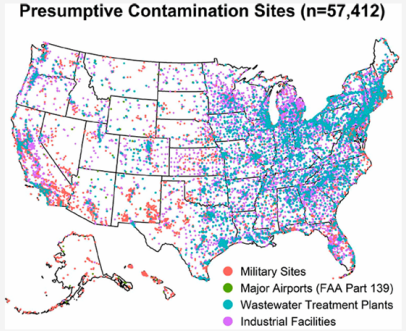
ABSTRACT: While research and regulatory attention to per- and polyfluoroalkyl substances (PFAS) has increased exponentially in recent years, data are uneven and incomplete about the scale, scope, and severity of PFAS releases and resulting contamination in the United States. This paper argues that in the absence of high-quality testing data, *PFAS contamination can be presumed* around three types of facilities: (1) fluorinated aqueous film-forming foam (AFFF) discharge sites, (2) certain industrial facilities, and (3) sites related to PFAS-containing waste. While data are incomplete on all three types of presumptive PFAS contamination sites, we integrate available geocoded, nationwide data sets into a single map of presumptive contamination sites in the United States, identifying 57,412 sites of presumptive PFAS contamination: 49,145 industrial facilities, 4,255 wastewater treatment plants, 3,493 current or former military sites, and 519 major airports. This conceptual approach allows governments, industries, and communities to rapidly and systematically identify potential exposure sources.



KEYWORDS: *per- and polyfluoroalkyl substances (PFAS), presumptive contamination, PFAS testing and investigation, AFFF, PFAS waste and disposal*

(Salvatore et al. 2022)

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Break

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PFAS Case Study #1: St. Mary's River WCSD

(CH2M Hill, Inc. 2024)

Step 1: WCSD need was confirmed

Step 2: PFAS WCSD Scope and Area: St. Mary's River, adjacent to Webster Outlying Landing Field, St. Mary's County, Maryland

St. Mary's River WCSD: Literature Review

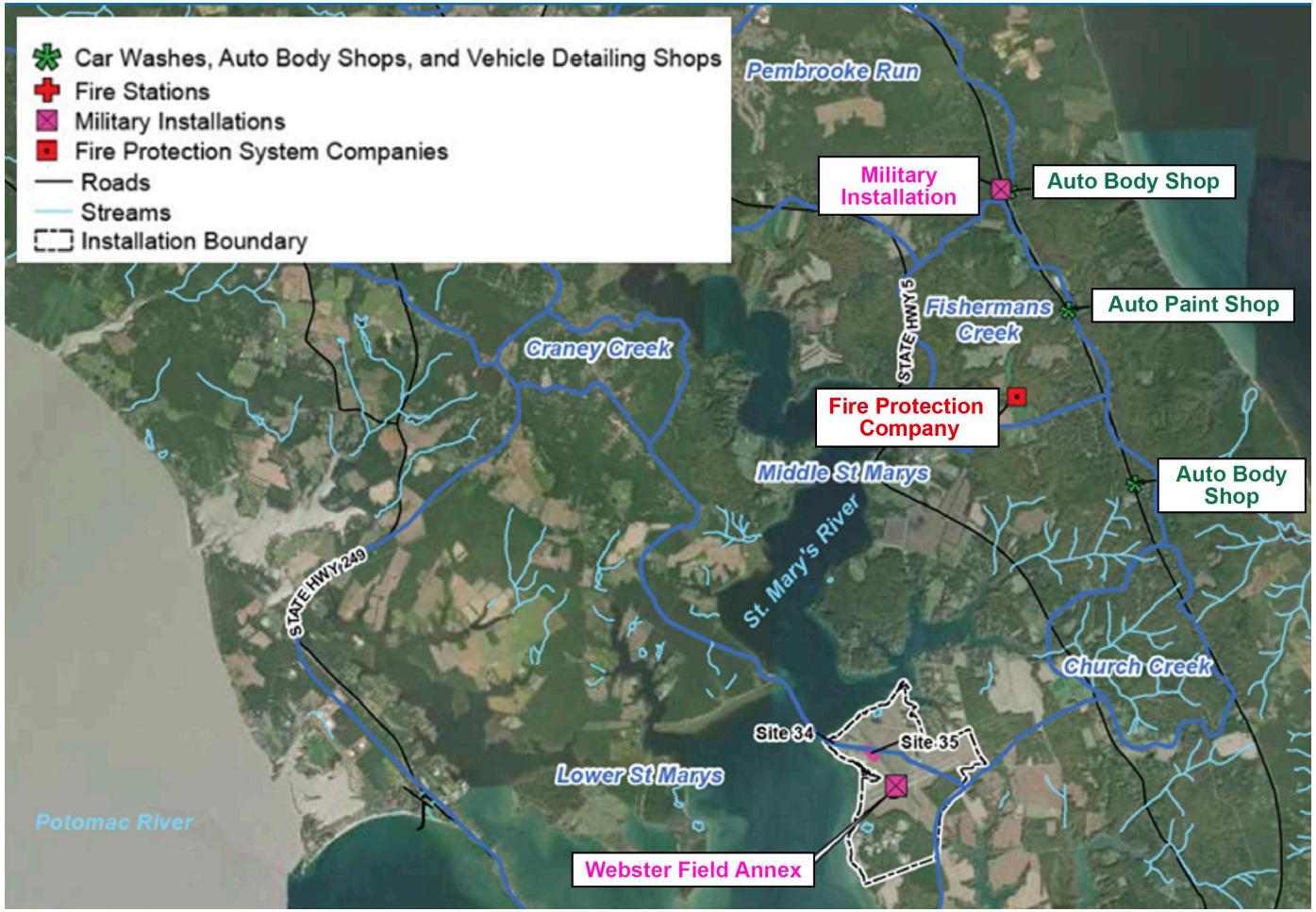
Step 3: Literature review included the following

- Web-based searches: Google, Google/Maps, PFAS project search
- Environmental data report generated using a 1-mile radius search from the St. Mary's River watershed

WCSD Watershed Contaminant Source Map
St. Mary's River/Webster Field Annex

Step 4: Watershed contaminant source map with potential PFAS source areas identified

- Airplane crash areas
- Airport
- Car washes, autobody shops, etc.
- Fire stations
- One other military installation
- Fire protection system companies
- Municipal landfill
- Biosolids land application areas



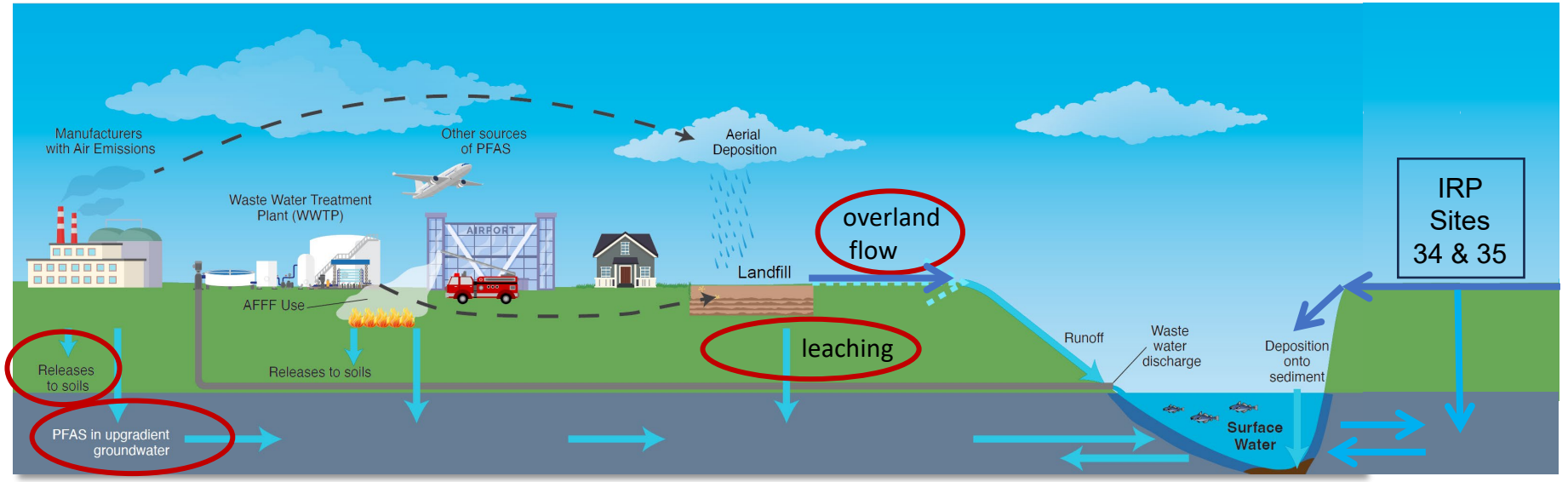
Example of a Watershed Contaminant Source Map

(CH2M Hill, Inc. 2024)

St. Mary's River WCSD: PFAS CSM

Graphic CSM not provided; described as follows

- **Potential Sources**
  - **<u>No confirmed PFAS releases identified</u>**, and **<u>no environmental impacts verified</u>**
  - Two non-Navy locations were potential PFAS-containing source areas; other areas were too far or less significant
- **Migration Pathways**

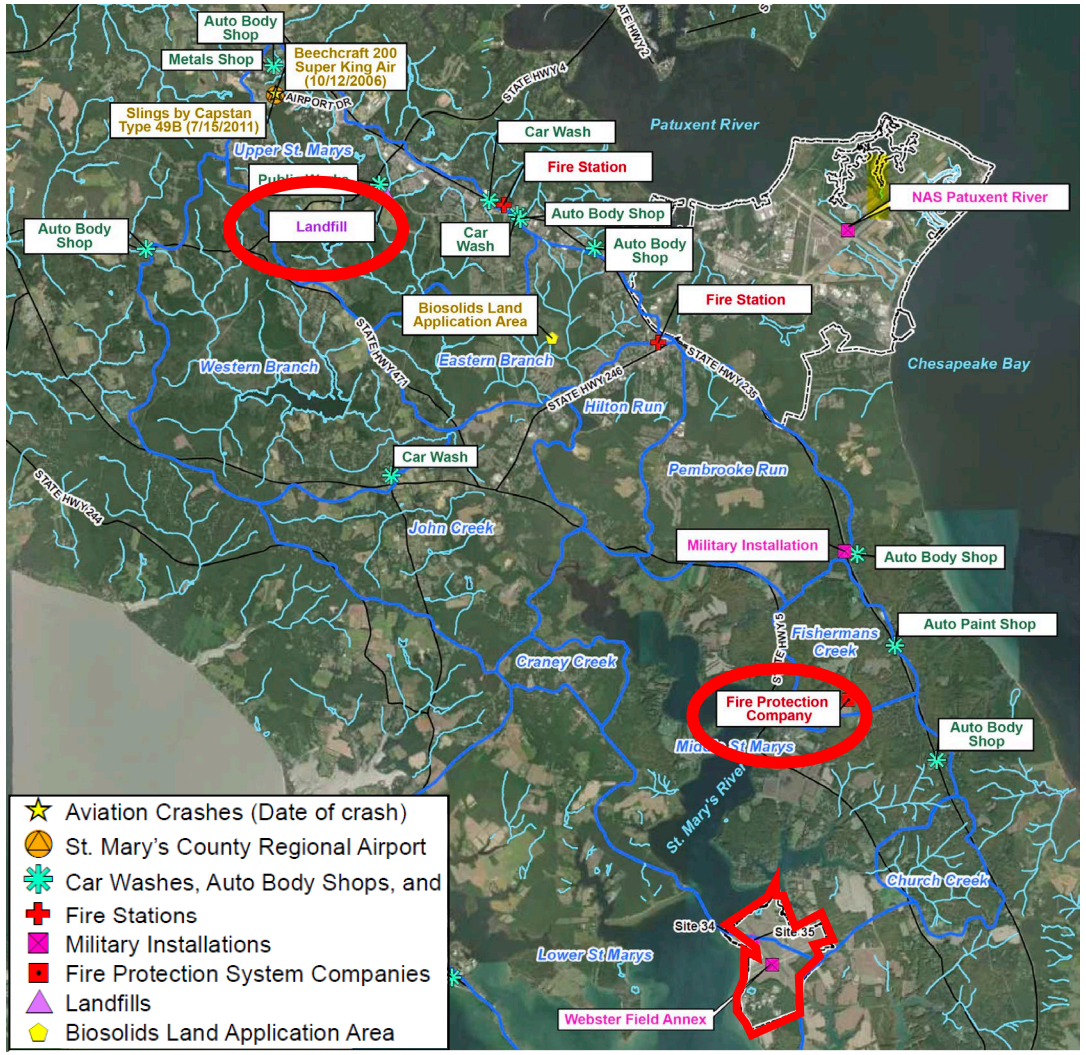


(NAVFAC EXWC 2026)

- On-base potential PFAS source areas include IRP Sites 34 and 35 at Webster Outlying Landing Field
- They have potential to release PFAS to surface water or sediments of the St. Mary's River

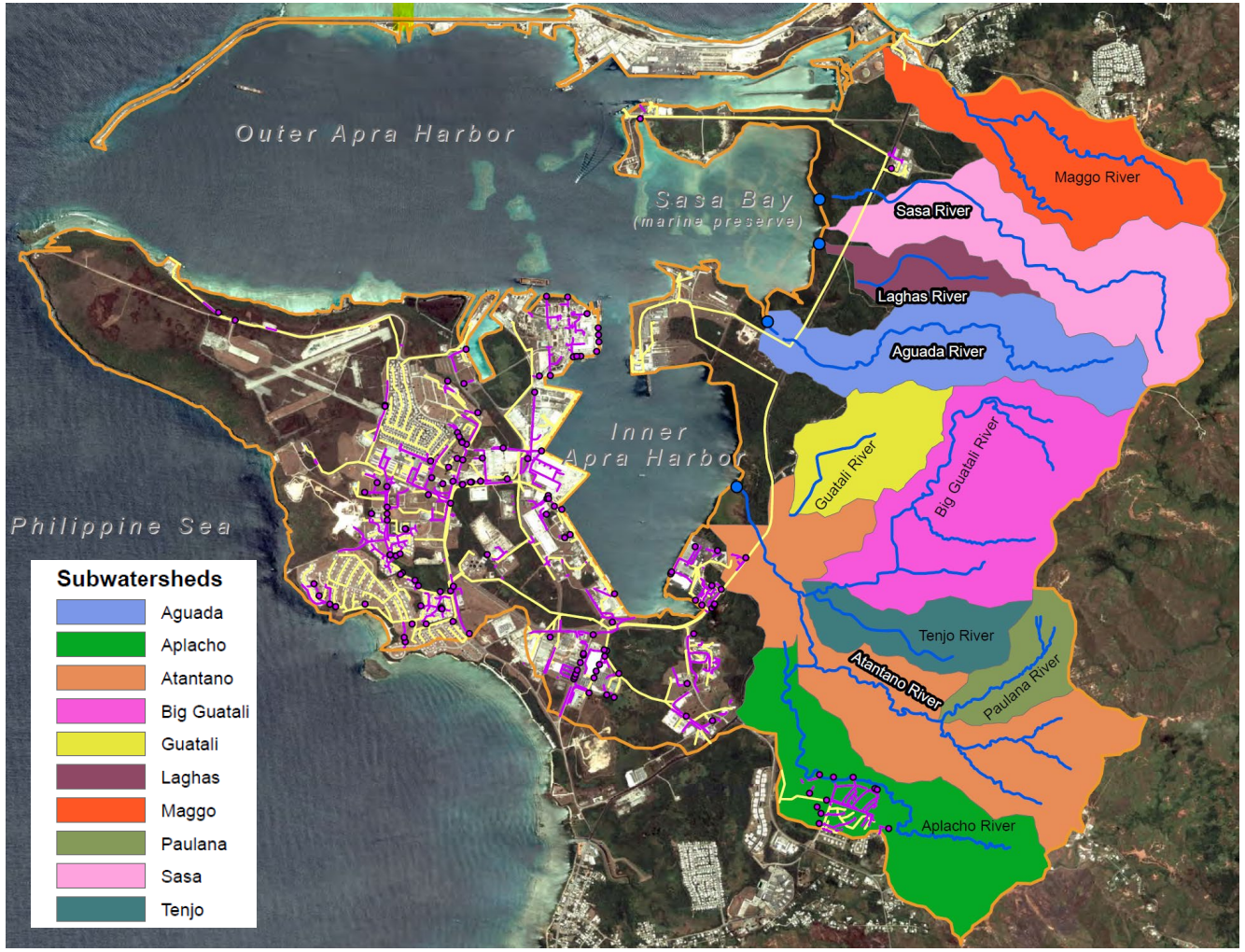
St. Mary's River WCSD: Conclusions

- Non-Navy potential sources of PFAS were identified in St. Mary's River watershed
- Of these, only two are considered to have higher potential for release of PFAS; however, **there is NOT any data to support this: no measures of releases**



(CH2M Hill, Inc. 2024)

Case Study #2: Apra Harbor



(AECOM 2012)

Step 1:
WCSD need was confirmed

Step 2:
WCSD Scope and Area: Apra Harbor, Guam

Apra Harbor WCSD: Literature Review

Step 3: Literature review included the following

- EPA Envirofacts Data Warehouse Web site (EPA 2004 and 2012) for Navy and non-Navy EPA-regulated sites associated with CERCLA/Superfund/Brownfields, RCRA (hazardous waste), water dischargers, toxic releases, and air emissions for the watershed area discharging to the harbor
- Navy documents considering the following
  - Geology, wetlands, benthic habitat, areas dredged/confined disposal facilities, Navy and non-Navy lands, onshore and offshore activities

Apra Harbor WCSD: Literature Review

Step 3: Table of Activities in the Watershed showing the following

- Potential COPCs associated with each IR Site and RCRA site in the Watershed
- Both included: metals, PAHs, PCBs, TPH, others

COPC: contaminant of potential concern
PAH: polycyclic aromatic hydrocarbon
PCB: polychlorinated biphenyl
TPH: total petroleum hydrocarbons

Table 2: List of Active/Future Navy IR and RCRA Sites in Apra watershed and chemicals of potential concern associated with each site

IR Sites
FISC – Lower Sasa Fuel Burning Pond
COPCs: metals, PAHs, TPH
NAVACTS – NEX Garage Waste Oil Tank
COPCs: metals, PAHs, PCB, TPH
NAVACTS – USS Proteus Fire Fighting Training Area
COPCs: PAHs, TPH
PWC – Carpentry Shop Dip Tank
COPCs: dioxins, metals, PCP, PAHs, TPH
PWC – Former Building 3009
COPCs: PCBs, TPH
SRF – Area Behind SRF Fenceline
COPCs: metals, OC pesticides, organotin, PAHs, PCBs, TPH
SRF –Plating Shop leach Field
COPCs: metals
RCRA Sites
FISC – Old NSD Drum Storage Lot
COPCs: metals, PAHs, PCBs, TPH
NAVACTS – NEX Carpentry Shop Abandoned Drum Area
COPCs: metals, PAHs, PCBs, TPH
NAVACTS – Spanish Steps Disposal Area
COPCs: metals, PAHs, PCBs, TPH
PWC – PWC Landfill
COPCs: cyanide, metals, PAHs, TPH
SRF – Woodworking Shop Dip Tank
COPCs: metals, naphthalene, PCP

FISC – Fleet Industrial Supply Center
NAVACTS – Naval Activities
PWC – Public Works Center
SRF – Ship Repair Facility

OC – organochlorine
PAHs – polycyclic aromatic hydrocarbon
PCBs – polychlorinated biphenyl
PCP – pentachlorophenol
TPH – total petroleum hydrocarbon

(AECOM 2012)

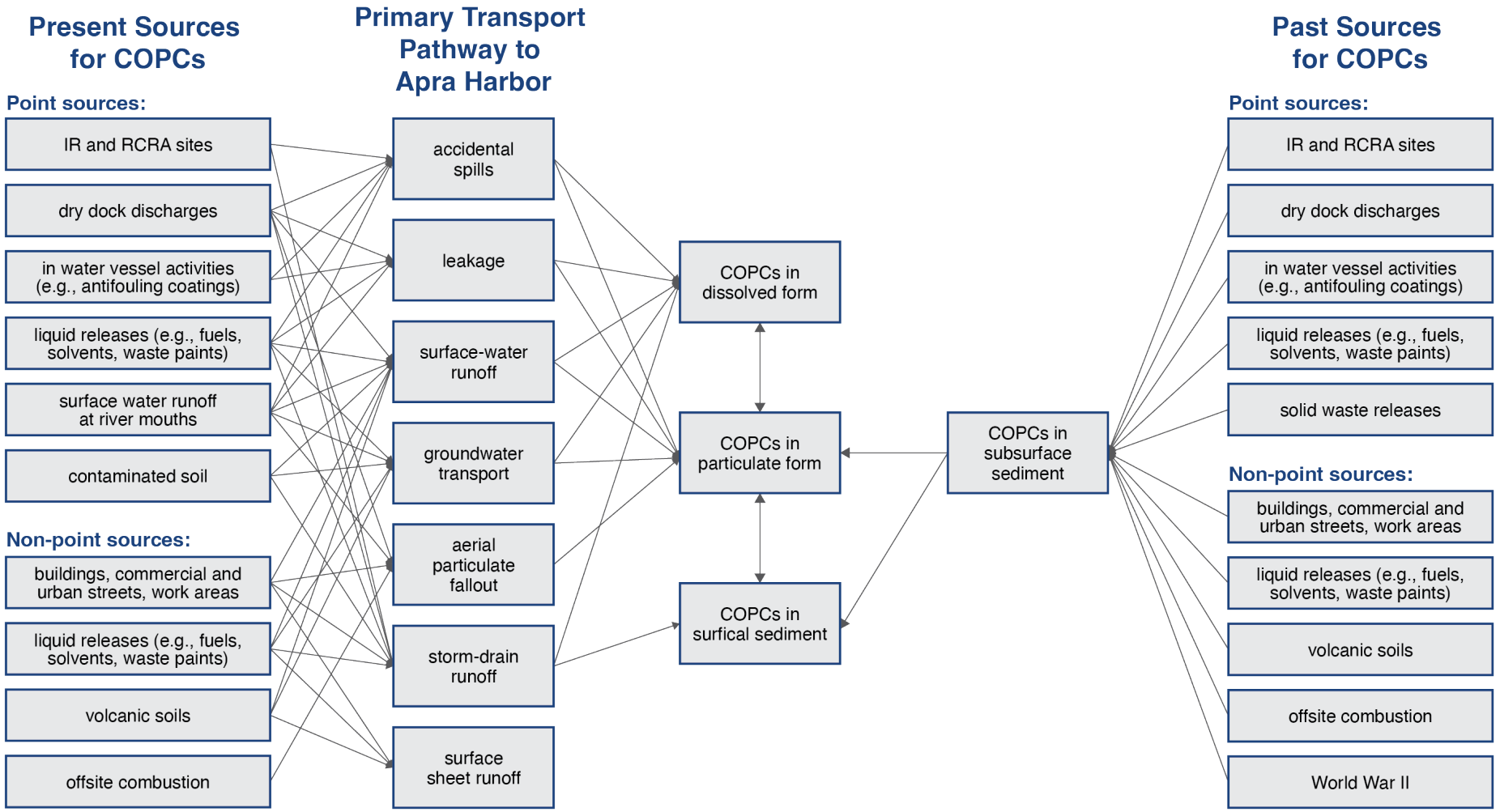
WCSD: Watershed Contaminant Source Map
Apra Harbor, Guam

Step 4: Watershed contaminant source map with potential chemical source areas identified

- Oil refineries/terminal
- Water treatment plants
- Shipyard
- Public works
- Salvage yard

(AECOM 2012)

Step 6. Apra Harbor WCSD: CSM Sources Fate and Transport



Preliminary Fate and Transport Pathways for Chemicals to Sediments in Apra Harbor
(AECOM 2012)

Apra Harbor WCSD: Conclusions

- Chemicals in Apra Harbor primarily from Navy point/non-point sources
- But there is potential contribution of chemicals from non-Navy sources
- Navy's contribution should be evaluated on site-specific basis

Table 4: Summary of Potential Sources for Chemicals from Navy and Non-Navy Sites in Apra Harbor Watersheds

Types of Sources	Navy	Non-Navy
Watershed Point Sources:		
EPA Regulated Sites:		
IR/RCRA Sites	12	
RCRA (hazardous waste)	2	2
Toxic Releases	1	2
Water Dischargers		4
Air Emissions		3
Watershed Non-Point Sources:		
Naturally Occurring Metals in Volcanic Soils		Entire Watershed
Storm Drains and Outfalls	Numerous	
Rivers		4
Other Sources:		
General Urbanization	Harbor Shoreline	Harbor Shoreline

(AECOM 2012)

Presentation Overview

- Introduction
  - What is a WCSD?
  - When is a WCSD required?
- Steps for Developing a WCSD
  - Steps 1 to 7
- Considerations for a PFAS WCSD
  - Literature review
  - Conceptual site model
- Case Studies
  - Case study #1: St. Mary's River WCSD—PFAS Example
  - Case study #2: Apra Harbor WCSD—Other Contaminants Example
- WCSD Activity
- Key Takeaways

WCSD Fun Activity: With 1 or 2 People Nearby

1. Hypothetical IR Site Q: WCSD Development Key Steps

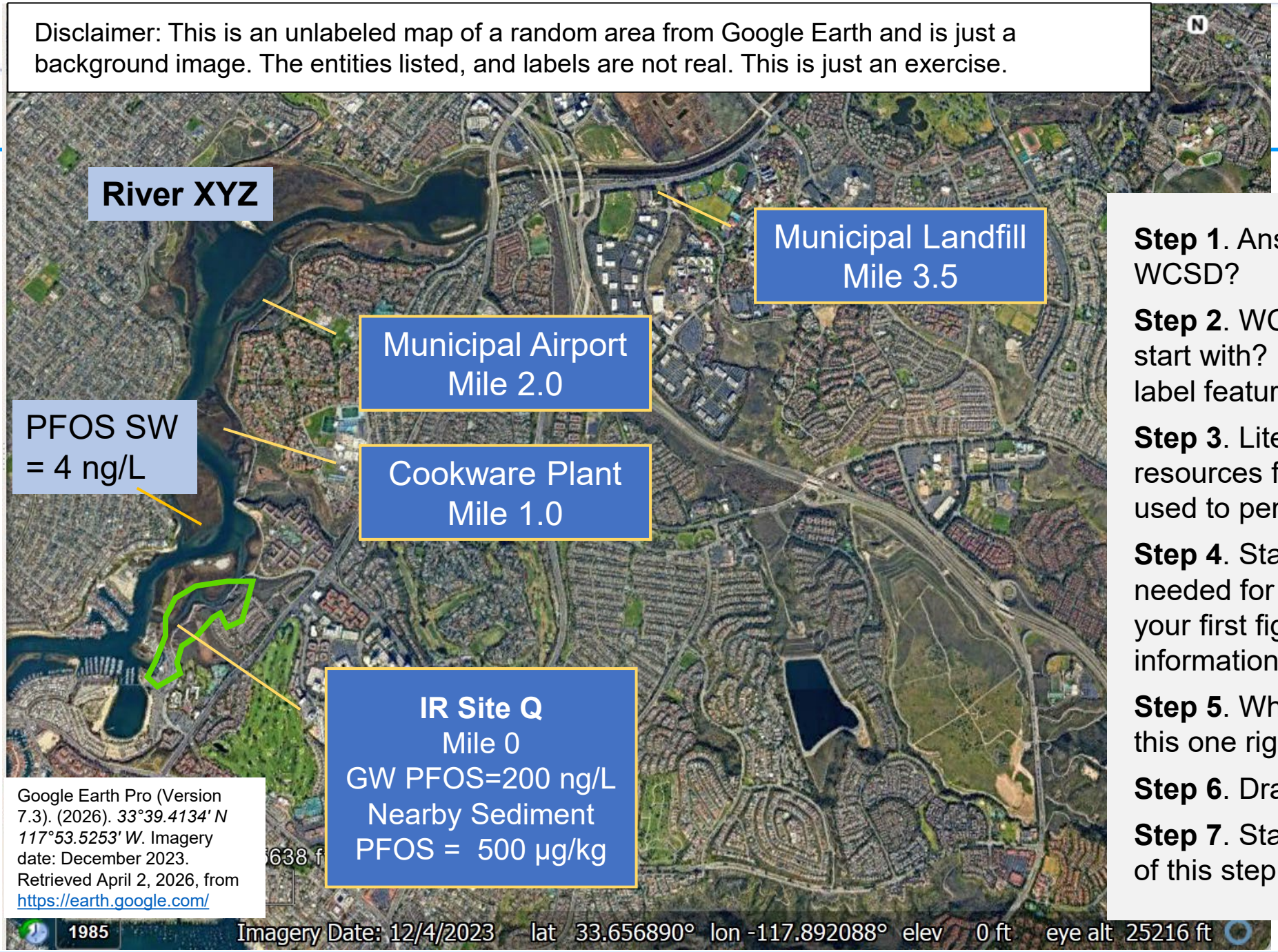
- **Navy IR Site Q** is located at mile 0 on **River XYZ**
- Assume upstream industries include municipal airport (2 miles upstream), cookware plant (1 mile upstream), and municipal landfill (3.5 miles upstream)
- River XYZ cuts through land at mile 0
- Assume PFAS has been measured in **River XYZ** upstream surface water, in groundwater within **IR Site Q** and in sediment and surface water within channel adjacent to site that feeds into **River XYZ**

2. Complete the steps typically followed when developing a WCSD (15–20 minutes)

- **Step 1.** Answer: Should you perform the WCSD?
- **Step 2.** WCSD scope: What figure you will start with? Draw a very simple figure and label features. This is Figure 1.
- **Step 3**. Literature review: Name two resources for PFAS WCSDs that can be used to perform the literature review.
- **Step 4**. State what refinement steps are needed for this step and draw and add to your first figure by drawing in additional key information. Label the features.
- **Step 5.** What is step 5? (Hint: you can't do this one right now.)
- **Step 6.** Draw a very basic graphic CSM.
- **Step 7.** State what would be done as part of this step (also can't do this right now).

3. Talk through findings and compare with the larger group

Disclaimer: This is an unlabeled map of a random area from Google Earth and is just a background image. The entities listed, and labels are not real. This is just an exercise.



Step 1. Answer: Should you perform the WCSD?

Step 2. WCSD scope: What figure you will start with? Draw a very simple figure and label features. This is Figure 1.

Step 3. Literature review: Name two resources for PFAS WCSDs that can be used to perform the literature review.

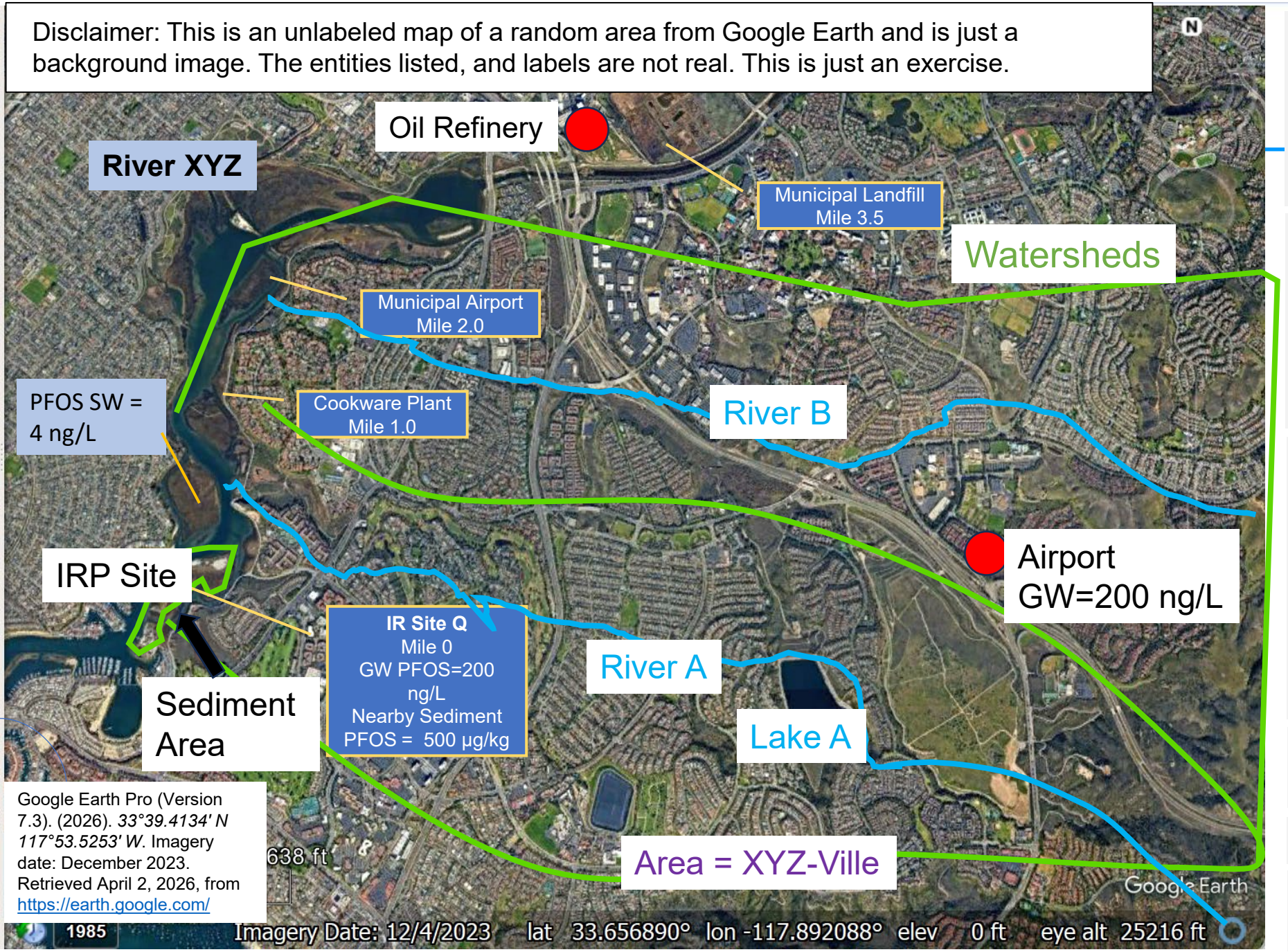
Step 4. State what refinement steps are needed for this step and draw and add to your first figure by drawing in additional key information. Label the features.

Step 5. What is step 5? (Hint: you can't do this one right now.)

Step 6. Draw a very basic graphic CSM.

Step 7. State what would be done as part of this step (also can't do this right now).

Disclaimer: This is an unlabeled map of a random area from Google Earth and is just a background image. The entities listed, and labels are not real. This is just an exercise.



Google Earth Pro (Version 7.3). (2026). *33°39.4134' N 117°53.5253' W*. Imagery date: December 2023. Retrieved April 2, 2026, from https://earth.google.com/

Step 1: Is the WCSD needed? **Yes**

Step 2. WCSD scope: What figure you will start with? Draw a very simple figure and label features. This is Figure 1. Watershed Features

Step 3. Literature review: Name two resources for PFAS WCSDs that can be used to perform the literature review.
EPA PFAS Analytic Tool
Google Earth

Step 4. State what refinement steps are needed for this step and draw and add to your first figure by drawing in additional key information. Label the features. Add potential sources besides the ones shown. Add analytical data if available.

Step 5. What is step 5? Site Visit – confirmation

Step 6. Draw a very basic CSM.

Step 7. State what would be done: Write the WCSD

Presentation Overview

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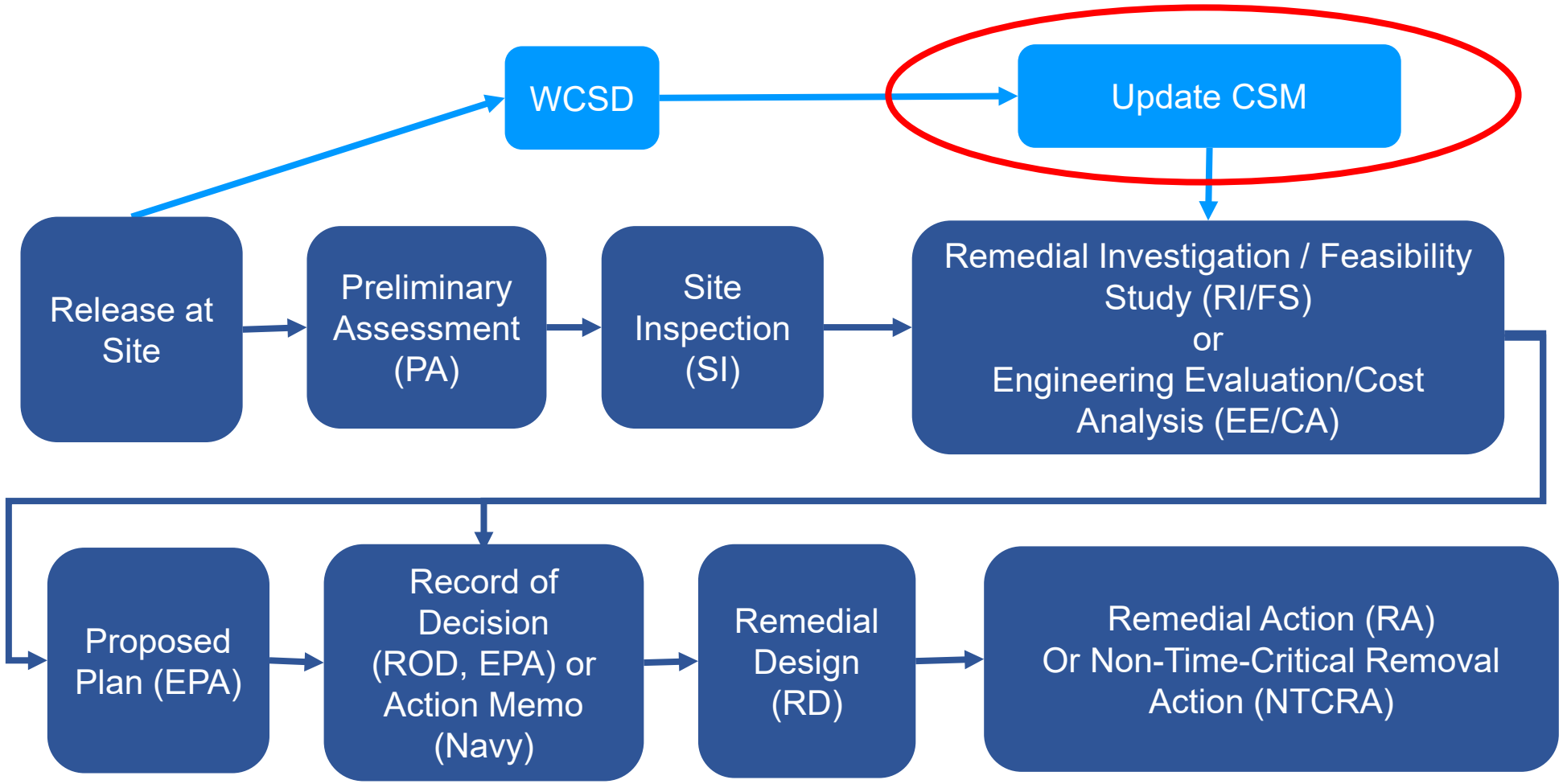
Key Takeaways

- WCSD is needed if there are non-Navy sources that could significantly contribute, or have contributed, to contamination in sediment investigation area
- WCSD is **concise but technical document** with key figures and tables
- PFAS, like other chemicals, are ubiquitous and can be in non-Navy sources that can impact a nearby Navy sediment site (*groundwater and surface water as well)
    - For PFAS WCSD, PFAS-specific literature review (sources) and PFAS/site-specific CSM are needed
- If non-Navy sources are present and significant, follow-on steps may be needed (e.g., a PFAS background study, engagement of other stakeholders)

KEY POINT

The WCSD is more like *CliffsNotes*, not an encyclopedia (10–12 pages, not 50!)

WCSD Allows for CSM Updates to Inform CERCLA* Process



- **Before Site Management:** Should we engage stakeholders?
- Is a background study needed?

** Similar Process for RCRA; expedited for TCRAs*

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Questions