CVP/SRAG Meeting

June 11, 2025

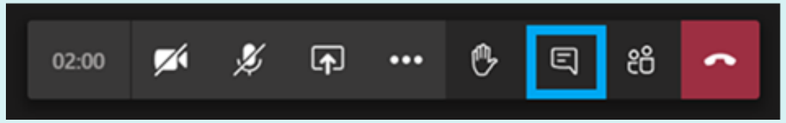
Carlton Dudley

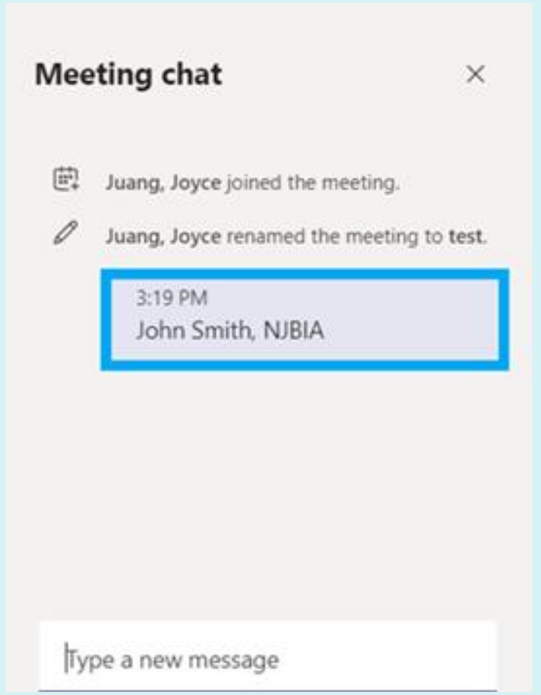
Director

Division of Environmental Evaluation & Remediation Review

In-House Rules Friendly Reminder

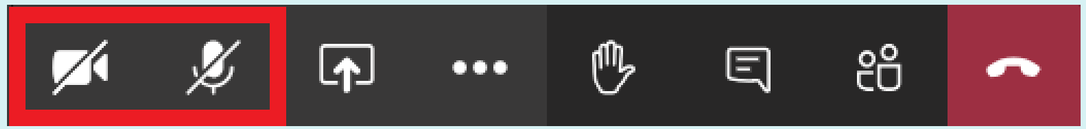
- Attendance:
  - Please enter your first and last name and organization you represent in the chat box in lieu of sign-in sheet.
  - *If you have dialed into the meeting, please email Samantha (Samantha.gleisner@dep.nj.gov). We are unable to identify the names of dialed in attendees.*



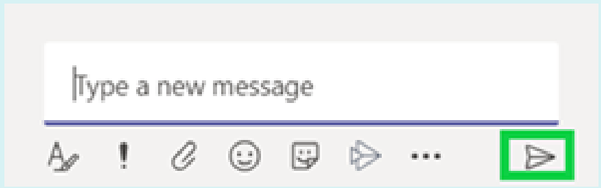


In-House Rules Friendly Reminder

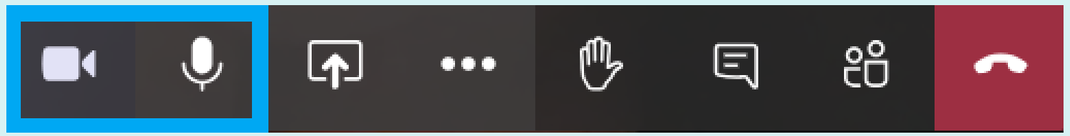
- Questions/Speaking Etiquette:
  - Please make sure your microphone is muted and your camera is off.



  - To request the opportunity to ask a question, please enter your name and affiliation in the chat box.



  - When called on to speak, you may un-mute yourself and, if you would like, turn on your camera.



  - When you have finished speaking, please re-mute yourself and turn off your camera.

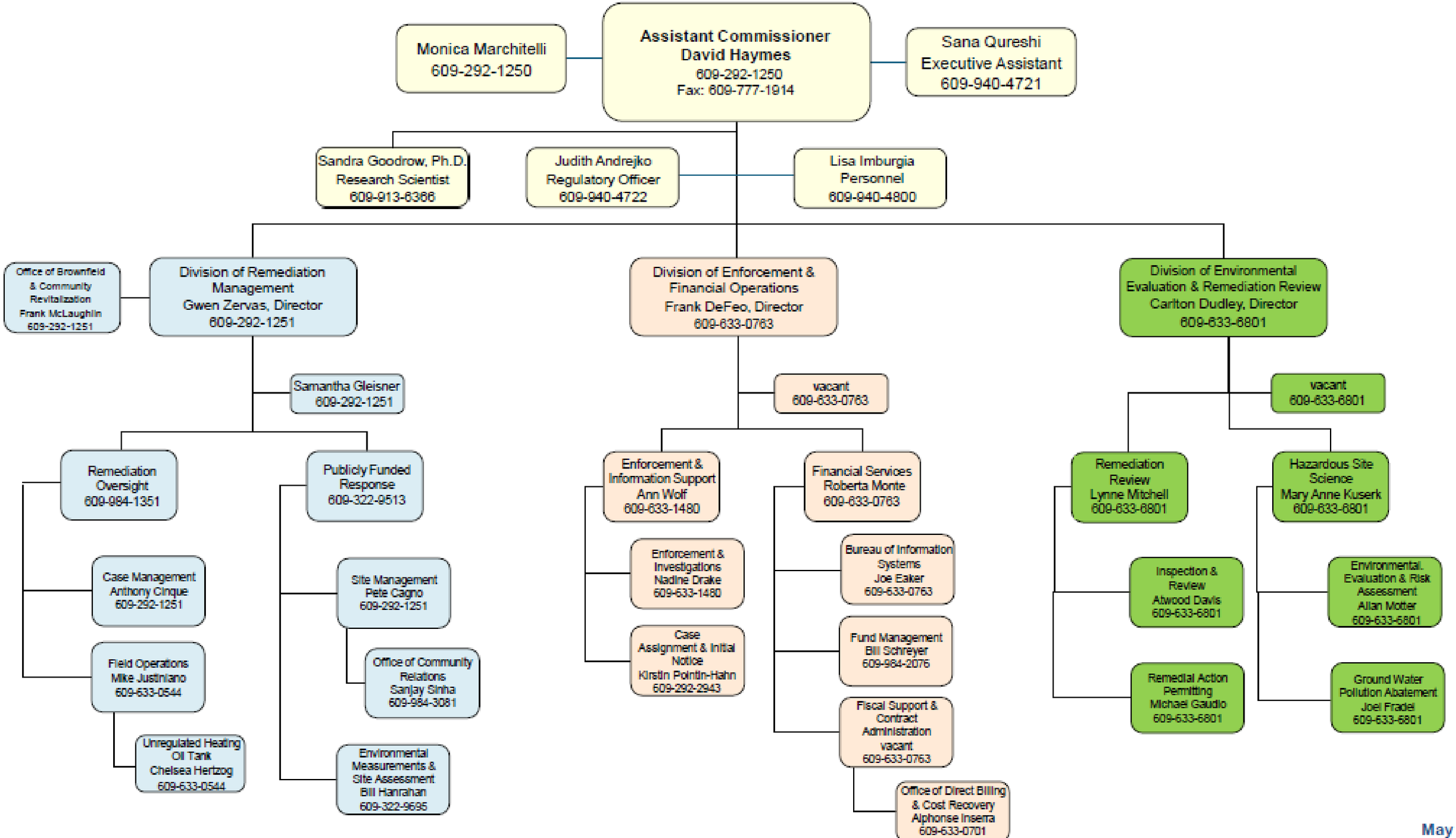
CSRR Contacts Update

Carlton Dudley, Director

Division of Environmental Evaluation & Remediation Review

Carlton.Dudley@dep.nj.gov

CONTAMINATED SITE REMEDIATION & REDEVELOPMENT



May 29, 2025

Contact Updates

- Please refer to the CSRR website for most current information
  - https://dep.nj.gov/srp/about/organization-chart/

CSRR

SRPLB Update

Dana Haymes
SRPLB Board
Dana.Haymes@dep.nj.gov

Updates

- 32 individuals passed the LSRP licensing exam and received their licenses in May.

Technical Guidance

Sana Qureshi

Office of the Assistant Commissioner

Sana.Qureshi@dep.nj.gov

Technical Guidance Update

Updating existing documents	Tentative Date, Document
SI/RI/RA Soil Technical Guidance	November 2025, final draft
Historic Fill	End of 2025, final draft
Technical Impracticability	2026, final draft
Analytical Methods	End of 2025, final draft
Landfills Investigation Technical Guidance	2026, final draft

Questions? Contact Sana Qureshi via email at: sana.qureshi@dep.nj.gov

Questions?

Training Update

Alissa Ambacher
CSRR Training Committee
Alissa.Ambacher@dep.nj.gov

Updates

- Updating the training committee webpage
  - Organizing to make more efficient
- Trainings for the remainder of the year to be determined
- Contact for all training committee inquiries:
  - Samantha Gleisner
    - Samantha.Gleisner@dep.nj.gov

Rules Update

Judith Andrejko

Office of the Assistant Commissioner

Judith.Andrejko@dep.nj.gov

Questions?

Spill Fund Financial Criteria

Frank Defeo, Director

Division of Enforcement and Financial Operations

Frank.Defeo@dep.nj.gov

CSRR Financial Relief Criteria

COMPOUND	NJ MCL/GWQS (ppt)	CSRR Financial Relief Criteria (ppt)
Perfluorononanoic Acid (PFNA)	13	10
Perfluorooctanoic acid (PFOA)	14	4
Perfluorooctanesulfonic acid (PFOS)	13	4
Hexafluoropropylene oxide-dimer acid (HFPO-DA or GenX)	20	10
Perfluorohexanesulfonic acid (PFHxS)	NA	10
Perfluorobutane sulfonate (PFBS)	NA	2,000

Questions?

DEP Explorer Demo

Joe Stefanoni
Bureau of Information Systems
Joe.Stefanoni@dep.nj.gov

Questions?

CSRR

Metrics

Lynne Mitchell, Assistant Director

Remediation Review Element

Lynne.Mitchell@dep.nj.gov

Questions?

Order of Magnitude

Lynne Mitchell, Assistant Director
Remediation Review Element
Lynne.Mitchell@dep.nj.gov

Michael Gaudio, Bureau Chief
Bureau of Remedial Action Permitting
Michael.Gaudio@dep.nj.gov

Listserv sent on May 27, 2026

Based on the Ground Water Quality Standards (GWQS) adopted on February 3, 2025, Contaminated Site Remediation & Redevelopment (CSRR) posted the "Order of Magnitude Guidance for the Ground Water Remediation Standards and Phase-In Guidance for Initial Ground Water Remedial Action Permit Applications that include Contaminants where the Ground Water Remediation Standard decreased by an Order of Magnitude or More".

This document includes key information including the order of magnitude evaluation process and phase-in guidance for scenarios beyond Remedial Action Permits. As such, this new guidance supersedes the "*Phase-In Guidance for Initial Ground Water Remedial Action Permit Applications that include Contaminants where the Ground Water Remediation Standard changed by an Order of Magnitude*."

The guidance document can be found at https://dep.nj.gov/srp/guidance/rs/ under "Phase In/Order of Magnitude Guidance."

Where to find this guidance

Home / Guidance / RS

Remediation Standards

Introduction to Remediation Standards

May 2021

Phase In/Order of Magnitude Guidance

The Department has issued the following guidance documents to assist remediating parties in complying with the amended ground water remediation standards adopted or developed on February 3, 2025:

- Phase-In Period for Use of Ground Water Remediation Standards N.J.A.C. 7:26D – v3.0
- Order of Magnitude and Phase-In Guidance for the Ground Water Remediation Standards and Initial Remedial Action Permit Applications
  - Phase-In Guidance for Initial Ground Water RAP Applications – archived

Before you start

- Before you can perform an order of magnitude (OOM) evaluation it must be determined which contaminant's Ground Water Remediation Standard (GWRS) changed by an order of magnitude or more.

- The May 2025 guidance provides that information:
  - On February 3, 2025 GWRS for seven compounds (vinyl chloride; cobalt; 1,1-biphenyl; cyanide (free); 1,3-dichlorobenzene (meta); heptachlor epoxide; and methoxychlor) decreased by an OOM or more.

Post final remediation document Step 1- OOM Identification/Comparison Evaluation

- Identify each ground water contaminant at the site or area of concern (AOC) whose GWRS decreased by an OOM or more.
  - vinyl chloride; cobalt; 1,1-biphenyl; cyanide (free); 1,3-dichlorobenzene (meta); heptachlor epoxide; and methoxychlor

- Compare the concentrations of each such ground water contaminant still present at the site or AOC against the new GWRS.

- If the difference between the on-site concentrations and the new GWRS is less than an OOM, no further remediation is required for that contaminant.

- If the difference between the on-site concentrations and the GWRS are an OOM or greater, step 2 below is required

Step 2- OOM Remedial Action Protectiveness Evaluation:

- Evaluate the site or AOC(s) to determine if the existing remedial action remains protective of public health and safety and of the environment based on the new GWRS for the contaminant(s).

- If the evaluation determines that the remedy remains protective, no further remediation is required for that contaminant.

- If the evaluation determines the existing remedy is not protective, additional remediation activities should be conducted to achieve compliance with the new GWRS and to ensure protection of public health and safety and of the environment. This could include the installation of additional monitoring wells and ground water sampling.

1. Sites With an Unrestricted Use NFA or RAO issued prior to the February 3, 2025 (or within the six-month phase-in period ending August 3, 2025)

- The OOM evaluation (steps 1 and 2 above) will be conducted whenever the site or AOC "re-enters" the Contaminated Site Remediation & Redevelopment Program (i.e., an ISRA trigger, child-care facility license renewal, property sale that requires update of site conditions for loan approval, etc.).

2. Sites With a Limited Restricted Use or Restricted Use NFA or RAO issued prior to the February 3, 2025
(or within the six-month phase-in period ending August 3, 2025)

- The OOM evaluation (steps 1 and 2 above) will be conducted as part of the submission of the next Ground Water Remedial Action Protectiveness/Biennial Certification Form

Sites Without an Approved/Certified RAW or RAR:

- For active sites or AOCs without a Department-approved or LSRP-certified RAW or RAR prior to the February 3, 2025 adoption of the GWQS, N.J.A.C. 7:9C (or within the six-month phase in period ending August 3, 2025), must be remediated to the February 3, 2025 GWRS pursuant to N.J.A.C. 7:26E5.1(d)4

3.Sites With an Approved/Certified Remedial Action Workplan (RAW) or Remedial Action Report (RAR) with an Unrestricted Use Final Remedy (Not an RAO or NFA) issued prior to the February 3, 2025 (or within the six-month phase-in period ending August 3, 2025)

- For contaminants that have not changed by an OOM for the remedial action, the GWRS identified in the RAW/RAR can be applied to the remediation of the site or AOC.

- Prior to the issuance of a Final Remediation Document the PRCR must conduct the remedial action protectiveness evaluation and perform any additional remediation for contaminants that have decreased by an OOM or more (Step 2) must be remediated to the February 3, 2025 GWRS:
  - vinyl chloride; cobalt; 1,1-biphenyl; cyanide (free); 1,3-dichlorobenzene (meta); heptachlor epoxide; and methoxychlor

- Note: Any additional data collected after the RAR is submitted can be submitted either as a new RAR (revised) or with the RAO as supplemental information.

4.a Sites With an Approved/Certified RAW with a Limited Restricted or Restricted Use Final Remedy (Not an RAO or NFA) issued prior to the February 3, 2025 (or within the six-month phase-in period ending August 3, 2025)

- For contaminants that have not changed by an OOM for the remedial action, the GWRS identified in the RAW can be applied to the remediation of the site or AOC.

- Prior to the issuance of a Final Remediation Document the PRCR must conduct the remedial action protectiveness evaluation and perform any additional remediation for contaminants that have decreased by an OOM or more (Step 2)) must be remediated to the **February 3, 2025** GWRS:
  - vinyl chloride; cobalt; 1,1-biphenyl; cyanide (free); 1,3-dichlorobenzene (meta); heptachlor epoxide; and methoxychlor

4.b Pending Initial Ground Water RAP Applications/RARs submitted prior to February 3, 2025 (or within the six-month phase-in period ending August 3, 2025)

- Sites where a Final Remediation Document have not been issued.

- Sites or AOCs that submitted an RAR and Initial Ground Water RAP Application which includes a contaminant(s) that decreased by an OOM or more prior to the February 3, 2025 adoption of the GWRS, N.J.A.C. 7:9C (or within the six-month phase-in period for Initial RAP Applications submitted/**post-marked by August 3, 2025**)

- The Department will be inspecting/reviewing these Initial Ground Water RAP Applications using the GWRS in effect at the time of RAP Application submission

- If the Ground Water RAP is approved/issued, the Department will include OOM remedial action protectiveness evaluation (step 2 above only) requirement in the RAP Schedule
  - Must be conducted prior to and included with the submittal of the first Remedial Action Protectiveness/Biennial Certification (Bi-Cert) Form due for the site
  - Note that any technical Ground Water RAP Modification or Termination Application submitted before the first Bi-Cert Form submission must include the OOM remedial action protectiveness evaluation

4.b Pending Initial Ground Water RAP Applications/RARs submitted prior to February 3, 2025 (or within the six-month phase-in period ending August 3, 2025) (continued)

- If the RAR and Initial Ground Water RAP Application needs to be withdrawn for any reason or is deemed administratively or technically incomplete by the Department and a RAW was not approved
  - Remediation, including an updated receptor evaluation, additional delineation if required, and remedial action selection, must be completed using the GWRS adopted on February 3, 2025
  - Must demonstrate that the remedial action is protective of public health and safety and of the environment prior to re-applying for the Initial Ground Water RAP

4.b Pending Initial Ground Water RAP Applications/RARs submitted prior to February 3, 2025 (or within the six-month phase-in period ending August 3, 2025) (continued)

- Completed OOM remedial action protectiveness evaluations for pending RAP Applications
  - Can be submitted at any time to the permit inspector/reviewer assigned to the RAP Application* or to Michael Gaudio, Bureau Chief of the Bureau of Remedial Action Permitting, at Michael.Gaudio@dep.nj.gov.

    *This information is available in real time on DataMiner through the 'Pending Permit Progress Report'. Instructions for producing a 'Pending Permit Progress Report' are:
    - Step 1: Search by Category and select Pending Permit Progress Reports. Click Submit.
    - Step 2: Select Pending Permit Progress by Program Interest ID.
    - Step 3: Select All for programs and enter the PI number for Report Criteria. Click Submit.

  - The OOM remedial action protectiveness evaluation requirement will not be included in the Ground Water RAP if the information is sufficient and the Ground Water RAP can be approved/issued.

Questions?

RAP Updates

Michael Gaudio, Bureau Chief
Bureau of Remedial Action Permitting
Michael.Gaudio@dep.nj.gov

Questions?

Determination of Fish Bioaccumulation Factors (BAFs) for PFAS in New Jersey

CVP/SRAG Meeting
June 11th, 2025

Dan Millemann, Ph.D.
NJDEP Division of Science & Research

Acknowledgements:

Academy of Natural Sciences:

Principal investigators:

David Keller, Ph.D

Tim Maguire, Ph.D

Marie Kurz, Ph.D
(Now at Oak Ridge National Laboratory)

Sampling/Support Staff:

- Daniel Morrill, Tracey Curran, Joseph Heiczinger & Michelle Gannon

New Jersey DEP:

Project managers (Division of Science & Research):

- Dan Millemann , Ph.D.
- Sandra Goodrow, Ph.D.

Program Representatives and Contributors:

- Science & Research:
  - Nick Procopio Ph.D. & Gary Buchanan Ph.D. (retired)
- Water Monitoring, Standards, & Pesticide Control:
  - Biswarup Guha, John Vile, Kelly Mascarenhas
- Water Quality:
  - Marco Alebus
- Watershed Protection & Restoration:
  - Bob Schuster

Fall 2021
- Project planning: QAPP development & site selection

Summer 2022
- Sampling of saline fish and water

Summer 2023
- Sampling of freshwater fish and water

Spring 2025
- Final report and data available

Ongoing
- Incorporation of BAFs into water quality standards

Development of NJ-Specific PFNA, PFOA, and PFOS Bioaccumulation Factors (BAFs)

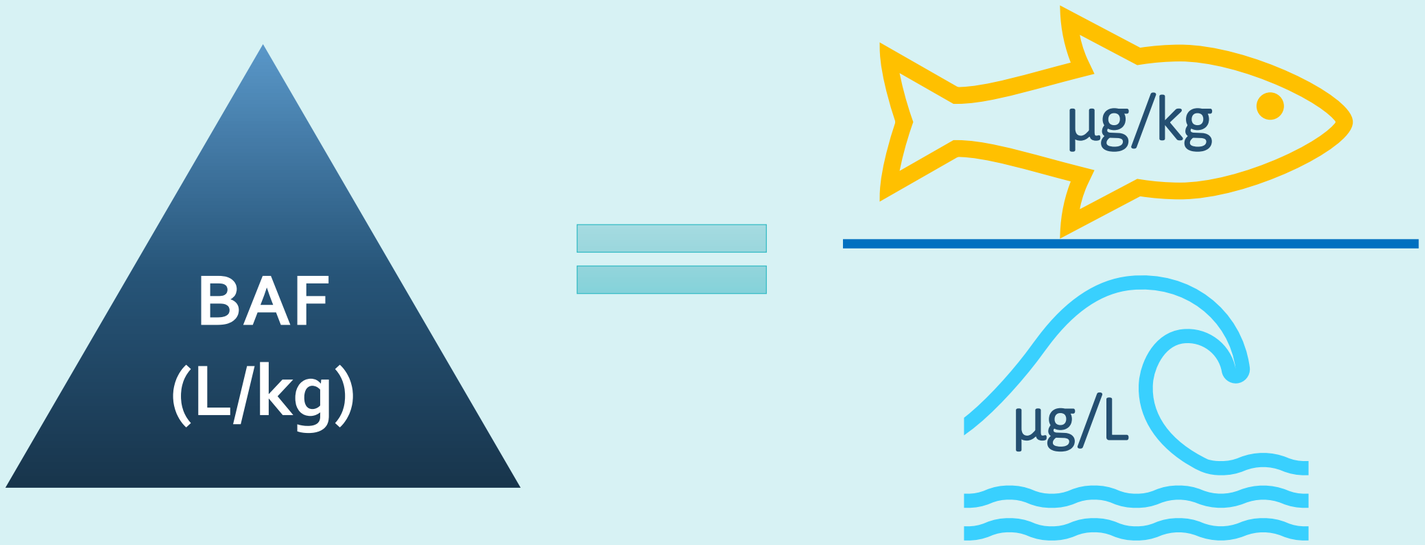
Simplified Surface Water Quality Criteria Equation:

$$\text{Criterion}(\mu g/L) = \frac{Reference\ Dose\ x\ RSC\ x\ Body\ Weight}{DW\ intake + (Fish\ Consumption\ Rate\ x\ BAF)}$$

- USEPA recently (December 26th, 2024) released draft surface water quality criteria for PFOS, PFOA, and PFBS with their own BAFs
  - Other states have previously incorporated their own BAFs using field studies, laboratory data, or literature reviews- Florida, Minnesota, Michigan
- New Jersey initiated this state-specific study in 2021

Development of NJ-Specific PFNA, PFOA, and PFOS Bioaccumulation Factors (BAFs)

A Bioaccumulations Factor (BAF) is the ratio of a contaminant concentration in fish tissue to the contaminant concentration in water and is used in surface water quality criteria development.

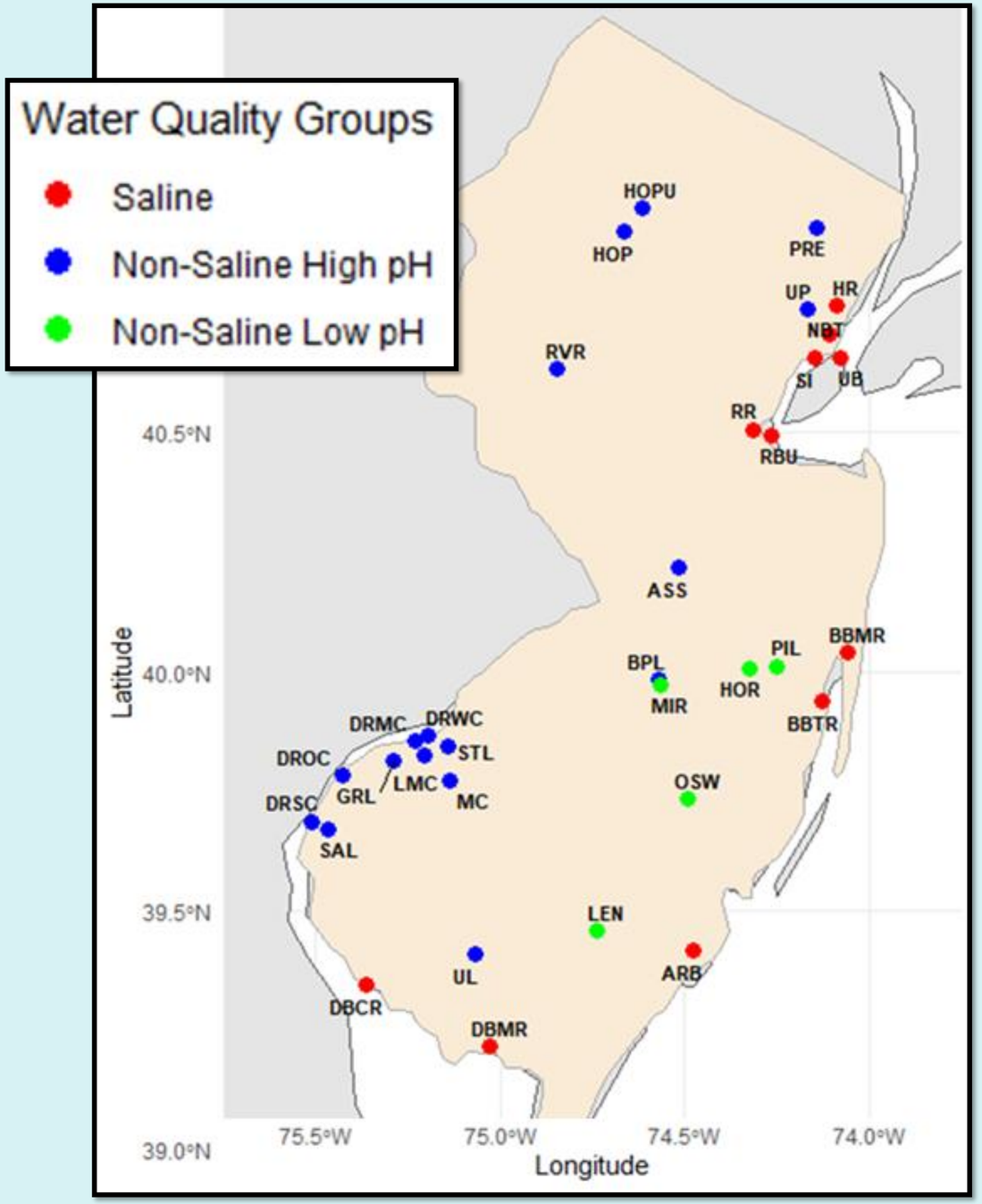


Bioaccumulative contaminants concentrate in fish tissue and can result in much higher exposure than drinking water alone.

Study design & PFAS Analysis

- Site Selection
  - Water column pre-sampling was conducted to prioritize sites and establish representative concentrations

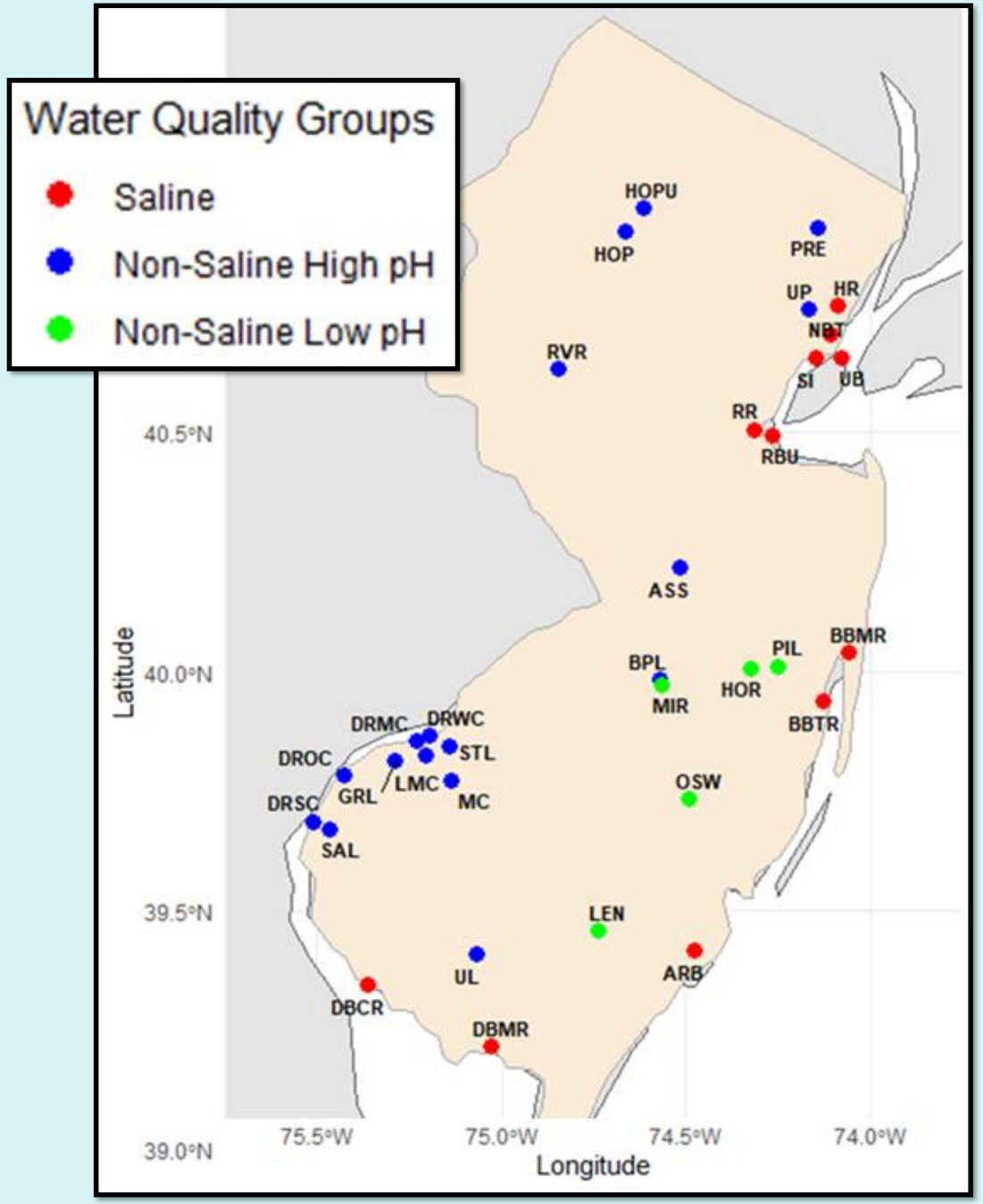
- Fish tissue, water, & sediment PFAS concentrations
  - Electrofishing, gill-netting, traps, rod & reel
  - Grab & Van Dorn sampling
  - Analysis: SGS AXYS Method MLA-110 Rev 02 Ver 12 (USEPA Method 1633)



Secondary parameters

- Stable isotope analysis to determine trophic levels

- Water quality characteristics that may impact PFAS partitioning:
  - Temperature, specific conductance, dissolved oxygen, pH, organic carbon, and salinity



Sampling Results Summary

33 water bodies were sampled

- Total water samples tested= 129
- Total fish samples tested = 312
- Total species represented: 15
- PFAS detected = 32

PFAS that did not occur in any sample:

- PFDos
- 4:2 FTS
- 8:2 FTS
- N-EtFOSA
- ADONA
- 9cl-PF3ONS
- 11cl-PF3OUdS
- PFMPA

Summer flounder (*Paralichthys dentatus*)

Freshwater Species:

- Bluegill
- Chain Pickerel
- Channel Catfish
- Common Carp
- Largemouth Bass
- Pumpkinseed
- Smallmouth Bass
- Yellow Perch

Saline Species:

- Black Sea Bass
- Northern Puffer
- Oyster Toadfish
- Summer Flounder

Found in Both:

- American eel (catadromous)
- Spot
- White Perch (anadromous)

New Jersey development of BAFs for PFAS

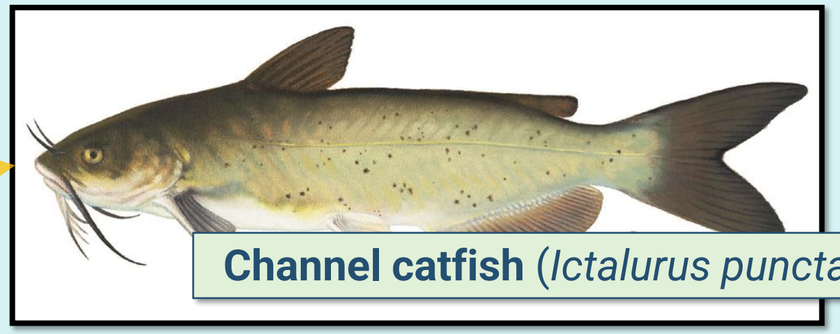
This robust data set enables NJDEP to calculate state-specific BAFs for fresh and saline waters with the following procedure:

Step	Nomenclature	Sample composition	Calculation
Step 1	Baseline BAF	BAF derived from field data for each species at each site	$Baseline\ BAF = \left(\frac{Fish\ Geometric\ Mean}{Water\ Geometric\ Mean}\right)$
Step 2	Species BAF	Baseline BAFs combined for each species from all sites within area of interest (fresh water or saline waters)	Geometric means of Baseline BAFs
Step 3	Final BAF	All species BAFs combined from all sites within area of interest (fresh water or saline waters	Geometric mean of Species BAFs (95% UCL)

New Jersey development of BAFs for PFOS

Species BAF (N =Sites: fresh, saline)	Fresh (L/kg)	Saline (L/kg)
American Eel (16, 6)	2510	628
Black Sea Bass (0, 2)	-	138
Northern Puffer (0, 2)	-	301
Oyster Toadfish (0, 6)	-	716
Spot (1, 6)	980	1220
Summer Flounder (0, 4)	-	353
White Perch (9, 6)	2040	911
Bluegill (13, 0)	2970	-
Chain Pickerel (6, 0)	2200	-
Channel Catfish (2, 0)	306	-
Common Carp (4, 0)	1670	-
Largemouth Bass (15, 0)	4160	-
Pumpkinseed (4, 0)	2180	-
Smallmouth Bass (3, 0)	5430	-
Yellow Perch (1, 0)	2150	-
Geomean	**1970**	**495**
95% UCL	2770	681

White perch (*Morone americana*)

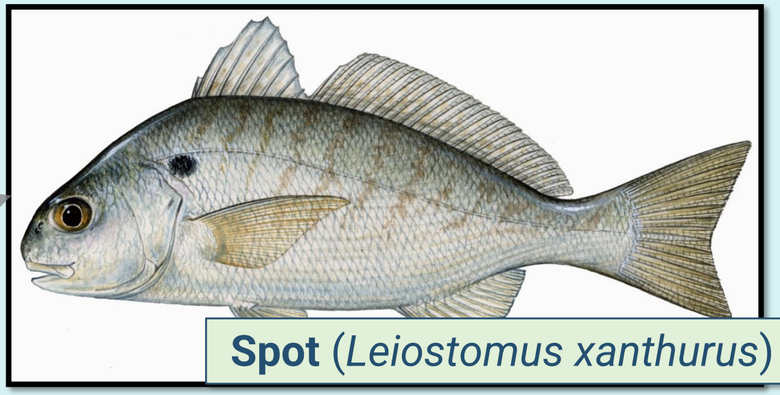


Channel catfish (*Ictalurus punctatus*)

Largemouth bass (*Micropterus salmoides*)

New Jersey development of BAFs for PFOA

Species BAF (N =Sites; fresh, saline)	Fresh (L/kg)	Saline (L/kg)
American Eel (13, 5)	15.3	39.5
Black Sea Bass (0, 0)	-	-
Northern Puffer (0, 0)	-	-
Oyster Toadfish (0, 4)	-	46.4
Spot (1, 5)	7.96	38.7
Summer Flounder (0, 0)	-	-
White Perch (0, 5)	-	19.1
Bluegill (6, 0)	16.1	-
Chain Pickerel (0, 0)	-	-
Channel Catfish (0, 0)	-	-
Common Carp (1, 0)	8.33	-
Largemouth Bass (2, 0)	23.7	-
Pumpkinseed (2, 0)	10.5	-
Smallmouth Bass (0, 0)	-	-
Yellow Perch (0, 0)	-	-
Geomean	**13**	**34**
95% UCL	109	158



Spot (*Leiostomus xanthurus*)

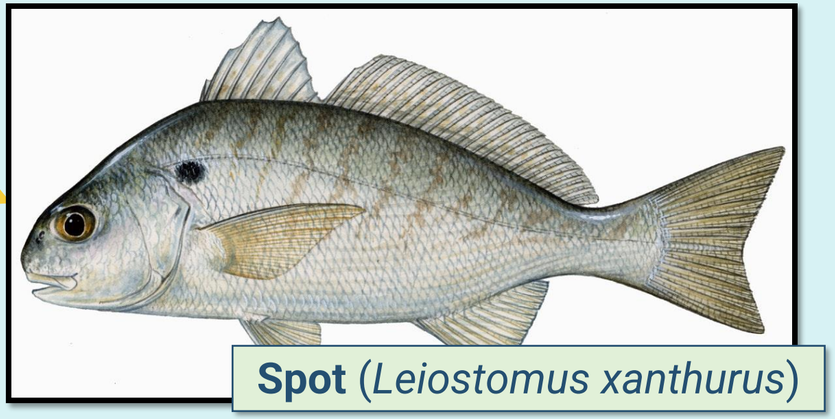
Bluegill sunfish (*Lepomis macrochirus*)

Largemouth bass (*Micropterus salmoides*)

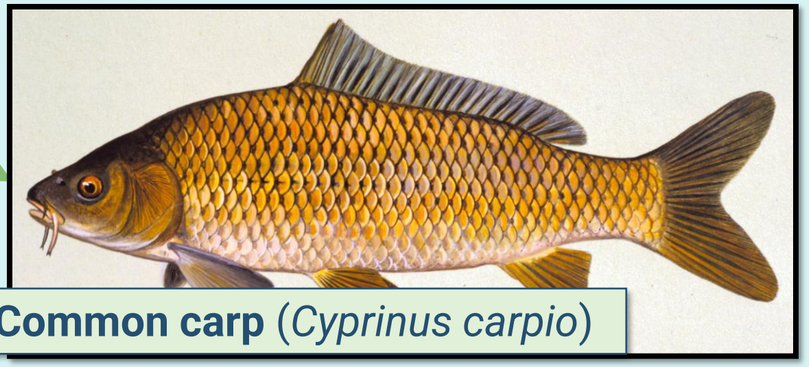
New Jersey development of BAFs for PFNA

Species BAF (N =Sites: fresh, saline)	Fresh (L/kg)	Saline (L/kg)
American Eel (14, 4)	190	183
Black Sea Bass (0, 0)	-	-
Northern Puffer (0, 0)	-	-
Oyster Toadfish (0, 5)	-	315
Spot (1, 5)	107	294
Summer Flounder (0, 2)	-	136
White Perch (7, 6)	43.8	202
Bluegill (8, 0)	105	-
Chain Pickerel (1, 0)	63.9	-
Channel Catfish (2, 0)	42.9	-
Common Carp (4, 0)	154	-
Largemouth Bass (7,0)	31	-
Pumpkinseed (4, 0)	66.7	-
Smallmouth Bass (1, 0)	74.5	-
Yellow Perch (1, 0)	172	-
Geomean	**81**	**216**
95% UCL	295	949

American eel (*Anguilla rostrata*)

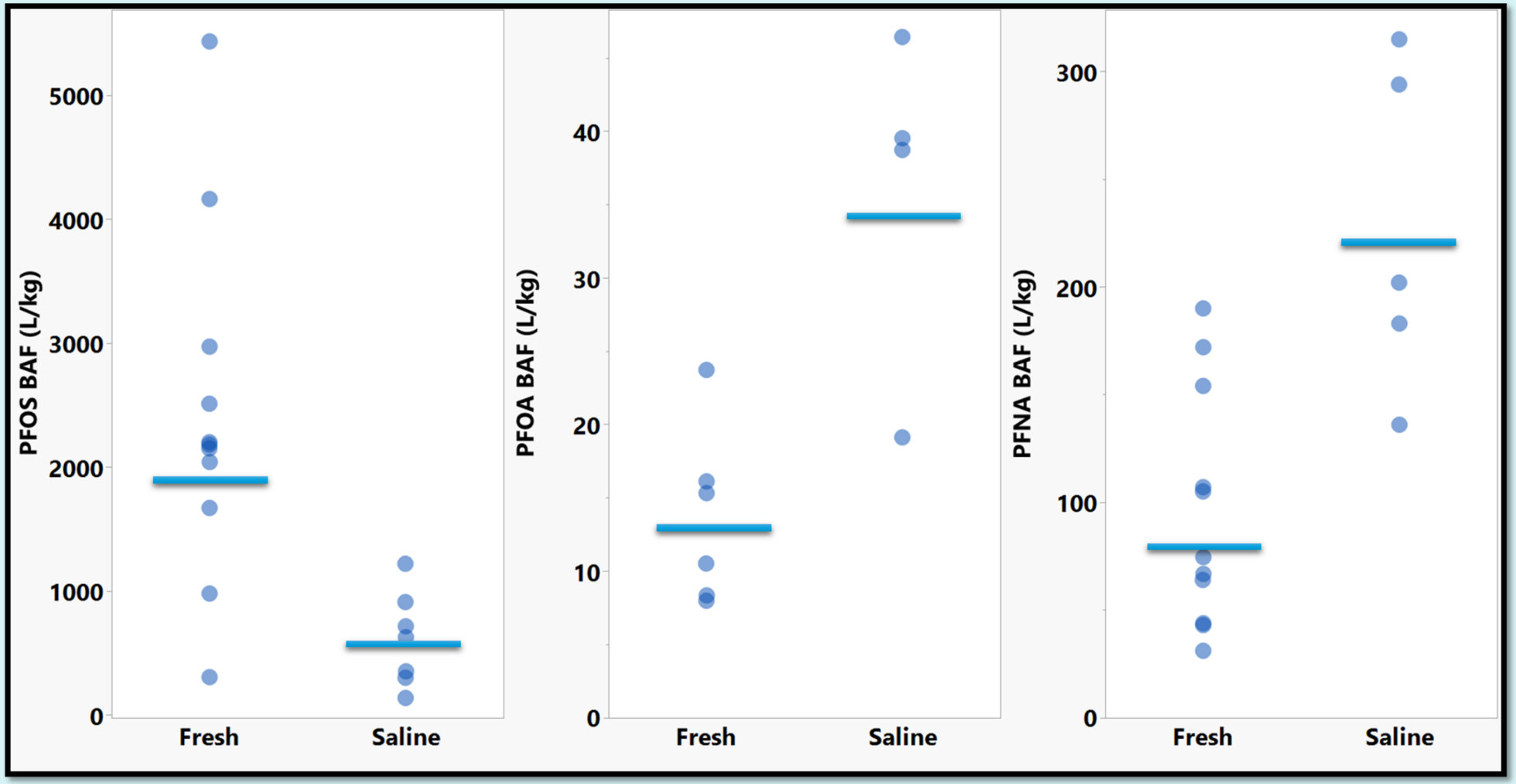


Spot (*Leiostomus xanthurus*)



Common carp (*Cyprinus carpio*)

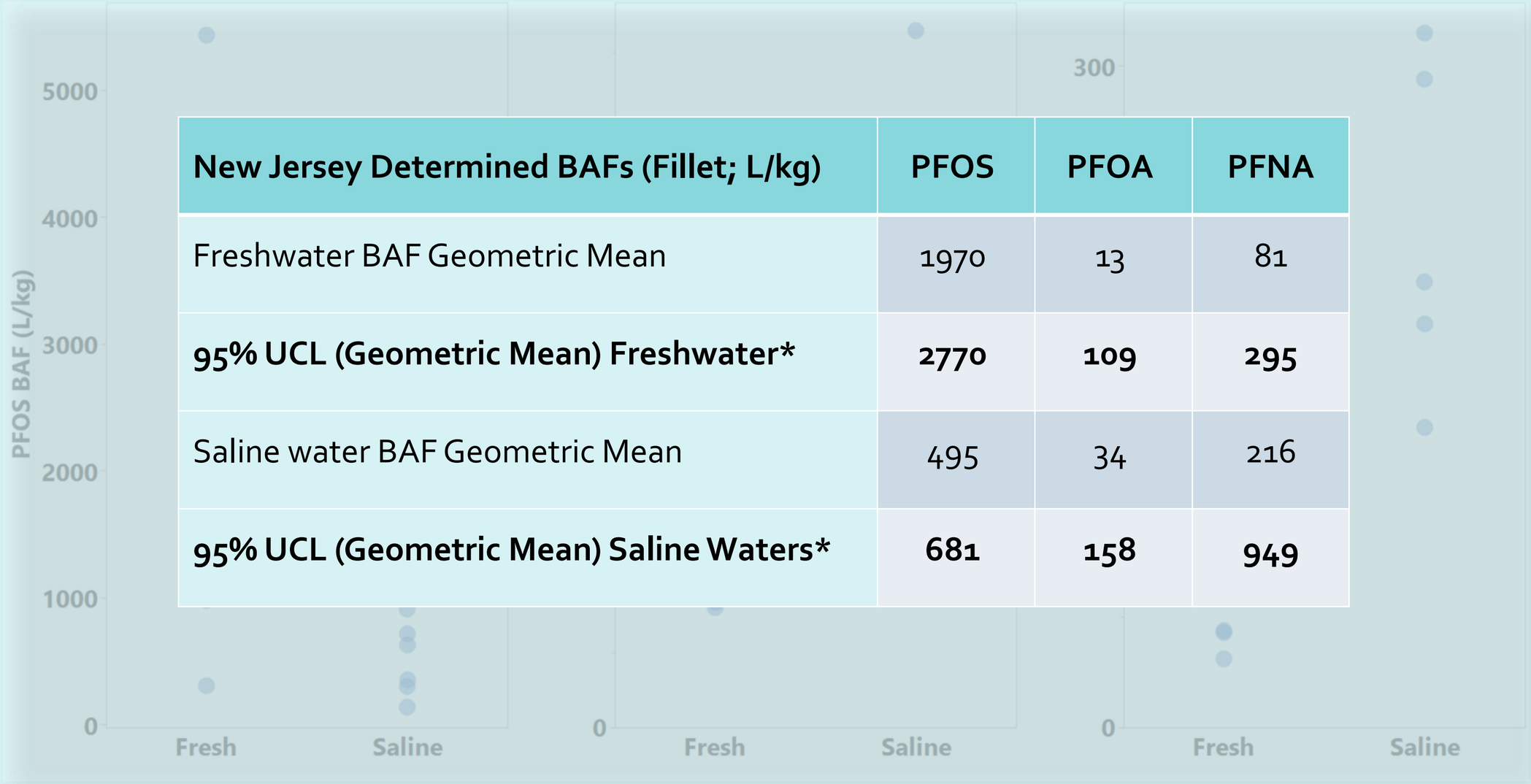
Study results were generally consistent with literature values for each PFOS, PFOA, and PFNA



= Geometric mean

Study results were generally consistent with literature values for each PFOS, PFOA, and PFNA

New Jersey Determined BAFs (Fillet; L/kg)	PFOS	PFOA	PFNA
Freshwater BAF Geometric Mean	1970	13	81
95% UCL (Geometric Mean) Freshwater*	**2770**	**109**	**295**
Saline water BAF Geometric Mean	495	34	216
95% UCL (Geometric Mean) Saline Waters*	**681**	**158**	**949**



BAF Comparisons (L/kg)

State or Study	Qualifier/Descriptor	Reference	PFOA	PFOS	PFNA
Wisconsin	WDNR Rule Package, paired fish and water from internal and external data- not used in rulemaking	WDNR, 2022	40	4745	-
Minnesota	State Data Set- 90th percentile used for rulemaking, no differentiation based on trophic level	MPCA, 2020	-	4289 7210 (90th percentile)	-
Florida	Geometric means summarized from literature (including non-native species)	Stuchal and Roberts, 2020	68	2358	-
Michigan	PFOA BAF based on laboratory kinetic models for rainbow trout	MDCH, 2015; Ruffle et al. 2024	4	2329 (TL3) 5047 (TL4)	-
ITRC PFAS Technical and Regulatory Guidance Document	Secondary analysis (unpublished*) of ITRC data (2022) by NJDEP	ITRC, 2022	34 (F) 379 (S)	1152 (F) 2479 (S)	332 (F) 483 (S)
Peer Review Article	Median BAFs summarized from primary literature	Burkhard, 2021	8	1230	117

BAF Comparisons (L/kg)

State or Study	Qualifier/Descriptor	Reference	PFOA	PFOS	PFNA
Wisconsin	WDNR Rule Package, paired fish and water from internal and external data- not used in rulemaking	WDNR, 2022	40	4745	-
Minnesota	State Data Set- 90th percentile used for	MPCA, 2020	-	4289	-
Florida					-
Michigan					-
ITRC PFAS Technical and Regulatory Guidance Document					332 (F) 483 (S)
Peer Review Article	Median BAFs summarized from primary literature	Burkhard, 2021	8	1230	117

	PFOS	PFOA	PFNA
NJ Freshwater BAF	1970	13	81
NJ Saline BAF	495	34	216
EPA BAF (TL weighted)	1040	35	-

Conclusions and additional considerations:

- **Extensive data set to be analyzed**
  - BAF calculations were 1st step
  - Continued comparisons using species, trophic level, region, water quality parameters, PFAS chain lengths, and functional groups
  - Development of **fish consumption advisories**

- **PFAS do not "follow the rules" of bioaccumulation**
  - Inconsistent accumulation with trophic level
  - Catfish; BAFs and accumulation consistently lower
    - Does physiology or behavior drive exposure & accumulation?

- **Additional research questions**
  - Do additional normalization steps need to be considered in PFAS BAF development?

Development of PFOS Fish Consumption Triggers

$$\text{Unlimited trigger concentration } (\mu g/g) = \frac{Reference\ Dose\ x\ Body\ Weight}{Meal\ Size} = \text{Fish Tissue Concentration}$$

Where:

Reference Dose (Hg) = 1.8 ng/kg-day
Body weight = 70 kg
Meal size = 227 g (8oz)

$$\text{Unlimited trigger concentration (ng/g)} = \frac{1.8\ \frac{ng}{kg}\text{-}day\ x\ 70\ kg}{227\ g} =$$

0.62 ng/g

- Triggers for less frequent consumption – consumption trigger multiplied by appropriate factor
  - Advisories for infrequent consumption (once every 3 months & yearly) are **not** recommended for high-risk populations (pregnant, nursing, may become pregnant; young children)
  - *Consistent with NJDEP advisories for other contaminants (e.g., PFAS, PCBs).*

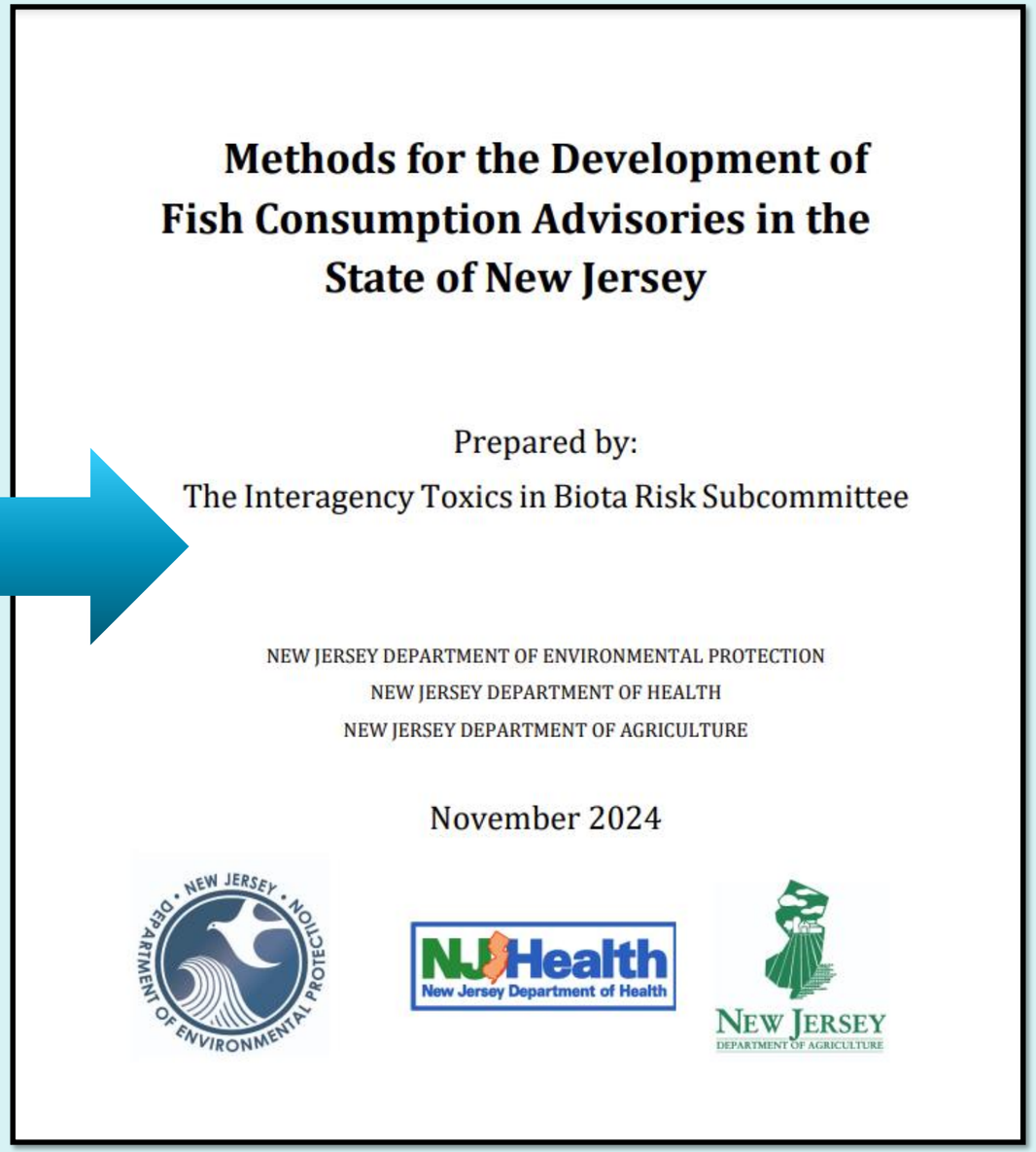
New Jersey Fish Consumption Triggers for PFAS (ng/g; ppb)

	General Population				*High Risk Population**			
Advisory Level:	**PFOA**	**PFNA**	**PFOS**	**PFUnA**	**PFOA**	**PFNA**	**PFOS**	**PFUnA**
Unlimited (daily)	0.62	0.23	0.56	**0.4**	0.62	0.23	0.56	**0.4**
One meal per week	4.3	1.6	3.9	**2.8**	4.3	1.6	3.9	**2.8**
One meal per month	19	6.9	17	**12**	19	6.9	17	**12**
One meal every 3 months	57	21	51	**37**	N/A	N/A	N/A	**N/A**
One meal every year	226	84	204	**146**	N/A	N/A	N/A	**N/A**
Do Not Eat	>226	>84	>204	**>146**	>19	>6.9	>17	**>12**

* Advisories based on consumption frequencies of "Once Every 3 Months" or "Yearly" are not applicable to high-risk groups (pregnant, may become pregnant, or nursing; young children).

Current Fish Advisory work:

- Recently published NJDEP Fish Consumption Advisory Guidance document (Fall 2024)
  - Contains detailed technical information for the overall program, risk equations, trigger values, and background on each chemical
- Inshore Monitoring (Summer 2025)
  - Fill data gaps for species from inshore coastal waters
- Evaluate PFAS advisories in relation to updated toxicity factors and increased sampling throughout the State



Methods for the Development of Fish Consumption Advisories in the State of New Jersey

Prepared by:

The Interagency Toxics in Biota Risk Subcommittee

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

NEW JERSEY DEPARTMENT OF HEALTH

NEW JERSEY DEPARTMENT OF AGRICULTURE

November 2024

NJ Health New Jersey Department of Health

New Jersey Department of Agriculture

Contact

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NJDEP Fish Advisory Main Page

NJDEP Fish Advisory Methods

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https://dep.nj.gov/dsr/

Any reference to commercial entities or tradenames is coincidental as part of a case study or for illustrative purposes and are not an endorsement by the presenter or the NJDEP

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Development of NJ Surface Water Quality Criteria

Saline water exposure pathway

Non-carcinogen

Fish Consumption only

$$\text{Criterion}(\mu g/L) = \frac{RfDx\ RSCx\ BW\ x\ Conversion\ Factor}{Fish\ Consumption\ Rate\ x\ BAF}$$

Carcinogen

$$\text{Criterion}(\mu g/L) = \frac{(\frac{Cancer\ Risk}{CSF})x\ BW\ x\ Conversion\ Factor}{Fish\ Consumption\ Rate\ x\ BAF}$$

Fresh water exposure pathways

Non-carcinogen

Drinking Water and Fish Consumption

$$\text{Criterion}(\mu g/L) = \frac{RfDx\ RSCx\ BW\ x\ Conversion\ Factor}{DW\ intake + Fish\ Consumption\ Rate\ x\ BAF}$$

Carcinogen

$$\text{Criterion}(\mu g/L) = \frac{(\frac{Cancer\ Risk}{CSF})x\ BW\ x\ Conversion\ Factor}{DW\ intake + Fish\ Consumption\ Rate\ x\ BAF}$$

Note: for presentation purposes the BAFs are simplified to be representative for a single trophic level of fish. In deriving criteria for chemicals with information for multiple trophic levels (i.e., for trophic levels 2 through 4), each trophic level-specific bioaccumulation factor and fish consumption rate are multiplied together, and that product is then summed with the products (i.e., bioaccumulation factor x fish consumption rate) for the other trophic levels.

Questions?

SOVEREIGN CONSULTING INC.
AN ENVIRONMENTAL SERVICES FIRM

Application of Sustainable Resilient Remediation (SRR) in the Remedial Decision Process and for Final Remedy Selection in New Jersey

Julian Davies, LSRP
Senior Project Manager
Sovereign Consulting Inc.

June 11, 2025

SOVEREIGN CONSULTING INC.
SCIENCE. SERVICE. SOLUTIONS.
PGT PROJECT GREENHOUSE GAS EMISSIONS TOOL

Glossary

ARRCS – Administrative Requirements for the Remediation of Contaminated Sites (NJ)
ASTM - American Society for Testing and Materials
CL:AIRE - Contaminated Land: Applications in Real Environments
CMR - Code of Massachusetts Regulations
CSRR – Contaminated Site Remediation & Redevelopment (NJ)
EU – European Union
GHG – Greenhouse Gas
GSR – Green and Sustainable Remediation
GW – Groundwater
HFC – Hydrofluorocarbon
HSSE – Health, Safety, Security, and Environment
IFRS - International Financial Reporting Standards
ISO - International Organization for Standardization
ISSB - International Sustainability Standards Board
ITRC – Interstate Technology and Regulatory Council
LNAPL – Light Non-Aqueous Phase Liquid
LSRP – Licensed Site Remediation Professional (NJ)
MCP - Massachusetts Contingency Plan
MW – Monitoring Well
NICOLE - Network for Industrially Contaminated Land
NJDEP – New Jersey Department of Environmental Protection (NJ)
NJPACT - New Jersey Protecting Against Climate Threats (NJ)
O&M – Operation and Maintenance
PA – Preliminary Assessment
PCB - Polychlorinated Biphenyl
PCE – Perchloroethylene
PGT - Project Greenhouse Gas Emissions Tool
RA – Remedial Action
RAP – Remedial Action Permit (NJ)
RAR – Remedial Action Report (NJ)
REAL - Resilient Environments and Landscapes (NJ)
RGGI – Regional Greenhouse Gas Initiative
RI – Remedial Investigation
SB – Senate Bill
SBMP – SRR Best Management Practice
SEC – Securities and Exchange Commission
SEFA - Spreadsheets for Environmental Footprint Analysis
SHMCAP - State Hazard Mitigation and Climate Adaptation Plan
SI – Site Investigation
SovCon – Sovereign Consulting Inc.
SRRA – Site Remediation and Reform Act (NJ)
SURF - Sustainable Remediation Forum
TCE – Trichloroethylene
USEPA – US Environmental Protection Agency
USDOD – US Department of Defense

Sustainability

GSR Evolution

USEPA: Green Remediation (2008)

SURF: "White Paper" (2009)

ITRC:

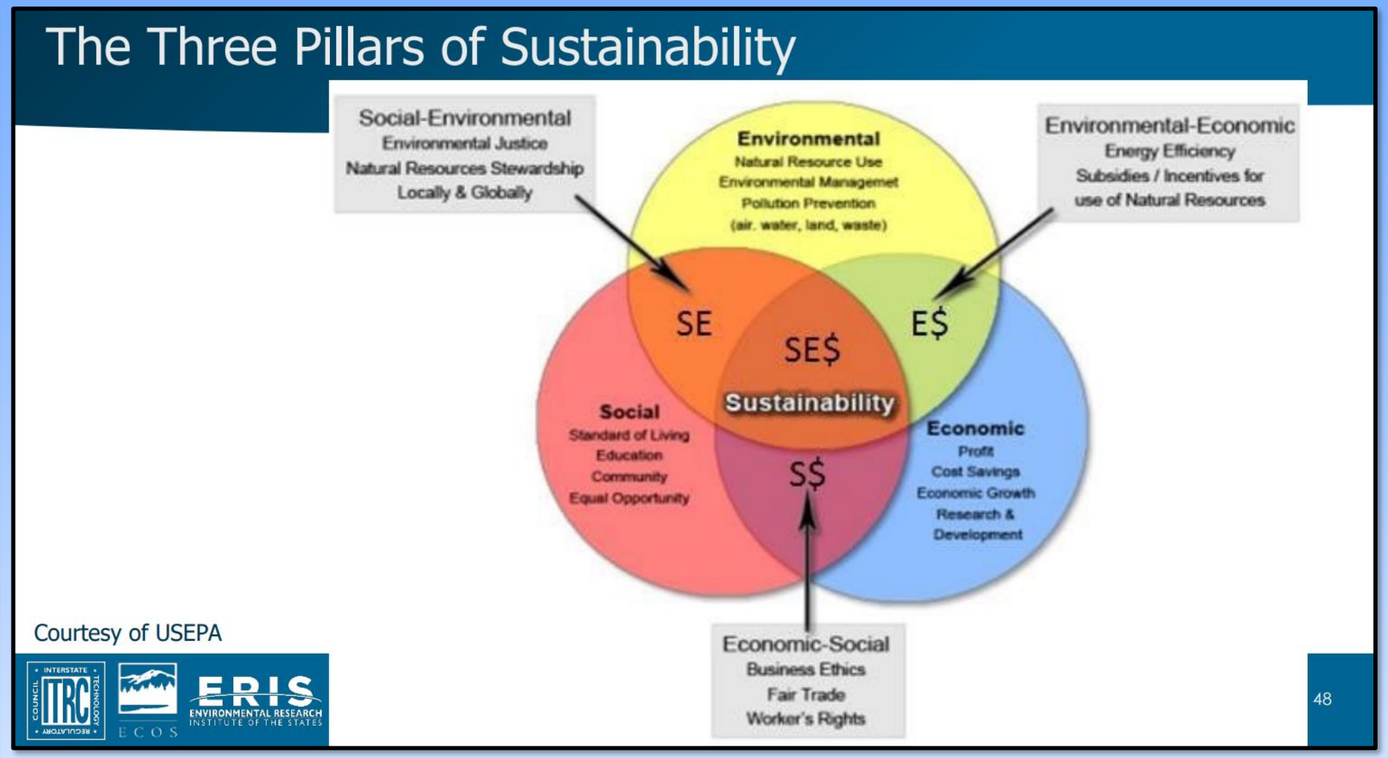
- GSR-1 (survey): 2011
- GSR-2 (framework): 2011
- SRR (sustainable resilient remediation): 2021

ASTM, USDOD (Navy, Air Force, Army)

CL:AIRE, NICOLE, SURF-UK, ISO

NJDEP: SRRA, ARRCs, Admin Guidance (2023)

* Courtesy of L. Bealer, Shell Oil Products US



Sustainability (SRR) Process

Quantitative: Environmental; Economic

Qualitative: Social

SRR Regulation

International

- EU: “European Climate Law” (Jun 2021)
- ISSB IFRS S2 “Climate-related Disclosures Standard” (Jan 2024)

Federal

- USEPA: Superfund Green Remediation Strategy; Principles for Greener Cleanups; Green Remediation Best Management Practices; Methodology for Understanding and Reducing a Project’s Environmental Footprint; GHG Standards for Vehicles; GHG Reporting Program; Clean Power Plan; HFCs Phase-Down; Methane Regulations
- SEC “Climate-related Disclosure Rule” (Mar 2024) {in-litigation 2025}

States

- MA: MCP amendment 310 CMR 40.0191(3)(e) & SHMCAP (Sep 2023)
- CA: SB 253 & 261 acts “Climate Corporate Data Accountability” (Oct 2023)
- Climate Action Plans (19 states)
- GHG Targets (24 states + DC)
- Carbon Pricing Mechanisms (CA, OR, WA, RGGI - 11 NE states)

Where does New Jersey stand?

- **SRRA 2.0** (Aug 2019) | **ARRCS** (Feb 2023) "GSR" provision

> "Green remediation" means the practice of considering all environmental effects of the remediation and incorporating options that maximize the net environmental benefit of cleanup actions.

- **NJPACT** "Executive Order 100" (Jan 2020)
- **REAL** "Resilient Environments and Landscapes" regulation (Jan 2024)
- **Senate Bill S2425** "Low-carbon Transportation Fuel Standard Program" (Jan 2024) - pending
- **Senate Bill S4117** "Climate Corporate Data Accountability Act" (Feb 2025) – proposed
- **GSR** NJDEP administrative guidance (Sep 2023)

Green Remediation: CSRR encourages strategies which consider environmental impacts of cleanup activities at every stage of the remedial process to maximize the net environmental benefit of a cleanup. Examples are reducing energy and water usage, promoting carbon neutrality, promoting industrial materials reuse and recycling, and protecting and preserving land resources.

Resilience Measures: CSRR encourages LSRP/contractors to integrate climate change vulnerability assessments and adaptation measures into the remediation process to ensure the resilience of remedies to climate change impacts.

The SRR Process

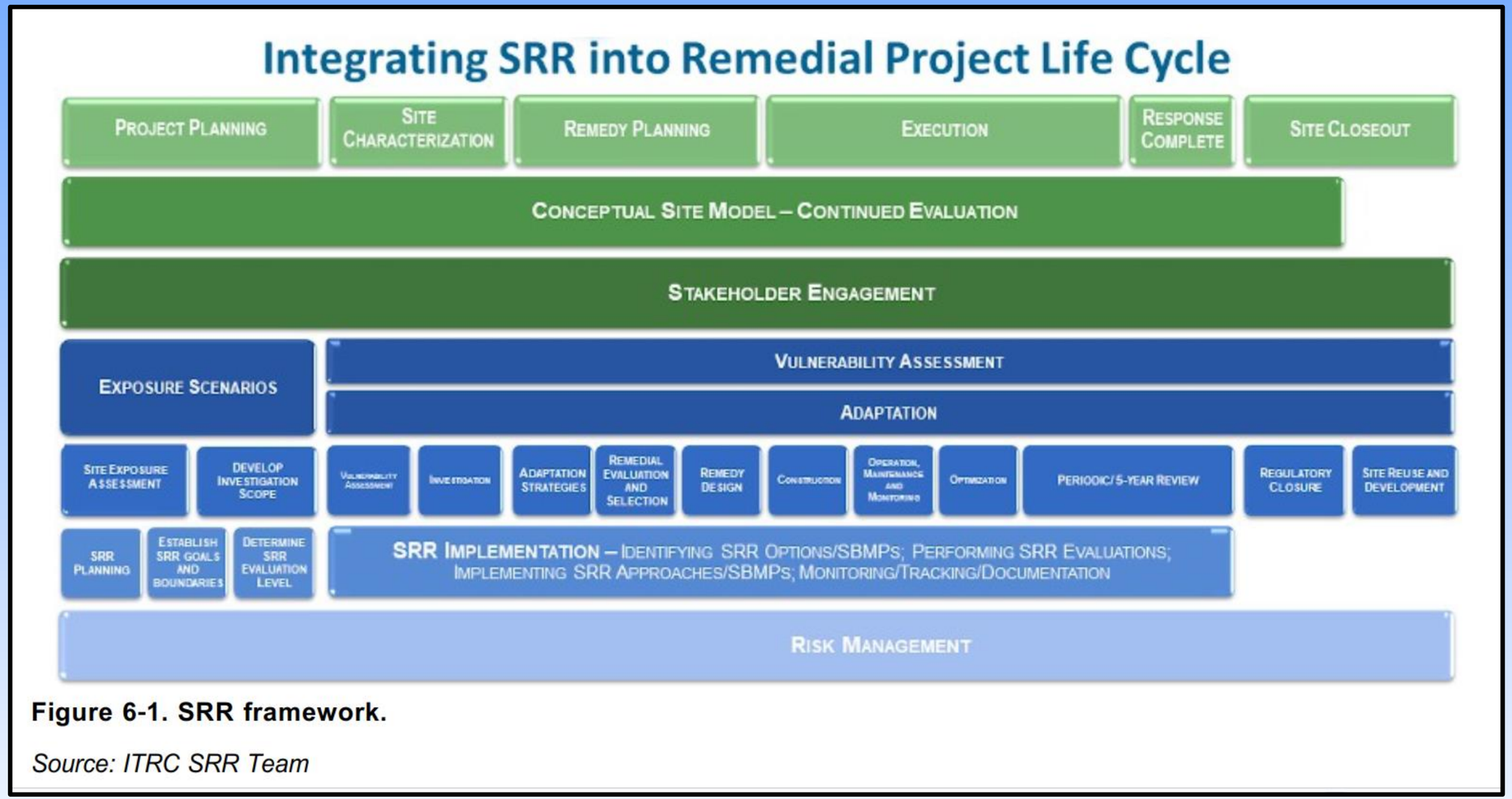


Figure 6-1. SRR framework.

Source: ITRC SRR Team

*Source: ITRC SRR-1 (Apr 2021)

SRR Implementation

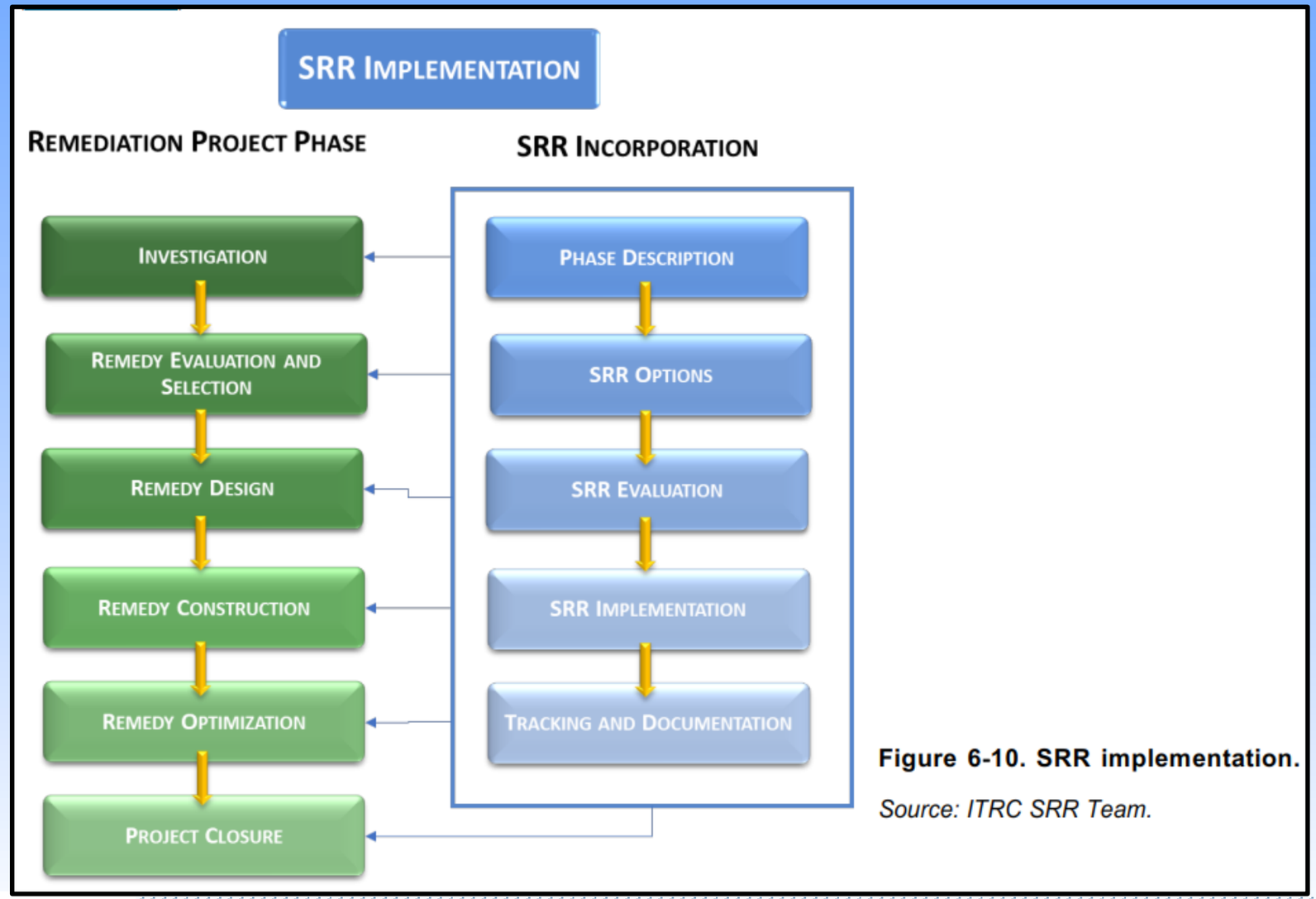


Figure 6-10. SRR implementation.

Source: ITRC SRR Team.

*Source: ITRC SRR-1 (Apr 2021)

SRR Assessment and Implementation
Quantitative

Environmental Tools

- EPA SiteWise: life cycle analysis; metrics; decision support
- EPA SEFA: metrics; workbooks; environmental footprint analysis
- Sovereign PGT® (proprietary):
  - single site / multi-site (portfolio) application
  - task based hierarchy structure (granularity)
  - baseline & life cycle analysis and projection
  - metrics - dynamic tracking & reporting (monthly)
    - ✓ CO_2 emissions tracking & reduction calculation
    - ✓ workforce exposure tracking & reduction calculation
    - ✓ waste tracking & reduction calculation
    - ✓ energy use tracking & reduction calculation
    - ✓ water replenishment tracking

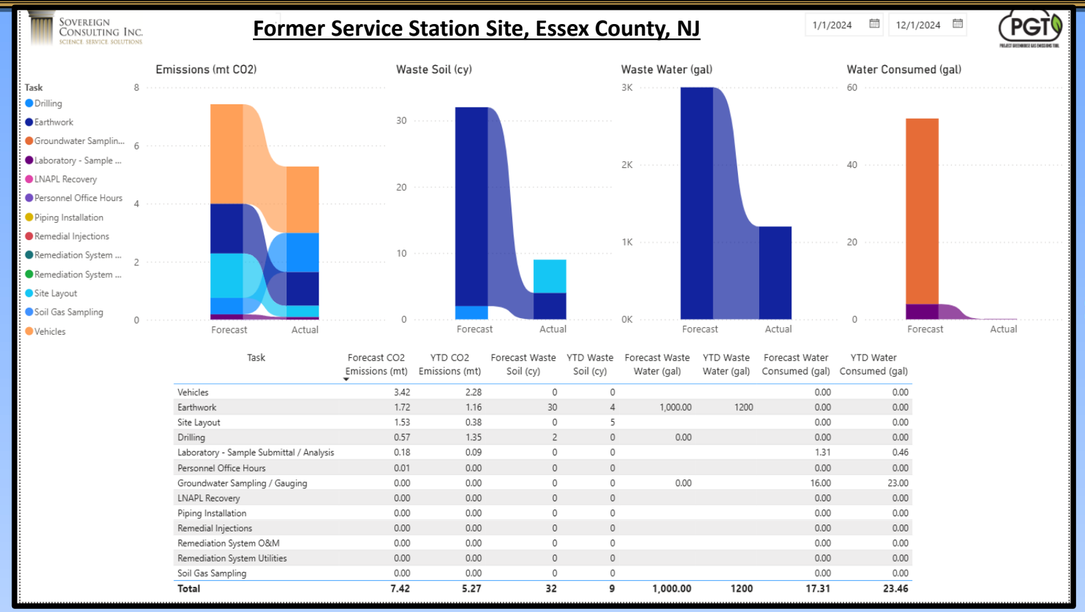
PGT
PROJECT GREENHOUSE GAS EMISSIONS TOOL

PGT HIGHLIGHTS

- *Operational simplicity*
- *Only 1-point of manual data entry*
- ***Minimal site PM training** required*
- *Automated data transfer*
- *Relational database for comparative analysis*
- *Presentation format flexibility available at all hierarchy levels*
- ***Forecasting & Tracking** application*
- *Scalable & easy customization*
- *Development expansion options*

PGT® - trademark pending

SRR: CO_2 Emissions Tracking



Task	Forecast CO2 Emissions (mt)	YTD CO2 Emissions (mt)	Forecast Waste Soil (cy)	YTD Waste Soil (cy)	Forecast Waste Water (gal)	YTD Waste Water (gal)	Forecast Water Consumed (gal)	YTD Water Consumed (gal)
Vehicles	3.42	2.28	0	0			0.00	0.00
Earthwork	1.72	1.16	30	4	1,000.00	1200	0.00	0.00
Site Layout	1.53	0.38	0	5			0.00	0.00
Drilling	0.57	1.35	2	0	0.00		0.00	0.00
Laboratory - Sample Submittal / Analysis	0.18	0.09	0	0			1.31	0.46
Personnel Office Hours	0.01	0.00	0	0			0.00	0.00
Groundwater Sampling / Gauging	0.00	0.00	0	0	0.00		16.00	23.00
LNAPL Recovery	0.00	0.00	0	0			0.00	0.00
Piping Installation	0.00	0.00	0	0			0.00	0.00
Remedial Injections	0.00	0.00	0	0			0.00	0.00
Remediation System O&M	0.00	0.00	0	0			0.00	0.00
Remediation System Utilities	0.00	0.00	0	0			0.00	0.00
Soil Gas Sampling	0.00	0.00	0	0			0.00	0.00
Total	**7.42**	**5.27**	**32**	**9**	**1,000.00**	**1200**	**17.31**	**23.46**

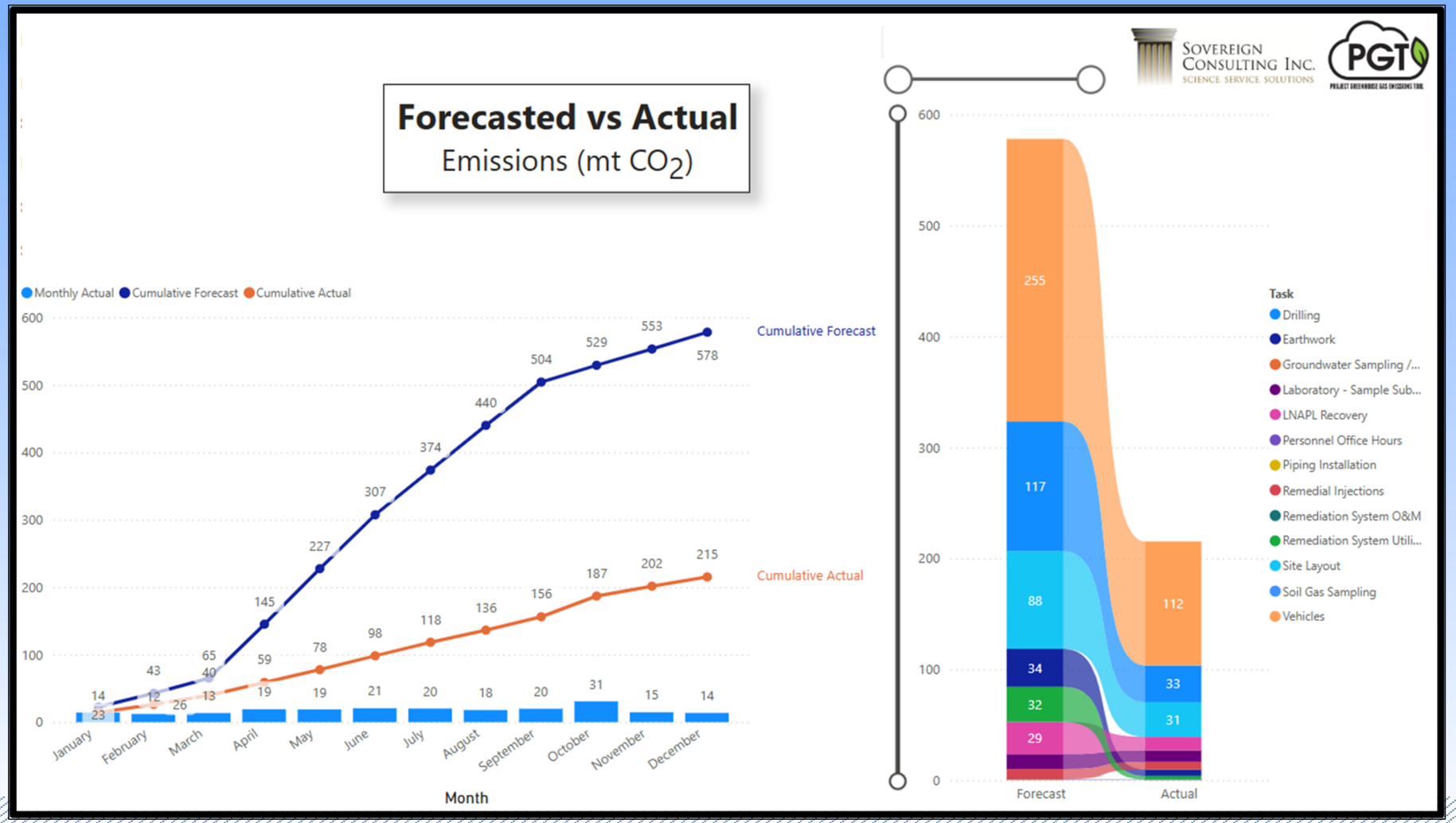
single site (ytd)

single site (year-on-year)

Activity	2020	2021	2022	2023	Total
Drilling	**87.64**	**701.11**		**438.20**	**1,226.95**
Direct Push / GeoProbe	87.64	525.84		438.20	1,051.68
Well Installs		175.27			175.27
Field Work Mob/Demob	**5,154.44**	**5,796.59**	**3,702.86**	**3,355.34**	**18,009.23**
Field Work Mob/Demob	5,154.44	5,796.59	3,702.86	3,355.34	18,009.23
Groundwater Sampling / Gauging	**2.51**	**1.25**	**1.25**	**1.43**	**6.45**
Gauge Only			0.00		0.00
Low Flow	2.51	1.25	1.25	1.43	6.45
Lab Courier Pickup	**323.49**	**323.49**	**388.19**	**323.49**	**1,358.68**
Lab Courier Pickup	323.49	323.49	388.19	323.49	1,358.68
LNAPL Recovery			**0.00**	**0.00**	**0.00**
Absorbent Sock			0.00	0.00	0.00
Report Preparation	**0.88**	**0.29**	**1.17**	**0.59**	**2.93**
Report Preparation	0.88	0.29	1.17	0.59	2.93
Site Layout	**989.09**	**2,967.28**	**0.00**	**2,472.74**	**6,429.12**
Air Knifing / Pre-Clearing	989.09	2,967.28		2,472.74	6,429.12
Ground Penetrating Radar	0.00	0.00		0.00	0.00
Survey	0.00	0.00	0.00	0.00	0.00
Utility Markouts	0.00	0.00		0.00	0.00
Waste Disposal	**684.50**	**342.25**	**1,026.75**	**2,395.75**	**4,449.25**
DRILL_Pickups				684.50	684.50
GWSG_Pickups	684.50	342.25	342.25	342.25	1,711.25
LNAPL_Pickups			684.50	1,369.00	2,053.50
Total	**7,242.56**	**10,132.28**	**5,120.23**	**8,987.54**	**31,482.60**

SRR: CO_2 Emissions Tracking

multi-site (month-to-month)



SRR: CO_2 Emissions & Waste Generation Comparison
GW Sampling Methodology Example

Volumetric Average Purge Vs. Low Flow Or No-purge

Considerations:

1) Low flow or no-purge GW sampling does not generate significant GW waste, if any.
2) Volumetric average purge generates GW waste. Disposed offsite via recycling/destruction.
3) GW waste requires transportation offsite (associated vehicle GHG emissions).
4) Disposal facility utilizes energy sources (associated GHG emissions) for recycle/disposal.

***Assumptions:**

1) GW purge waste is non-haz.
2) **Minimum one 55-gallon drum of purged GW waste p/event.**
3) 100-mile return trip to transport drums from site to disposal facility.
4) Transportation fuel used = diesel.

SiteWise v3.2 Results

- **0.0026 metric tons CO_2** emissions to recycle/treat **one** 55-gallon drum of purge GW.
- **0.14 metric tons CO_2** emissions for transport of **one** 55-gallon drum of purge GW.

	Soil Residue	Residual Water
Will DIESEL-run vehicles be retrofitted with a particulate reduction technology?	No	No
Weight of the waste transported to landfill or recycling (tons)	0.0	0.2
Fuel used	Diesel	Diesel
Total number of trips	0.0	1.0
Number of miles per trip	0.0	100.0
Total distance traveled (miles)	0	100
Fuel efficiency by weight of load (mpg)	7.4	7.4
Total fuel used (gal)	0.0	13.6
BTU per gallon fuel used	135,847	135,847
CO_2 emission factor (g/gal)	1.01E+04	1.01E+04
N_2O emission factor (g/gal)	1.14E-01	1.14E-01
CH_4 emission factor (g/gal)	1.14E+01	1.14E+01
NOx emission factor (g/gal)	3.27E+00	3.27E+00
SOx emission factor (g/gal)	5.79E-02	5.79E-02
PM_{10} emission factor (g/gal)	2.91E-01	2.91E-01
ENERGY OUTPUT		
Energy used (BTU)	0.0E+00	1.8E+06
CO_2 OUTPUT		
CO_2 emission (metric ton)	0.0E+00	1.4E-01
N_2O emission (metric ton CO_2 e)	0.0E+00	4.8E-04
CH_4 emissions (metric ton CO_2 e)	0.0E+00	3.3E-03
NOx, SOx and PM_{10} OUTPUT		
NOx emission (metric ton)	0.0E+00	1.4E-05
SOx emission (metric ton)	0.0E+00	7.8E-07
PM_{10} emission (metric ton)	0.0E+00	3.9E-06
ACCIDENT RISK		
Fatality risk	0.0E+00	7.8E-07
Injury risk	0.0E+00	6.3E-05

	Operation 1
Landfill type	Non-Hazardous
Region	NJ
Waste disposed in landfill (tons)	0.22948
Landfill methane emissions (metric tons CH_4)	0
Waste disposed in non-hazardous landfill (tons)	0.2
Waste disposed in hazardous landfill (tons)	0.0
Energy used (MMBTU/ton)	1.60E-01
Electricity used (MWh/ton)	7.70E-03
CO_2 e emission factor (lb/ton)	2.50E+01
NOx emission factor (lb/ton)	1.40E-01
SOx emission factor (lb/ton)	7.50E-02
PM_{10} emission factor (lb/ton)	4.00E-01
Electricity production efficiency	45.12%
ENERGY OUTPUT	
Energy used (BTU)	4.9E+04
CO_2 OUTPUT	
CO_2 emission (metric ton)	2.6E-03
CH_4 emissions (metric ton CO_2 e)	0.0E+00
NOx, SOx and PM_{10} OUTPUT	
NOx emission (metric ton)	1.5E-05
SOx emission (metric ton)	7.8E-06
PM_{10} emission (metric ton)	4.2E-05

* Minimal assumptions. Site-specific considerations will vary on an individual basis (i.e., # of drums; mileage to disposal facility; truck fuel; disposal method; facility energy source; etc.)

SRR: CO_2 Emissions & Waste Reduction – SI/RI

Active Terminal Site, Middlesex County, NJ

SRR Assessment & Implementation Steps:

- Activity = MW drilling & soil borings. Expected duration = 10 weeks
- Event planning stage: emissions/workforce exposure/waste forecast via PGT™
- Event execution stage: monthly emissions/workforce exposure tracking via PGT™ during field implementation
- SRR actions implemented
  - Evaluation of emissions for on-site handling/pre-treatment alternatives for waste stream
  - Combined drilling and soil boring activities – reduced field time (workforce exposure & emissions)
  - Combined field teams and their vehicle usage ((multiple personnel commute within single vehicle)
  - SBMPs utilized
- Emissions reductions:
  - Waste drums (& disposal) reduced from 300+ to 56
  - Waste transportation and oversight (& associated vehicles) reduced
  - Reduce # of water frac tanks(10,000-gal) needed from 2 to 1
  - Elimination of GW pre-treatment system (& related emissions)

Completion

- Duration 6 weeks
- 56 drums (soil)
- 7.500-gals GW (1 Frac Tank)
- No GW pre-treatment
- CO_2 emissions reduction = 11,862 kg CO_2
- Waste soil reduction = 23.5 cubic yards
- Workforce exposure reduction: 100 hrs SovCon driving | 750 mi subcontractor driving (drilling) | 2,250 mi subcontractor driving (waste disposal)

Sovereign PGT™ Output Results

Emissions Breakdown | **Waste Produced** | **HSSE & Risk**

Task	CO_2 Emissions (kg CO_2)	Energy Cost ($)	Energy Use (hrs)	Waste Water* (gal)	Soil ($yards^3$)	Sovereign Miles Driven	Contractor Miles	Waste Disposal Miles
Field Work Mob/Demob	2505.85	$1,082.60	51.25	--	--	300.00	1750.00	--
LNAPL Recovery	7668.50	$3,101.00	56.00	--	--	*see mob/demob*	*see mob/demob*	--
Drilling	--	--	--	10000	37.5	*see mob/demob*	*see mob/demob*	2750
Waste Disposal	3764.75	$1,646.28	68.75	--	--	*see mob/demob*	*see mob/demob*	--
Total	**13,939.10**	**$5,829.88**	**176.00**	**10000.00**	**37.50**			

Emissions Breakdown | **Waste Produced** | **HSSE & Risk**

Task	CO_2 Emissions (kg CO_2)	Energy Cost ($)	Energy Use (hrs)	Waste Water* (gal)	Soil ($yards^3$)	Sovereign Miles Driven	Contractor Miles	Waste Disposal Miles
Field Work Mob/Demob	1442.40	$621.96	30.00	--	--	200.00	1000.00	--
LNAPL Recovery	--	--	--	--	--	*see mob/demob*	*see mob/demob*	--
Drilling	--	--	--	7500	14	*see mob/demob*	*see mob/demob*	500
Waste Disposal	684.50	$299.32	12.50	--	--	*see mob/demob*	*see mob/demob*	--
Total	**2,126.90**	**$921.28**	**42.50**	**7500.00**	**14.00**			

Planning

- Duration 10 weeks
- 300 drums (150 GW/150 soil)
- 2 Frac Tanks
- GW pre-treatment system

SRR: CO_2 Emissions Reduction - RA

Camden County, NJ

Substitute Daily Commute with Overnight Stays
Substitute Out-of-town with Local Employee

	CO_2 Emissions (kg CO_2)	Energy Cost ($)	Energy Use (hrs)
Baseline Total	9,909	$ 4,493	641
Proposed Total	5,698	$ 2,751	540
Reduction	**4,211**	**$ 1,742**	**101**
% Reduction	**42%**	**39%**	**16%**

- Eliminate **19 Daily Commute Days** related to 24 days of injection events*
  - Mob/Demob: **1** Contractor Heavy Trucks traveling **130 miles** per day (19 days = **2,470 miles** total)
- Eliminate **1,632 Miles** with Local Employee
  - Mob/Demob: **10 miles** per day traveled by Sovereign Employee from Cherry Hill (24 days = **240 miles** total) vs **78 miles** per day traveled by Sovereign Employee from Robbinsville (24 days = **1,872 miles** total)

*Assuming injection events are 5 days in a row (M-F)

Morris County, NJ

Substitute Active LNAPL Recovery with Passive Recovery

	CO_2 Emissions (kg CO_2)	Energy Cost ($)	Energy Use (hrs)
Baseline Total	8,987.54	$ 3,476.09	574.48
Proposed Total	8,315.04	$ 3,262.30	542.85
Reduction	672.49	$ 213.79	31.63
% Reduction	7%	6%	6%

- Substitute **15 Dewatering Events** with Passive Recovery & **Quarterly** Product Removal
  - Mob/Demob: **1** Sovereign Light Truck traveling **115 miles** per day (**460 miles** total vs **1,725 miles**)
  - LNAPL Drums: **4 drums** (**200 gallons** total vs **4,125 gallons**)

SRR Implementation
Applying SBMPs

Soil Excavation RA @ a former terminal site, MA (replicated at NJ site in Bergen County in 2023)

Lead-in-soil Excavation Sustainable BMPs

Planned/Doing/Done	These BMPs are either currently included in bid specs, or have already been completed as part of project preparation.
Recommended	These BMPs can be easily implemented at low or no cost and will materially improve project.
Ideal	These optional BMPs are presented for discussion purposes and can be implemented with some additional cost

= Complete

	BMP Category	Sustainability Category	Best Management Practice	SES	Sovereign	Documentation Method
1	All	All	Display SBMPs Notice Board at gate			Photograph installed sign
2	Project Planning & Team Management	Economic, Social	Establish a dynamic work strategy, which provides flexibility to adjust cleanup activities according to real-time field measurements. For example, screening soil samples at pre-determined decision points through use of laser-induced fluorescence technology might indicate that contaminated subsurface material in some areas could be left in place and covered with clean material instead of excavated.		Horizontal and vertical excavation extents shall be verified via field screening using XRF	Completed - see project documentation
3	Disposal	Environmental	Select the closest qualified waste facility.			Completed
4	Residual Solid & Liquid Waste	Environmental	Lay synthetic barriers and fluid collection systems on ground surfaces of staging and work areas, to avoid introducing toxic materials to underlying groundwater.	The material shall be placed on a base of 6 mil polyethylene liner and covered with the same material	All impacted soils must be staged on poly sheeting or equivalent impermeable surface	Confirm by post completion photographs

Excavation Site Signage

In-field "Green Zone" Presentation

SRR Assessment of Selected Remedial Options Qualitative

Active Industrial Facility Site, Morris County, NJ

Favorable
Somewhat Favorable
Unfavorable

Metric	Comprehensive On-Site Excavation	Comprehensive Off-Site Excavation	On-Site Engineering Control with Deed Notice	Off-site Hotspot Excavation	Passive NAPL Recovery	Groundwater MNA
Effectiveness	Permanently removes contaminant	Permanently removes contaminant	Prevents contact with contaminant	Partially removes contaminant	Permanently removes contaminant	Proven remedial option w/ natural processes
Risks	Large scale excavation related risks	Excavation related risks	Regular inspection / maintenance of barrier needed	Small scale excavation related risks	Low risk	Driving
Reliability	Permanently removes contaminant	Permanently removes contaminant	Stable long-term solution	Permanently removes contaminant	Permanently removes contaminant	Proven remedial option w/ natural processes
Costs	High	High	Medium	Medium	Low	Low
Resiliency	No future climate change concerns	No future climate change concerns	Minimal future climate change concerns	Minimal future climate change concerns	No future climate change concerns	No future climate change concerns
GHG Emissions	High	High	Moderate/Low	Medium	Low	Low/Moderate
Implementation	Physical constraints. Active business	Multi-party coordination needed	Regular inspection / maintenance of barrier needed. Deed Notice recording	Common & readily available	Only O&M needed	Only monitoring needed
Site Benefits	Directly removes contaminant	Directly removes contaminant	Leaves contaminant on site	Directly removes contaminant. Lowers health risk	Directly removes contaminant. Minimally invasive	Indirectly removes contaminant. Minimally invasive
Timeliness	Short- term	Short- term	Short-term	Short-term	Uncertain duration. Long-term	Uncertain duration. Long-term
Non-Pecuniary	Disruption to business	Disruption to business. Possible aesthetic improvement	Minimal short-term impact to business	Minimal short-term impact on local businesses/neighbors	Minimal impact on local businesses/neighbors	Potentially viewed as 'no action'

Final Remedial Options SRR Scoring Semi-Quantitative

Active Industrial Facility Site, Morris County, NJ

Metric	Relative Importance Score (1 - 5)	No Action* (Baseline)	Comp. On-Site Excavation	Comp. Off-Site Excavation	On-Site Engineering Control w/ Deed Notice	Off-site Hotspot Excavation	Passive NAPL Recovery	Groundwater MNA
Effectiveness	5	0	10	10	5	5	10	10
Risks	5	0	0	5	5	5	10	10
Reliability	4	0	8	8	8	8	8	8
Cost	4	8	0	0	4	4	8	8
Resiliency	3	3	6	6	8	6	6	6
GHG Emissions	3	6	0	0	3	3	6	3
Implementation	2	4	0	0	2	4	4	4
Site Benefits	2	0	4	4	2	4	4	4
Timeliness	1	0	2	2	2	2	1	1
Non-Pecuniary	1	0	0	0	2	2	1	1
Total		**21**	**30**	**35**	**41**	**43**	**58**	**55**

Favorability Score	
Favorable	2
Somewhat Favorable	1
Unfavorable	0

Relative Importance Score
X
Favorability Score

Remedial Option Selection Sustainability Summary

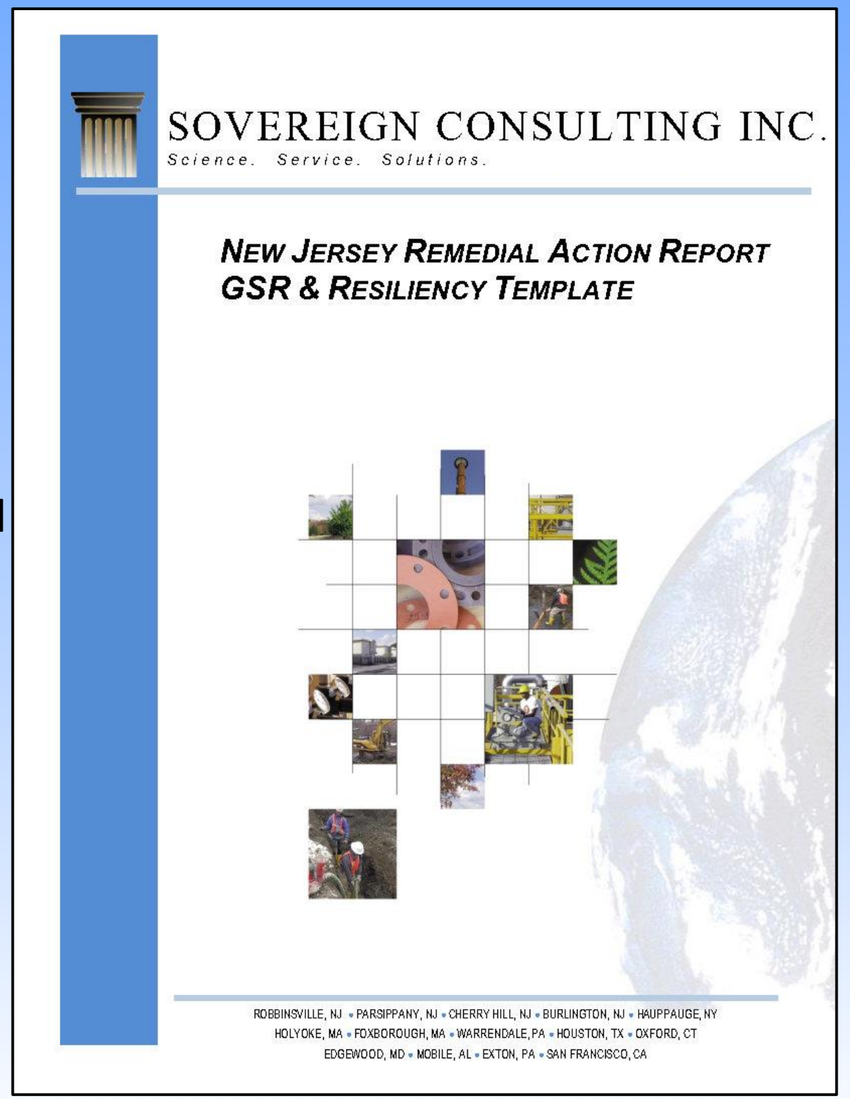
Active Industrial Facility Site, Morris County, NJ

ITRC Sustainability Considerations	
Social	• Prevents human exposure and reduces health risks from PCBs • Minimal impact to business • Minimal impact to neighbors
Economic	• Business can remain open during remediation • Lower overall cost compared to sitewide excavations
Environmental	• Removes PCE/TCE and NAPL from groundwater • Prevents wildlife exposure to PCBs • Lower greenhouse gas emissions and less ground disturbance compared to sitewide excavations
Resilience	• Minimal climate change concerns • Regular inspection, O&M, and monitoring will be performed • Extreme weather-related erosion & increased groundwater fluctuation may pose some future risk

SRR Implementation Reporting

NJDEP Key Document Submittal

- Include an SRR section in each report (SI, RI, RA)
- Summarize SRR application and results
- Highlight SRR assessment results and its use as part of decision process for remedial activity
- Memorialize SRR components as part of the final remedy within the RAR – since 2022
- Memorialize SRR components within RA permit application (Section K) – for consideration



Contact Information

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Greenhouse Gas Inventory: (https://sovcon.com/about-us/greenhouse-gas-inventory)

PGT™ GHG Tool: (https://sovcon.com/services/pgt)

PGT
PROJECT GREENHOUSE GAS EMISSIONS TOOL

Questions?

The last CVP/SRAG Meeting for this year will take place
October 15, 2025
9:00-12:00