



# **USDA FOG ABATEMENT TRAINING:** **BUILDING A BUSINESS CASE FOR AN EFFECTIVE FOG ABATEMENT PROGRAM & EMERGING CONTAMINANTS OF CONCERN**

## **SESSION 2**

**POLLUTION PREVENTION**  
resource center



**W S A**  
a project of [pprc.org](http://pprc.org)

**This training is sponsored by a grant from the USDA Rural Utilities Service (RUS)**

**This training is brought to you through a grant  
from the USDA Rural Utilities Service**





<a href="#">WHO WE ARE</a> →	<a href="#">OUR EVENTS</a> →	<a href="#">OUR PROJECTS</a> →	<a href="#">GET INVOLVED</a> →
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**WWW.PPRC.ORG**

## About Us

Western States Alliance (WSA) is a project of the [Pollution Prevention Resource Center](#) that helps professionals identify and implement best practices in Fats, Oils, and Greases (FOG) management.

We are a membership organization of FOG professionals from across the United States. [Click here](#) to check out our staff bios on pprc.org.

Our vision is to be a comprehensive source of knowledge and assistance to advance technologies and best management practices, conserve resources, and derive the most value from FOG while prohibiting its damaging effects in the wastewater system.

### Conferences & Workshops

We offer two FOG related technical training conferences each year: The [FOG Forum](#) & the [Pacific Northwest Pretreatment Workshop](#). Both events offer immersive training, program development and implementation sessions, and many opportunities for networking with your peers.

[Subscribe Below >](#)

### FOG Abatement Training

With funding from the USDA, we provide both virtual and in-person trainings to help small rural communities and those who serve them. The trainings focus on building the business case for your program, program implementation and emerging chemicals of concern.

[Training Calendar >](#)

### National Resource Reference Guide

Our National Reference Resource Guide is a "one-stop" shop to learn about FOG, its value as a resource, its problems in sewer conveyance lines, its contribution to sanitary sewer overflows, its cost of treatment, and how you can establish or enhance a FOG Abatement program.

[View the Guide >](#)

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TECHNICAL RESOURCES TAB



**We encourage open discussion  
during the presentation...**



# TRAINERS:

Clayton Brown

Jude Brown

Patrick Bryan

Arjen DeHoop

Ed Gilmore

Ken Grimm

David James

Jean Waters



# BUSINESS CASE TOPICS

## Session 1

- Establishing the Need for a FOG Program
- Data Needed
- Excess Operation & Maintenance Costs
- Program Development Costs (Part 1)

## Session 2

- **Planning**
- **Program Development Costs (Part 2)**
- **Data Acquisition and Management**
- **Cost-Benefit Analysis**
- **Emerging Contaminants of Concern**



## PATRICK BRYAN, PPRC FOG TRAINER AND TECHNICAL PROGRAM MANAGER

*Stanislaus County, Hazardous Materials Inspector  
County Of Fresno, NPDES Inspector  
Municipal Interagency Training Coordinator*

- EXPERIENCE SERVING AS A WASTEWATER AND STORM WATER INSPECTOR FROM THE COUNTY OF FRESNO, CALIFORNIA.
- BACKGROUND IN COMMERCIAL AND DEVELOPMENT PROGRAMS PATRICK UNDERSTANDS THE DISCONNECT THAT CAN OCCUR BETWEEN THE COMMUNITIES WE SERVE SUCH AS FOOD SERVICE ESTABLISHMENT'S (FSES), OTHER REGULATORY INSPECTORS/PROGRAMS AND WITHIN OUR OWN AGENCIES.
- BUILDING RELATIONSHIPS WITH INTERNAL DEPARTMENTS AND PRIVATE STAKEHOLDERS IS ESSENTIAL FOR A SUCCESSFUL FOG PROGRAM.





# PLANNING & PROGRAM DEVELOPMENT COSTS

WHAT DOES IT TAKE TO PUT TOGETHER AN EFFECTIVE FOG  
PROGRAM?

# PLANNING AND PROGRAM DEVELOPMENT

## Planning

Take time to map out what your FOG Program outcomes should be

Identify measures to track.

Measures should demonstrate that outcomes have been met, or are being achieved



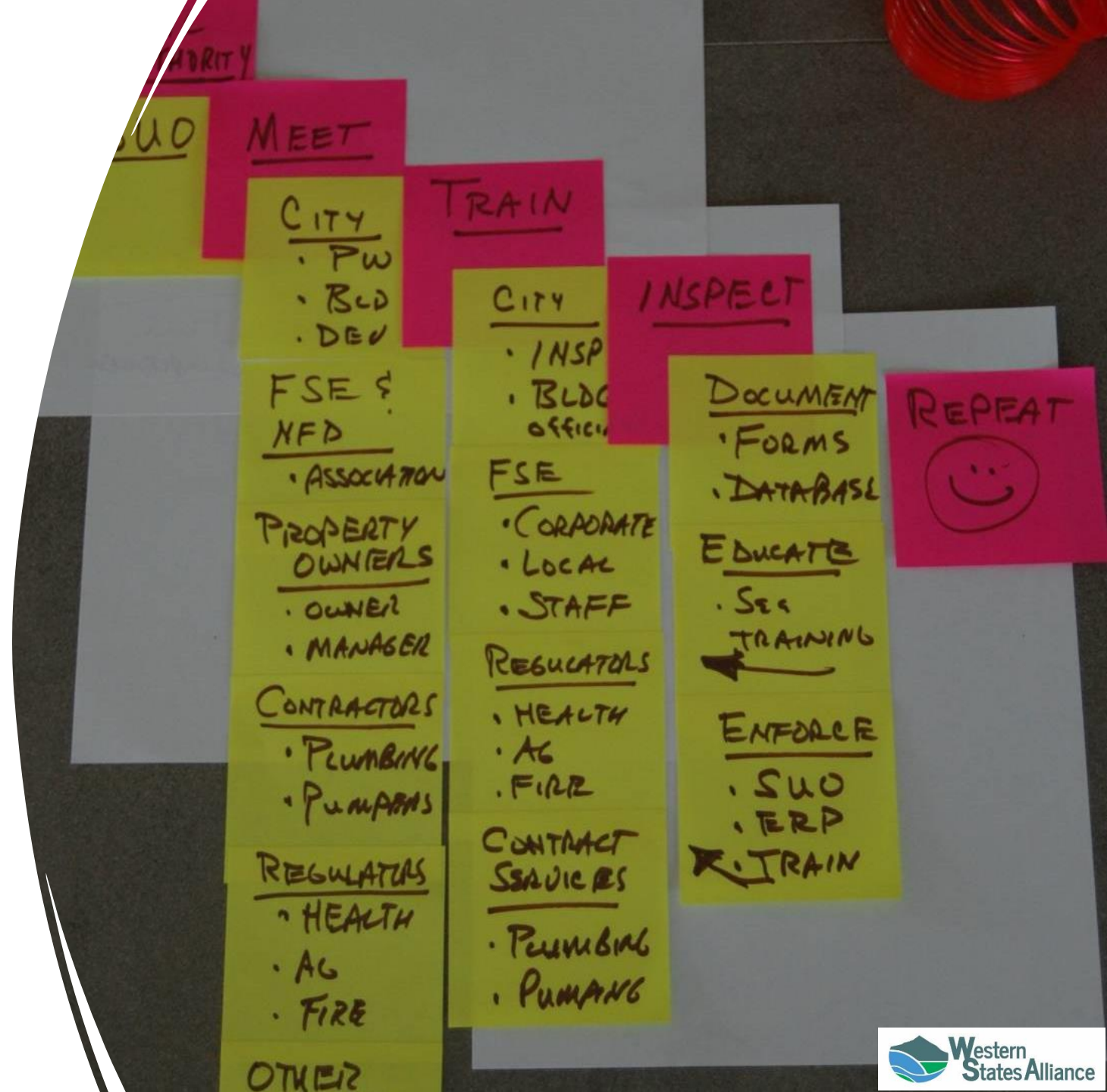
“An effective FOG program must be data-driven, not effort-driven.”

Gary Christiansen, City of Seattle  
Public Works



# PROGRAM DEVELOPMENT

- Put legal authority into place (covered in PM session)
- Identify all stakeholders
- Identify all “moving parts” of the program (i.e., CMOM/IPP)
- Implement, gather data, analyze, and repeat



# PROGRAM DEVELOPMENT STAFFING PLAN

- Which staff will be involved in program development?
- One sewer district developed for a year, using
  - Division Manager (part time)
  - Program Manager (part time)
  - Communication specialist (part time)
  - Environmental Specialist (full time)

# STAKEHOLDER INVOLVEMENT PLANNING

- Have you **identified** the stakeholders?
- Have **meetings** been scheduled to discuss the FOG Program with stakeholders?
- Has the **business case** been presented to the municipal leadership?
- One sewer district spent **one year meeting with stakeholders** in monthly meetings. Four staff members from the District were involved, three part time and one full time during this year.
- What are the **estimated fully-loaded labor costs** to get input from stakeholders?

# STAKEHOLDERS INVOLVED

## FSE Data (partial list)

- Physical **Address** (and GIS data or latitude/longitude)
- Potential **FOG Loading** of FSE (very high, high, medium, low)
- **Proximity** of FSE to a FOG-impacted sanitary sewer line (FOG line)
- Type(s) of **FOG pretreatment**
- Interceptor **maintenance history**
- **Fixtures and drains connected** to interceptor
- **Contact information** for FSE
- **Landlord** or property manager contact information

# STAKEHOLDERS INVOLVED

## Utility Data (partial list)

- Which collection system **line segments** are impacted by FOG?
- What is the **cleaning frequency** for these FOG lines?
- Does the **frequency exceed** the established line cleaning frequency for the normal collection system?
- What is the **cost per line segment** to keep these FOG lines cleared?
- Are there **pump stations** impacted by FOG?
- How **often** are these stations cleaned?
- What is the **cost per cleaning**?



# NO SURPRISES !



## All Stakeholders Must Be Kept **Updated** On This Process

- Regular Updates
- Meetings
- Stakeholder Participation

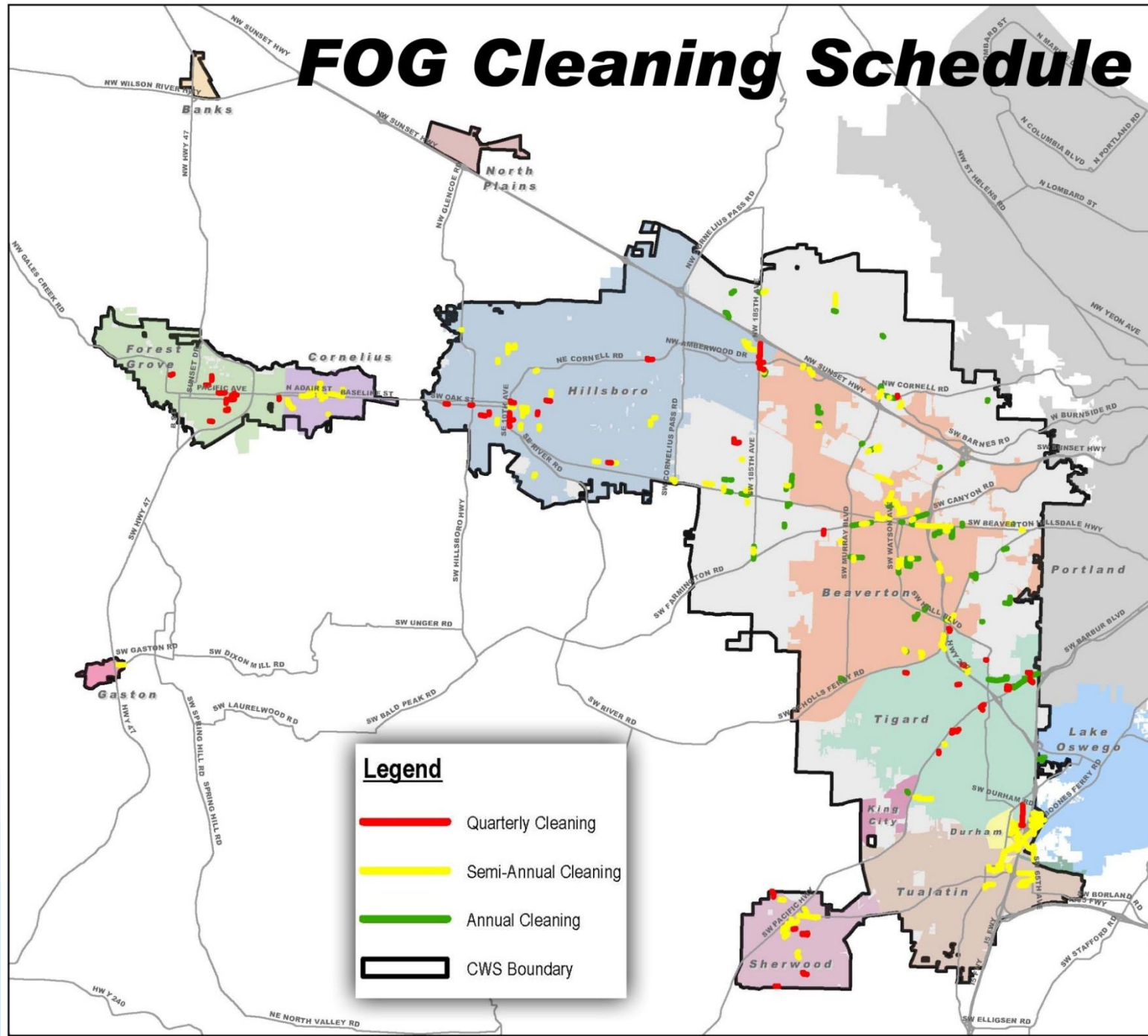
## City **Management** Must Be Kept In The Loop, Too

- Regular Updates
- Feedback

# Prioritizing Inspections

- **Give priority to FSEs on most frequently cleaned lines & pump stations**
- **Give priority to FSEs that produce the most FOG**

# FOG Cleaning Schedule





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# Poll Question



# Kennedy/Jenks Brown Grease Supply Study

## Kennedy/Jenks Consultants

200 S.W. Market Street, Suite 500  
Portland, Oregon 97201  
503-295-4911  
FAX: 503-295-4901

### Brown Grease Supply Study

16 February 2011

Prepared for

**Clean Water Services**  
2550 SW Hillsboro Highway  
Hillsboro, OR 97123

K/J Project No. 1091014.10

## Technical Resources

As part of our mission to provide technical resources from partners throughout the country, we offer this selection of FOG related materials for your training needs.

[National Resource Reference Guide](#)

[Preferred Pumper Program](#)

[Interceptor Sizing Guide](#)

[Kennedy Jenks Brown Grease Supply Study](#)

[WSA's FOG Source Control Guide](#)

[The City of Portland's FOG Extra Charge Guidelines](#)

[WSA FOG Training Playlist on YouTube](#)

[Plumbing & Draining Institute Publications](#)

[FOG Resources in the PPRC Resource Library](#)

[Presentation Slides from FOG Abatement Training \(coming soon\)](#)

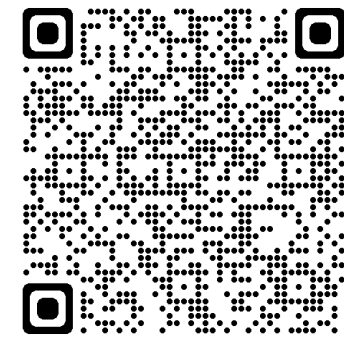
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[Kennedy-Jenks-Brown-Grease-Supply-Study.pdf](#)  
[\(western states alliance.org\)](#)







# INTERCEPTOR WHISPERER

## Hydromechanical GREASE INTERCEPTOR

### Sizing and Selection Guide

(includes two-page worksheet)

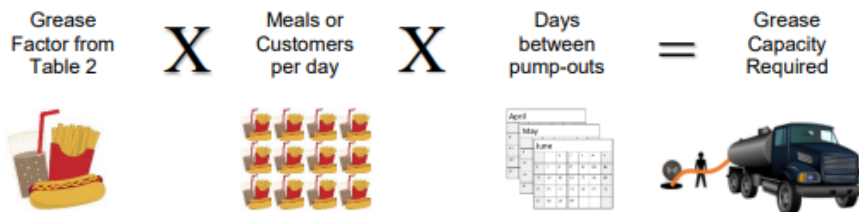
August 2018 Edition

#### ABSTRACT

Hydromechanical grease interceptors certified to ASME A112.14.3, CSA B481 or PDI G101 are tested to determine efficiency, flow-alone is not sufficient to ensure that sizing and selection method provides guidance. A second step is included that evaluates the flow rate to be used to select a grease inter

#### Step 2: Calculate Grease Capacity

Once the minimum flow rate has been established in Step 1, calculate the minimum grease storage capacity for the HGI required for the desired pump-out frequency as follows:



To determine the correct grease factor, using Table 2, select the menu type (1 through 30), then the correct column (A through D) for whether there is a fryer and whether the establishment uses disposable or washable plates, glasses, knives, forks and spoons (flatware).

Table 2

Type	Menu	Grease Factor ->			
		without Fryer without flatware	without fryer with flatware	with fryer without flatware	with fryer with flatware
		A	B	C	D
1	Bakery	0.035	0.0455	0.035	0.0455
2	Bar and Grille	0.005	0.0065	0.025	0.0325
3	Barbeque	0.035	0.0455	0.035	0.0455
4	Breakfast Bar - Hotel	0.005	0.0065	0.025	0.0325
5	Buffet	0.035	0.0455	0.058	0.0754
6	Burger and fries, fast food	0.035	0.0455	0.035	0.0455
7	Cafeteria	0.025	0.0325	0.035	0.0455
8	Caterer	0.005	0.0065	0.025	0.0325
9	Chinese	0.035	0.0455	0.058	0.0754
10	coffee shop	0.025	0.0325	0.035	0.0455
11	Convenience Store	0.005	0.0065	0.025	0.0325
12	Deep fried Chicken / seafood	0.035	0.0455	0.058	0.0754
13	Deli	0.005	0.0065	0.025	0.0325
14	Family Restaurant	0.035	0.0455	0.035	0.0455
15	Frozen Yogurt	0.005	0.0065	0.025	0.0325
16	Greek	0.025	0.0325	0.035	0.0455
17	Grocery Bakery	0.025	0.0325	0.035	0.0455
18	Grocery Deli	0.025	0.0325	0.035	0.0455
19	Grocery Meat Department	0.025	0.0325	0.025	0.0325
20	Ice Cream	0.025	0.0325	0.035	0.0455
21	Indian	0.025	0.0325	0.035	0.0455
22	Italian	0.035	0.0455	0.035	0.0455
23	Mexican, fast food	0.035	0.0455	0.035	0.0455
24	Mexican, full fare	0.035	0.0455	0.058	0.0754
25	Pizza	0.025	0.0325	0.035	0.0455
26	Religious Institution	0.005	0.0065	0.025	0.0325
27	Sandwich shop	0.005	0.0065	0.025	0.0325
28	Snack Bar	0.005	0.0065	0.025	0.0325
29	Steak and seafood	0.035	0.0455	0.058	0.0754
30	Sushi	0.005	0.0065	0.025	0.0325

# Data Acquisition and Management

Gathering data to implement the FOG  
program



# DATA COLLECTION & STORAGE

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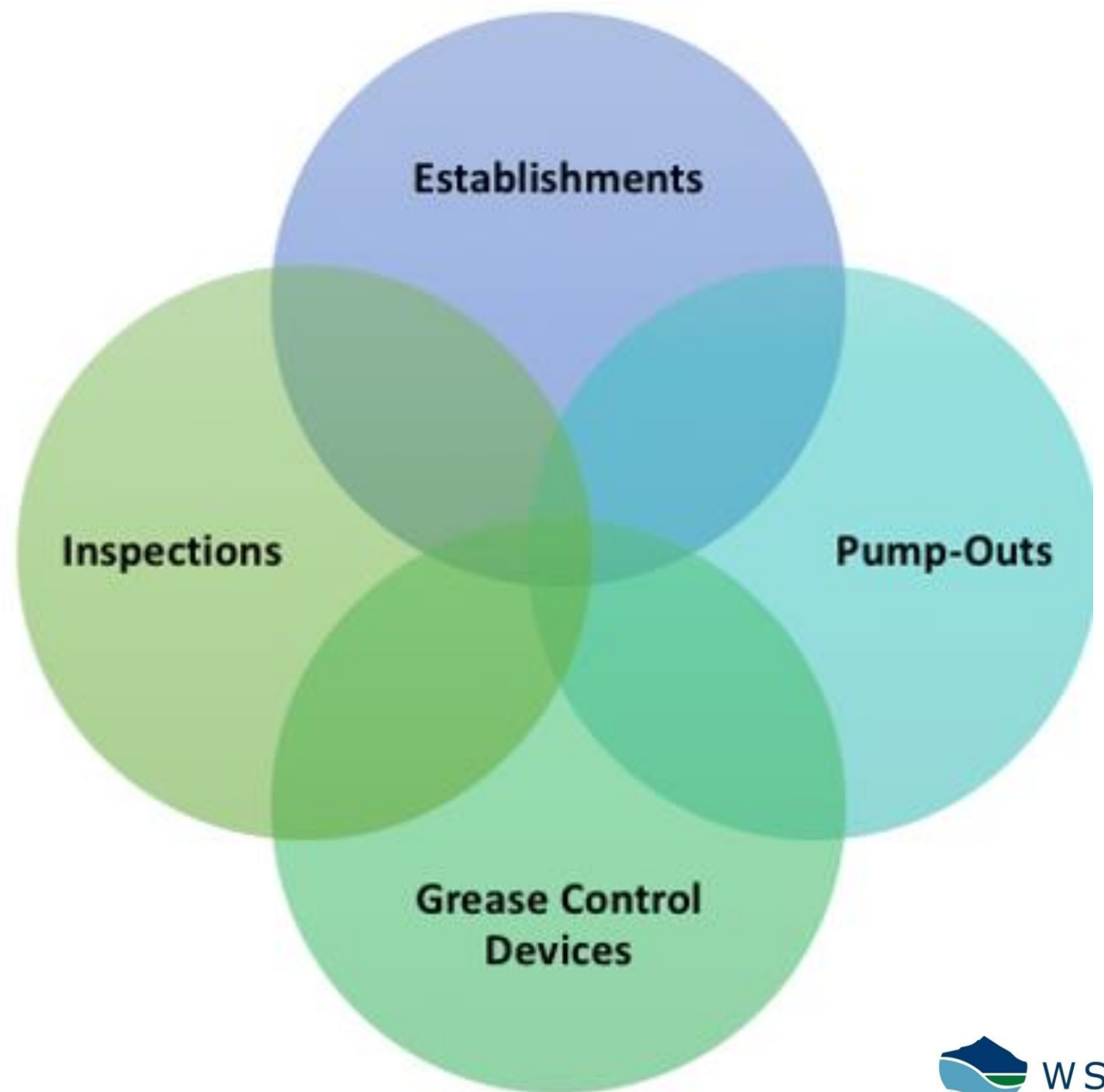
- What data do you need?
- How do you collect the data?
- How is the data stored?
- Can the data be easily analyzed?



# FOG Program Tracking

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- Track FOG program elements as separate entities
- Add more as your program matures.



# FSE DATA NEEDED

## FSE Tracking (partial list)

- FSE Name
- Physical address (and GIS data or latitude/longitude)
- Potential FOG loading of FSE (very high, high, medium, low)
- Proximity of FSE to a FOG-impacted sanitary sewer line (FOG line)
- Type(s) of FOG pretreatment
- Grease interceptor maintenance history
- Fixtures and drains connected to interceptor
- Contact information for FSE
- Landlord or property manager contact information

# PUMPER INFORMATION MANAGEMENT



- Pumper Name
- CONTACT INFORMATION
- Registration #
- AUTHORIZED DISPOSAL SITE
- PUMPING MANIFEST
- PUMP-OUT VOLUME

FOR EACH  
PUMPOUT EVENT

# COLLECTION SYSTEM DATA NEEDED

## Partial list

- Which collection system line segments are impacted by FOG?
- What is the cleaning frequency for these FOG lines?
- Does the frequency exceed the established line cleaning frequency for the normal collection system?
- What is the cost per line segment to keep these FOG lines cleared?

# COLLECTION SYSTEM DATA NEEDED

## Partial list - continued

- Are there manholes impacted by FOG?
- What is the cleaning frequency for these manholes?
- Are there pump stations impacted by FOG?
- How often are these stations cleaned?
- What is the cost per cleaning?
- Are additives used in these stations to “control” FOG?
- What is the cost of using these additives?



# EXCEL SPREADSHEET EXAMPLE

RESTAURANTS	HAULER	CLEANING	LAST	DUE FOR
WITH TRAPS		SCHEDULE	CLEANED	CLEANING
Abella Italian Kitchen	Baker	monthly	23-Oct-19	19-Nov
Bellagios	River City	2 months	11-Sep-19	19-Nov
Boeckman Creek School	River City	Annually	9-Jul-19	20-Jul
Boones Junction Pizza	River City	2 months	8-Oct-19	19-Dec
Boston's	Encore	monthly	19-Nov	19-Dec
Beer Station CLOSED 2018	NW Bio-fuel	3 months	18-Jul	18-Oct
Better Bean Company	Baker	6 month	18-Mar	18-Sep
Canton Phoenix	Oregon Oils	monthly	1-Jul-19	19-Aug
Charbonneau Country Club	River City	6 months	9-Jul-19	19-Dec
Corner Coffee Shop	River City	3 months	12-Mar-19	19-Apr

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# Poll Question

# PATRICK BRYAN, PPRC FOG TRAINER AND TECHNICAL PROGRAM MANAGER

*Stanislaus County, Hazardous Materials Inspector  
County Of Fresno, NPDES Inspector  
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- EXPERIENCE SERVING AS A WASTEWATER AND STORM WATER INSPECTOR FROM THE COUNTY OF FRESNO, CALIFORNIA.
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- BUILDING RELATIONSHIPS WITH INTERNAL DEPARTMENTS AND PRIVATE STAKEHOLDERS IS ESSENTIAL FOR A SUCCESSFUL FOG PROGRAM.

# LINKO FOG



FOG Management Industrial Pretreatment Why Linko Support [Request a Demo](#)

## A data-driven approach to FOG management

Transform your data from burden and risk to actionable insights that continually improve the daily operations of your inspection and compliance experts. Better data, faster decisions, stronger relationships.

[Request a Demo](#)



Discover a better way to manage fats, oils, and grease in your city

## Achieve compliance through collaboration

The best way to handle FOG is to reduce or prevent it from entering your sewer system. By pairing automated compliance enforcement & reporting capabilities with flexible educational tools, Linko helps you foster a cooperative program & strong



FOG Management Industrial Pretreatment Why Linko Support [Request a Demo](#)

"With Linko, we are able to focus on the FSEs who have missed a cleaning event rather than waiting on getting data entered, or having to track down reports that may have gone missing via fax or other means."

Cheryl Tilly  
Grease Compliance Officer  
City of Winston-Salem

## 6 ways Linko will improve your FOG management program

### FLEXIBLE AND SCALABLE

No two FOG programs are exactly alike, and their challenges evolve as they grow. Regardless of program type or maturity, Linko will support and enhance your existing workflows while scaling as the responsibilities and purview of your program expand. Cities of all sizes across North America rely on us.

### AUTOMATED DATA MANAGEMENT

The cost of bad data and inefficient workflows is bigger than you might think. By reducing manual data entry, automatically determining food service establishment compliance status, and providing integrations with other systems and business partners, Linko ensures your teams are always equipped with accurate insights.

### OPTIMIZED INSPECTIONS

By showing you who to inspect and when, Linko helps your team strategically prioritize and analyze your growing list of FSEs. And when the time comes, inspectors are equipped with rich site data and automatically-generated inspection forms tailored to your exact needs.

### EDUCATIONAL OUTREACH

Proactive engagement with regulated industry partners is the cornerstone of every successful FOG program. Linko supplies a robust toolkit to create and distribute tailored educational content to proactively keep your stakeholders informed, and your system protected.

### COMPLETE VISIBILITY

Linko provides a centralized view of all compliance data, inspection results, FSE details, and more. No more inspection blindspots or compliance risks lurking out of site—replaced by a secure repository of rich insights to improve your FOG program.

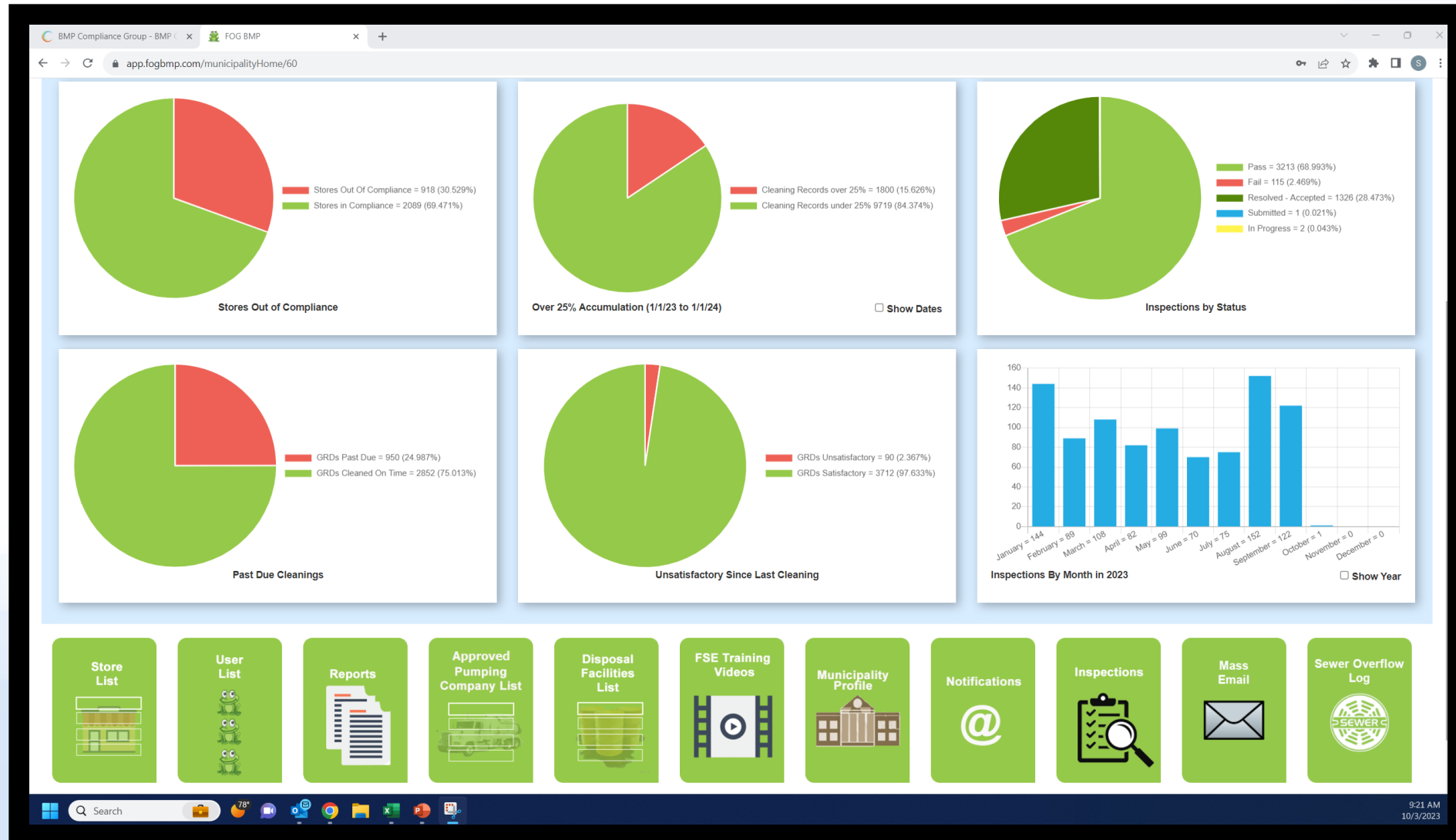
### REMOTE CAPABILITIES

To maintain your program's efficiency, inspectors can use Linko to capture and enter data directly at the source. Electronic reporting by FSE and waste haulers at the time of grease removal or device maintenance ensures the data is accurate, and free of transcription errors.



## Turn-Key Municipal F.O.G. Program

- Cloud Based
- Mobile Friendly
- Transparent Pricing
- Easy to use
- 100% American Made & Veteran Owned
- Designed by F.O.G. Experts
- 100% Satisfaction Guaranteed





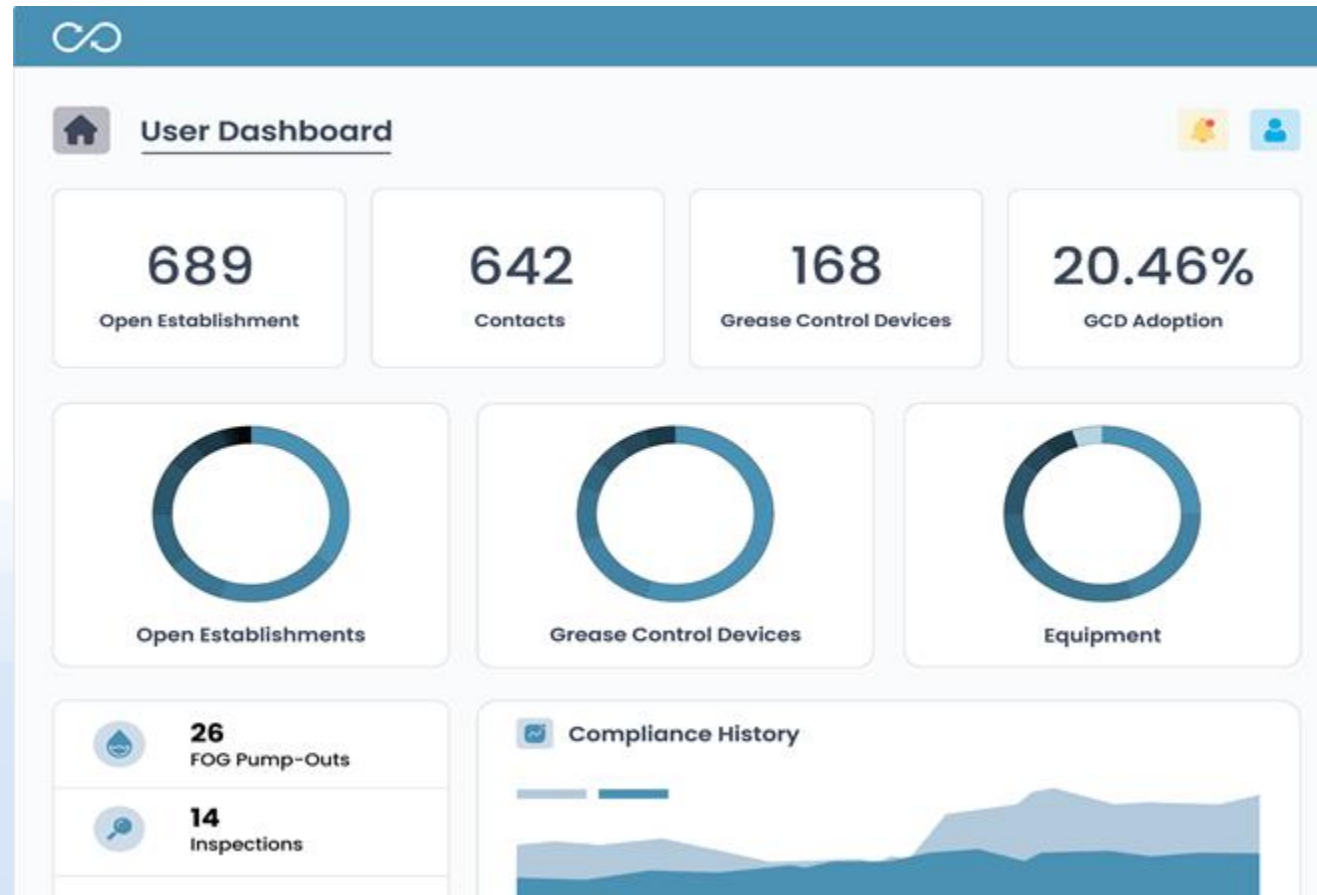
FREE MUNICIPAL SETUP AND DEMO

VISIT: [WWW.FOGBMP.COM](http://WWW.FOGBMP.COM)

EMAIL: [INFO@FOGBMP.COM](mailto:INFO@FOGBMP.COM)

CALL: [1.855.FOG.BMP1](tel:1.855.FOG.BMP1)

## Modern FOG Management Simplified



# Track and manage pump out reports with ease

The screenshot displays the 'Pump-Outs' management interface. At the top, there is a search bar, a menu icon, and buttons for 'Actions', 'Import', and 'Add Pump-Out'. Below this is a table with the following columns: Establishment Name, Address, Service Provider, GCD, Serviced On, Volume, and File. The table contains four rows of data, each with a paperclip icon in the File column.

Establishment Name	Address	Service Provider	GCD	Serviced On	Volume	File
—	—	—	—	—	—	📎
—	—	—	—	—	—	📎
—	—	—	—	—	—	📎
—	—	—	—	—	—	📎



# Auto-schedule inspections & submit reports from the field

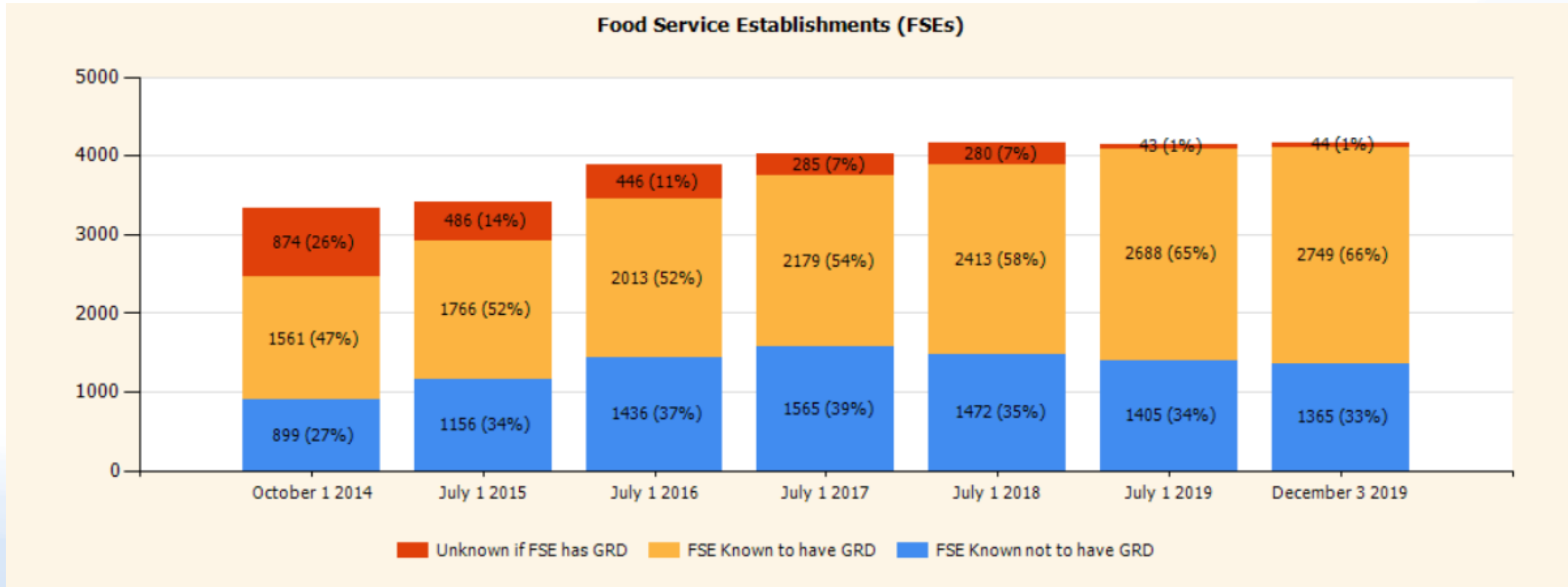
The screenshot displays the 'Inspections' dashboard in the Swift Comply application. At the top left is the Swift Comply logo. The main header area includes a search bar, a menu icon, and an 'Actions' button. On the right side of the header, there are notification and user profile icons. Below the header is a table with the following columns: Establishment Name, Location, Location Address, Compliance, Assigned Inspector, Inspected On, and File. The table contains four rows of data. The first two rows show 'Compliance' as green bars, while the last two rows show 'Compliance' as red bars. Each row has a paperclip icon in the 'File' column, indicating that a report or document is attached to each inspection record.

Establishment Name	Location	Location Address	Compliance	Assigned Inspector	Inspected On	File
---	---	---	Green	---	---	📎
---	---	---	Green	---	---	📎
---	---	---	Red	---	---	📎
---	---	---	Red	---	---	📎

# Make it easy for your users to maintain compliance

Reference No	Establishment	Enforcement Type	Issued Date	Actions Due Date	Status	File
---	---	---	---	---	Green	📎
---	---	---	---	---	Green	📎
---	---	---	---	---	Orange	📎
---	---	---	---	---	Red	📎

# PORTLAND INSPECTION RESULTS OVER 5 YEARS



# FOG INFORMATION SYSTEM QUESTIONS

1. What is the ANNUAL cost per user license?
2. Fully functional from desktop, tablets, and smartphones? If so, do you charge extra for mobile capability?
3. Is there an annual flat fee that grants full access to the complete program and all available features? Are there levels/tiers? If so, what are they and what are the annual costs?
4. Is there a charge for set up, data integration, and implementation/? if so, how much?
5. Is there a charge for multiple municipal users? If so, how much per user?

Adapted from “Choosing the right software to manage your FOG Control Program”, FOG in the News, US FOG ALLIANCE, June 2022

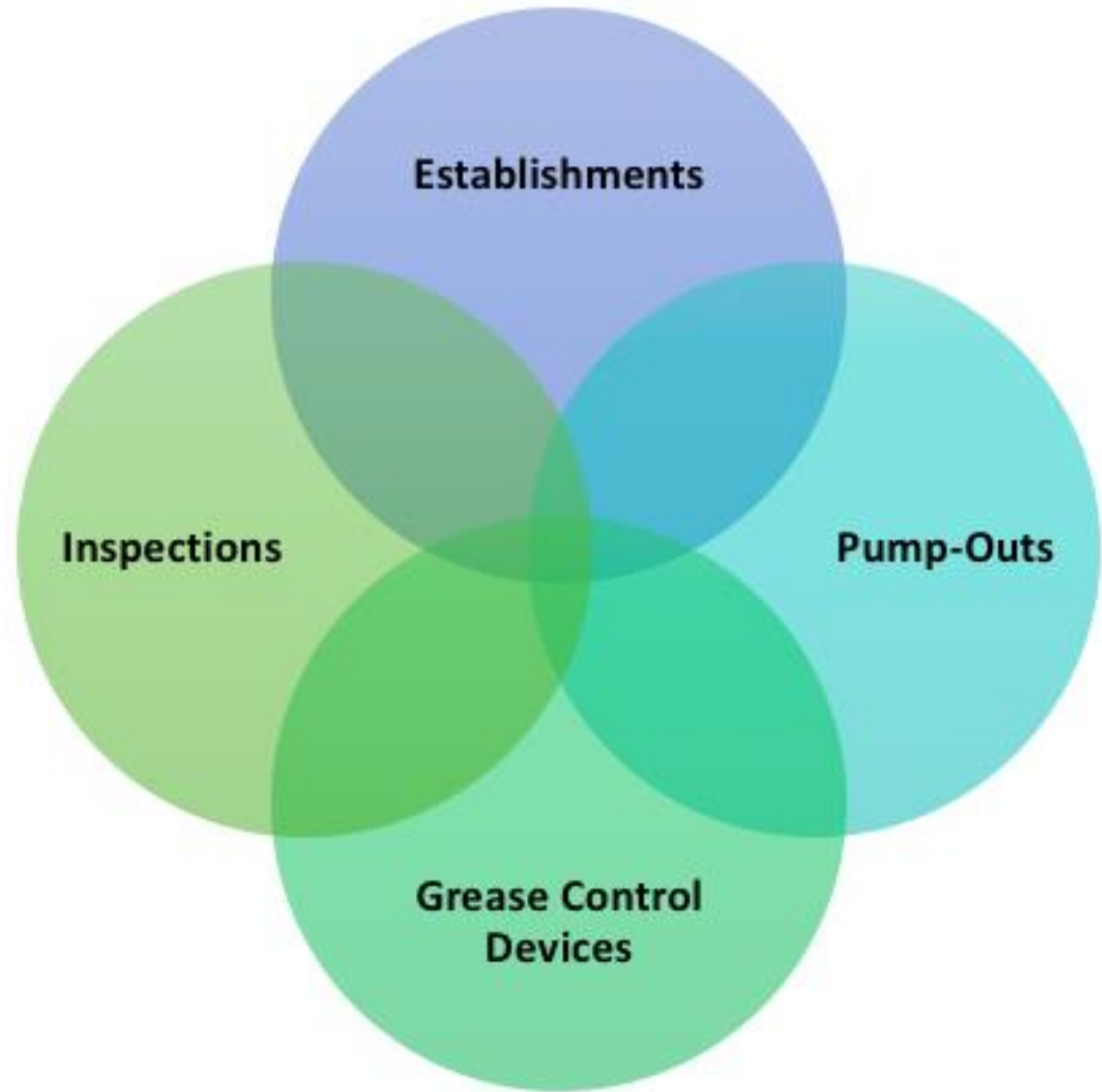
# FOG INFORMATION SYSTEM QUESTIONS

6. Is there a charge for program training? If so, how much?
7. Is there ever any potential charge for customer/technical support? If so, how much?
8. Are there additional charges for program updates? If so, how much?
9. Are software downloads required? If so, how much extra cost?
10. Can FSE users access the portal with their own passwords? If so, is this an extra cost? How much?
11. Can transporters access the portal with their own passwords? If so, is this an extra cost? How much?

Adapted from “Choosing the right software to manage your FOG Control Program”, FOG in the News, US FOG ALLIANCE, June 2022

# WHATEVER YOU DECIDE TO USE

You'll want to include  
these four elements



We're  
looking for a  
dozen  
jurisdictions

- We have **funding** over the next three years to **provide data management software** to a dozen programs per year.
- We're **committed to helping** these jurisdictions implement a FOG abatement program.
- The programs need to **meet one of our three demographic criteria**
  - Less than 80% of the state's nonmetropolitan median household income
  - Less than 85% white
  - Less than 10,000 people

Contact **Jean Waters** if you're interested.

[jwaters@pprc.org](mailto:jwaters@pprc.org); 206-352-2050 Ext 110; or via the "Contact" tab at the Western States Alliance website.

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# Poll Question





## Ken Grimm

12 years in industry, serving as Lead, Finishing Shop Manager, ISO Internal Auditor.  
Managed industrial use discharge process and permits

6 years as EHS Manager, HR Manager and facility Training Manager for Capital Industries, Inc.

Past 19 years to current serving as Industry Outreach Manager and Trainer for PPRC.

2013 to present providing FOG Program training for PPRC and WSA.

Enjoy hiking, cooking/baking, motorcycle rides

# Cost-Benefit Analysis

Given the costs of program implementation and expected costs on on-going program implementation, what are the financial and health/environmental benefits?

# COST-BENEFIT ANALYSIS

- Existing costs to municipality if no FOG program is implemented
- Cost to develop and implement FOG program
- Cost to maintain a well-managed FOG program
- Proposed savings due to well-managed FOG program

# WHAT IS A FOG PROGRAM COST-BENEFIT ANALYSIS?



- The process of comparing the costs and benefits of **ACTIVITIES & RESOURCE ALLOCATIONS TO ACHIEVE DESIRED RESULTS**
- A way to evaluate effectiveness of decision-making
- Helps collection system staff & **FOG PROGRAM MANAGERS MAKE INFORMED DECISIONS**
- A way to determine the break-even time period where costs equal benefits

# FOG PROGRAM COST-BENEFIT ANALYSIS

## Pros

- Help Justify additional fog program resources
- Test worthiness of additional resources of various staffing and operational cost scenarios
- Help determine priorities

## Cons

- Some of the needed data is not readily available
- Estimate short- and long-term expected results

# BASIC FOG PROGRAM COST- BENEFIT ANALYSIS

- **Step 1**: Existing costs to municipality if no FOG program is implemented or enhanced (i.e., “Status Quo” Costs)
- **Step 2**: Cost to develop and implement or enhance a FOG program to achieve desired outcomes
- **Step 3**: Cost to maintain a well-managed FOG program
- **Step 4**: Estimated savings due to well-managed FOG program
- **Step 5**: Time period to break-even

# CALCULATING COSTS

- Collect actual cost data where feasible
- Use calculators if available
- develop calculators if possible
- Use Anecdotal data if available

What is the **cost to clean sanitary sewer lines** per lineal foot?

Column A	Column B	Column C	Column D	
Time to clean each line section (hrs)	Fully loaded labor rate (\$/hr)	Equipment cost (\$/hr)	Traffic Control (\$/hr)	Total cost (A*(B+C+D))

Fully loaded labor rate includes benefits and overhead. For emergency cleanouts, include overtime charges. Equipment costs may be estimated based upon the cost for renting equipment. Traffic control costs may be estimated based on the cost for contracting out for traffic control.

What is the **cost to clean pump stations**?

Column A	Column B	Column C	Column D	
Time to clean each pump station (hrs)	Fully loaded labor rate (\$/hr)	Equipment cost (\$/hr)	Traffic Control (\$/hr)	Total cost (A*(B+C+D))

# EXAMPLE OF A BUSINESS CASE PRESENTATION ON COST-BENEFITS

## Sample Cost-Benefit Analysis

2,300 FSEs

4 New FSE/Month

### Status Quo Annual

Item	Cost
# lineal feet /yr	\$180,000
Pump Station	\$45,000
Air Relief	\$10,000
FOG Disposal	\$22,000
WWTP maintenance	\$35,000
WWTP Operations	<del>\$2,800,000</del>
<b>Total Cost</b>	<b>\$3,092,000</b>

### FOG Program Costs

Item	Cost
Development	\$120,500
1st Inspection	\$375,000
Ongoing Insp	\$90,000
Plan Review	\$6,000
Data Mgmt	\$45,000
<b>Development Cost &amp; First Insp</b>	<b>\$495,500</b>
<b>Program Maintenance Cost</b>	<b>\$141,000</b>

### Savings after 5 years,

Item	Cost
Line Cleaning	\$36,000
Pump Station	\$9,000
Air Relief	\$2,000
FOG Disposal	\$4,400
WWTP Maint	\$7,000
WWTP Operation	\$560,000
<b>Total Cost Savings</b>	<b>\$618,400</b>

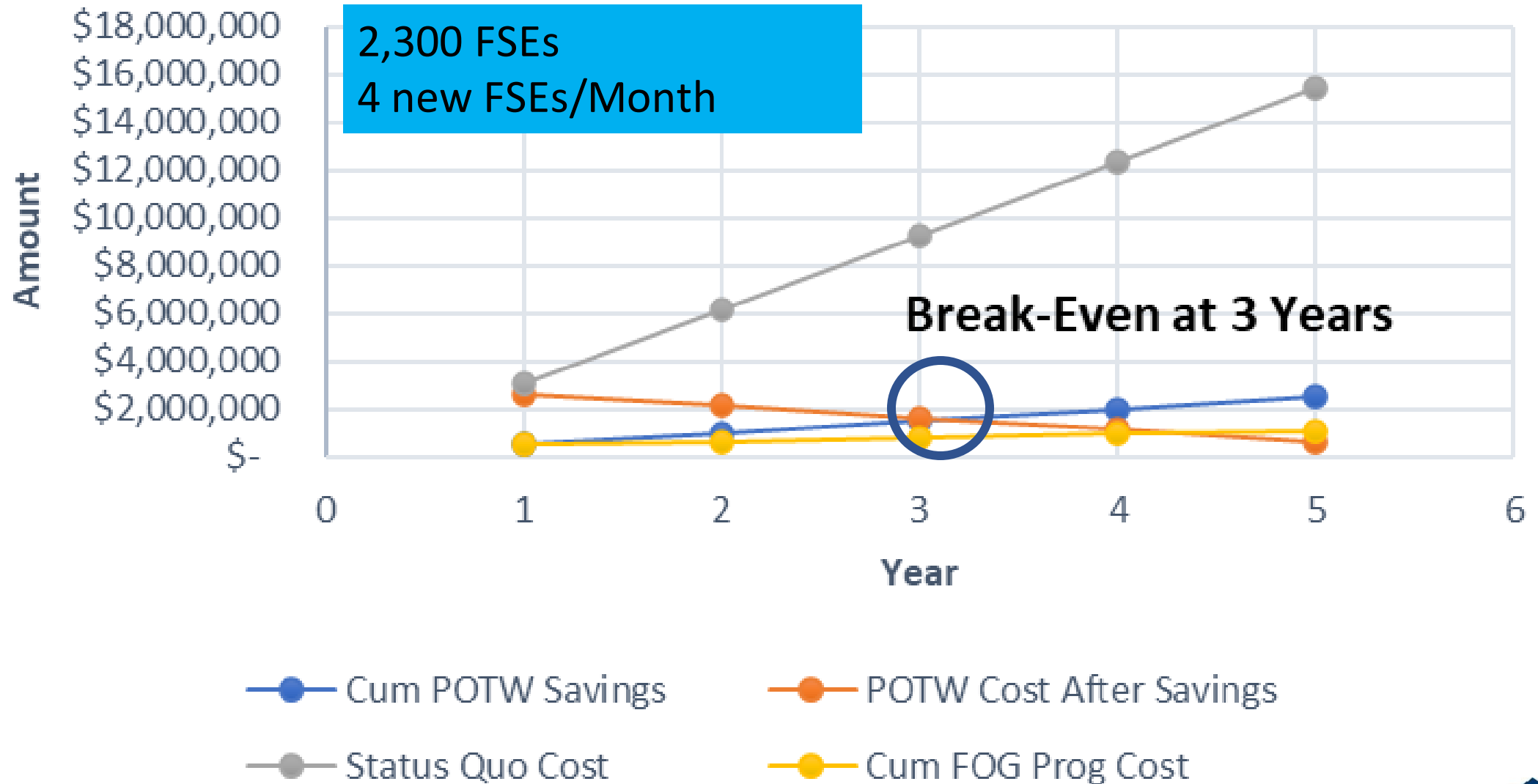
80% Cost Reduction

Total Savings after year 5

**\$2,473,600**



# Simple FOG Program Cost-Benefit Analysis



# **COST-BENEFIT CALCULATIONS COMPLETE.**

What about the rest  
of the proposal?


- Program Development
- Program Implementation
  - Phased Approach
  - FOG Triage
  - Data Acquisition and Management

???????



???????

# Poll Question

The image features a large, white, cylindrical industrial storage tank in the foreground, supported by dark metal legs. The tank is positioned on the right side of the frame. In the background, a city skyline is visible at dusk, with various buildings and structures illuminated by lights. The sky is a mix of orange, yellow, and blue, suggesting a sunset or sunrise. The overall scene is industrial and urban.

# Contaminants of Emerging Concern (CEC) and Publicly Owned Treatment Works (POTWs)

# Purpose of Contaminants and PFAS Presentation

**AWARENESS** - Awareness likely contaminants that may not be regulated yet, but are of concern; potential impacts on human health and the environments

**SOURCES** -Likely sources of these contaminants

**PREVENTION** - Source water protection; Source control; Product substitution; Minimization

**PARTNERSHIPS**

**MITIGATION** -  
Destruction; Treatment

# What are Contaminants of Emerging Concern?

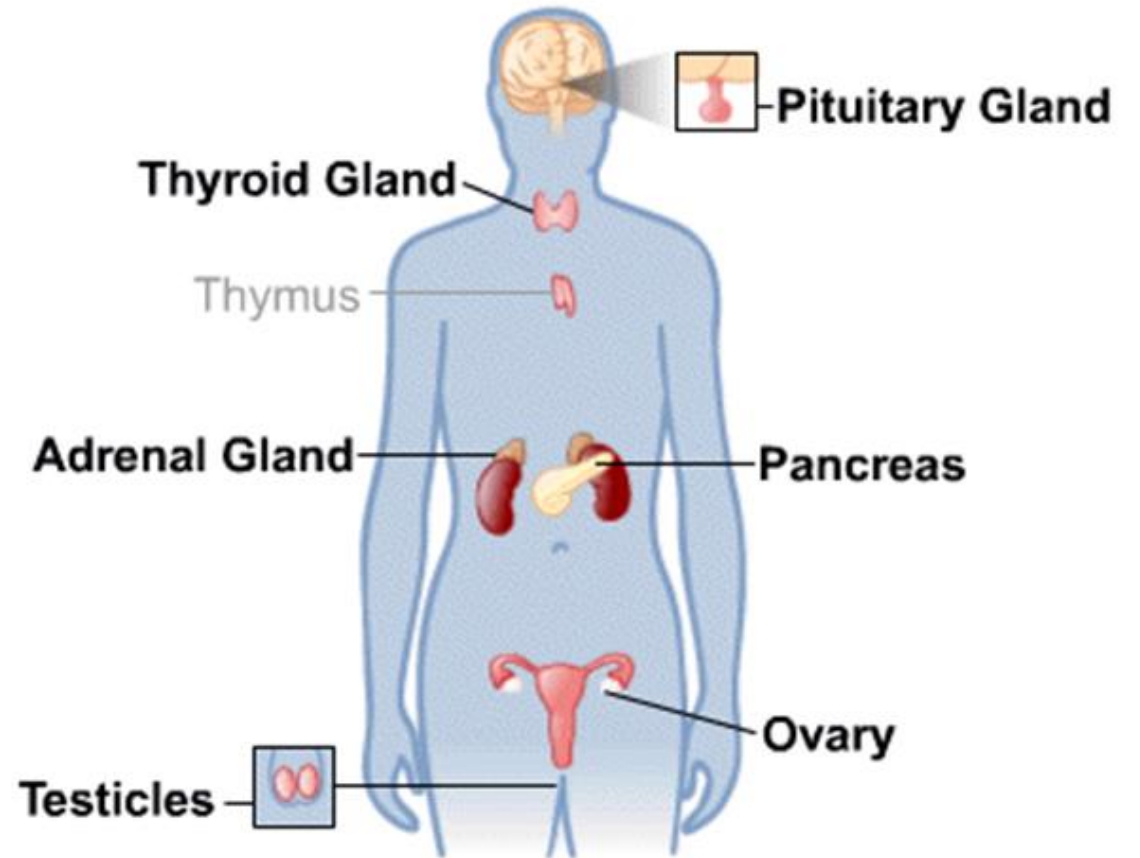
- Contaminants of emerging concern are chemicals and toxics found in waterbodies that may cause ecological or human health impacts and they are not currently regulated.
- Treatment plants cannot always remove these contaminants.
- Cleaner raw water = lower treatment costs and fewer public health risks



# Endocrine Disruptors

- Bisphenols (BPA)
- Phthalates
- Triclosan
- Polychlorinated biphenyls (PCB)
- Some pharmaceuticals
- Some Personal Care products

Human Endocrine System



Point Sources are regulated

Pet Flea and Tick products contribute significantly

Nonpoint Sources contribute more contaminants than point sources

More in Stormwater than wastewater

Impacts to Health and Environment

- Acute & Chronic human effects
- generational/cumulative health impacts
- degradation of water bodies-drinking water sources



This study conducted in the San Francisco Bay Area provided evidence that **fipronil** and **imidacloprid** pass through wastewater treatment at concentrations > toxicity thresholds for sensitive organisms

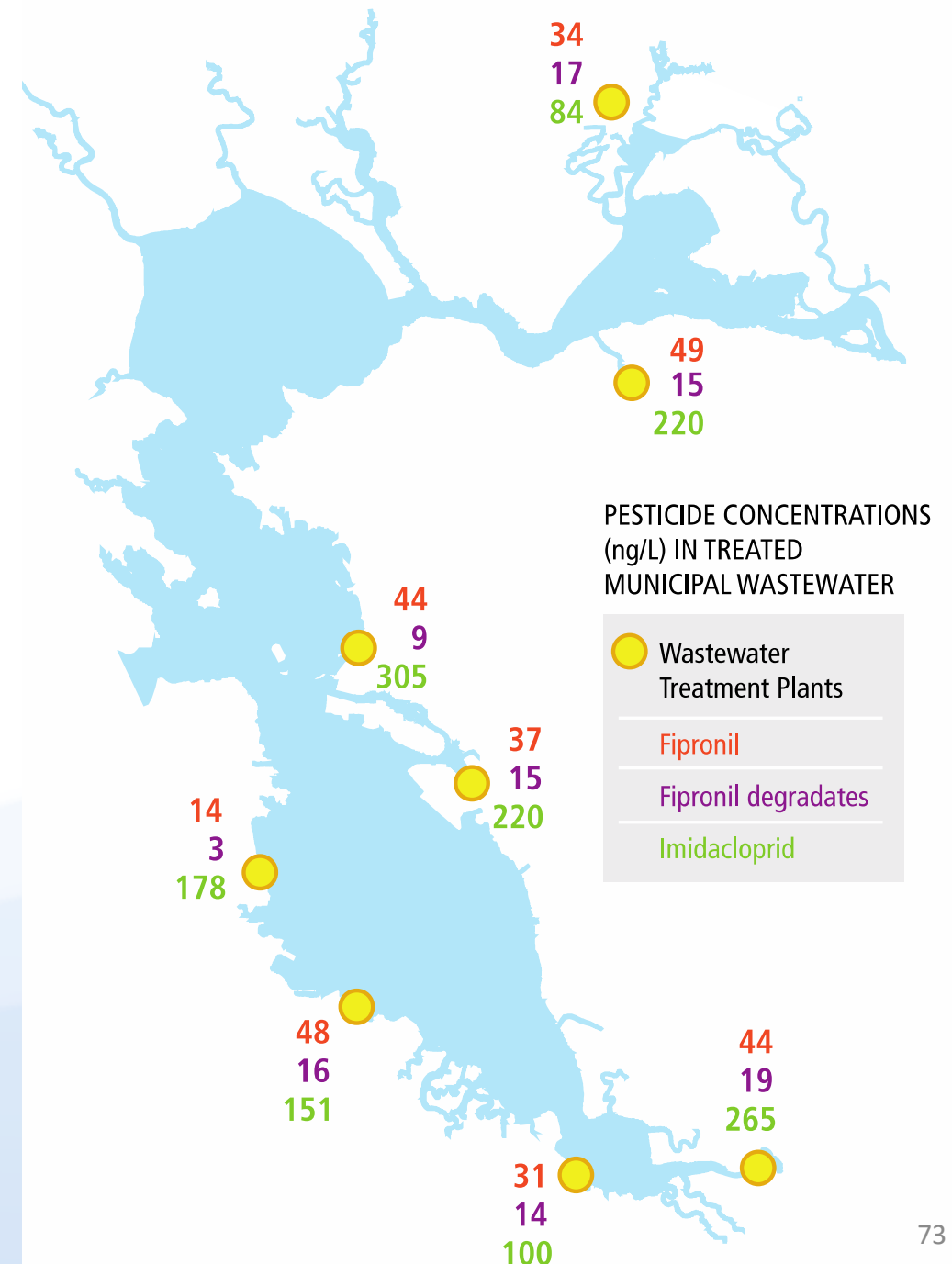
Aquatic toxicity thresholds:

11 ng/L for fipronil

10 ng/L for imidacloprid

Sadaria, A.M. et al. 2017. Passage of Fiproles and Imidacloprid from Urban Pest Control Uses Through Wastewater Treatment Plants in Northern California.

*Environmental Toxicology and Chemistry*. 36 (6), 1473-1482.



# Per- and Polyfluoroalkyl substances (PFAS)

**PFAS** - per- and polyfluoroalkyl substances

- More than 12,500 PFAS compounds (aka “forever chemicals”), and some have been found to be extremely persistent, bioaccumulative and toxic to humans and wildlife
- Some of the most common include Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA), Perfluorobutanoic Acid (PFBS), a.k.a. C8

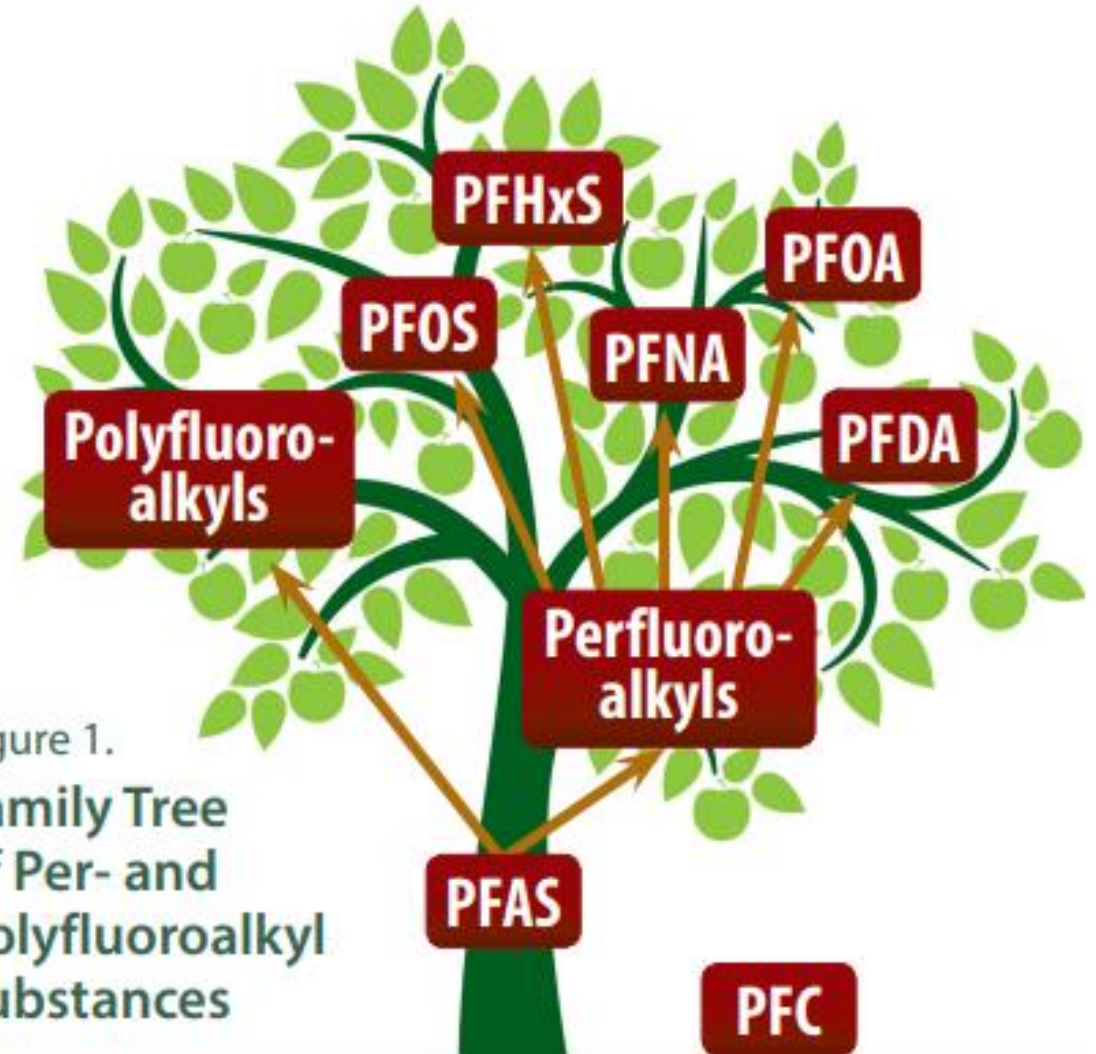


Figure 1.  
Family Tree  
of Per- and  
polyfluoroalkyl  
Substances

# Where are PFAS compounds commonly found?



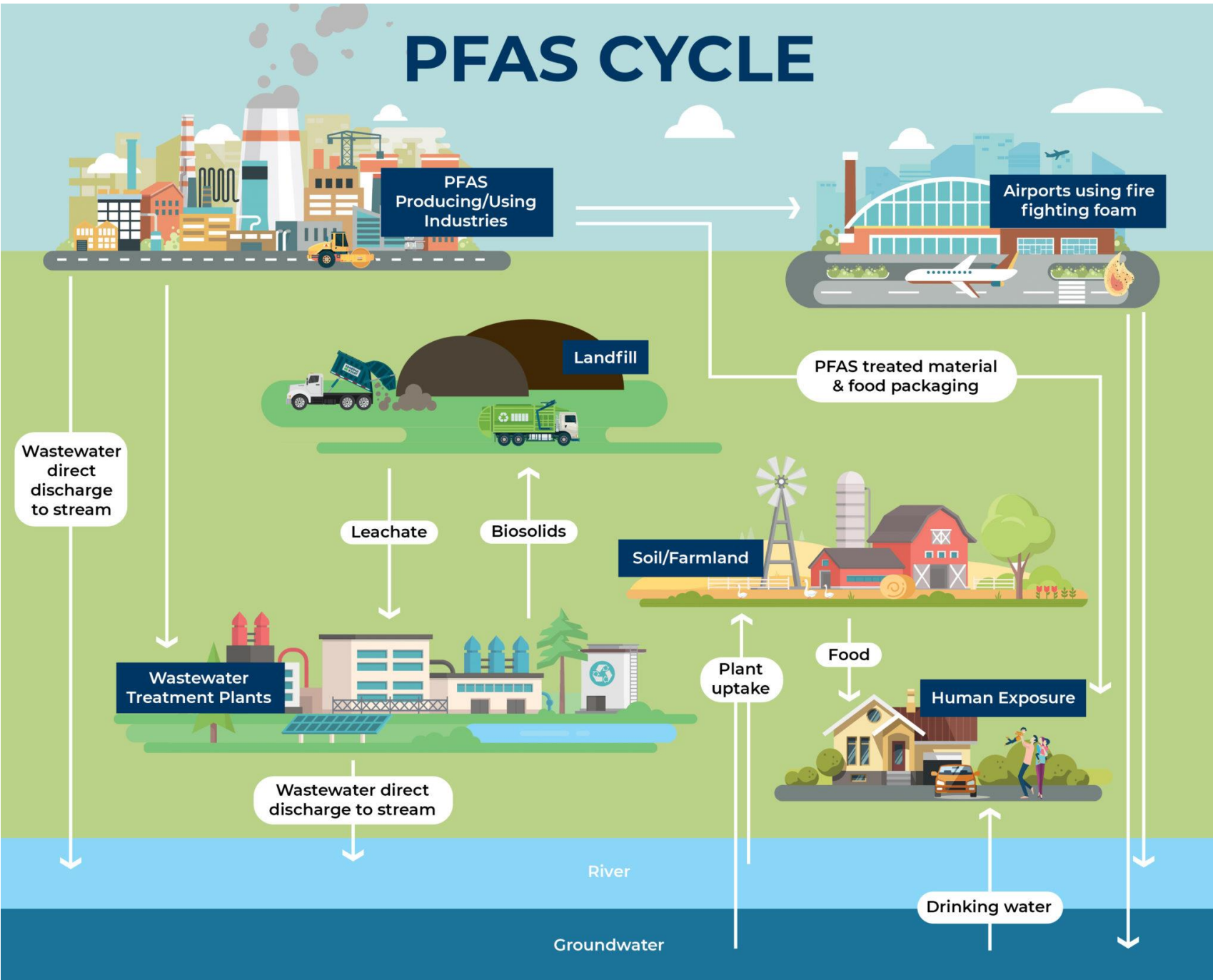


## PATRICK BRYAN, PPRC FOG TRAINER AND TECHNICAL PROGRAM MANAGER

*Stanislaus County, Hazardous Materials Inspector  
County Of Fresno, NPDES Inspector  
Municipal Interagency Training Coordinator*

- EXPERIENCE SERVING AS A WASTEWATER AND STORM WATER INSPECTOR FROM THE COUNTY OF FRESNO, CALIFORNIA.
- BACKGROUND IN COMMERCIAL AND DEVELOPMENT PROGRAMS PATRICK UNDERSTANDS THE DISCONNECT THAT CAN OCCUR BETWEEN THE COMMUNITIES WE SERVE SUCH AS FOOD SERVICE ESTABLISHMENT'S (FSES), OTHER REGULATORY INSPECTORS/PROGRAMS AND WITHIN OUR OWN AGENCIES.
- BUILDING RELATIONSHIPS WITH INTERNAL DEPARTMENTS AND PRIVATE STAKEHOLDERS IS ESSENTIAL FOR A SUCCESSFUL FOG PROGRAM.

# PFAS CYCLE



## Legend

Sources

Exposure Pathways

# High Levels of Some PFAS Can Impact Health

Increase  
cholesterol

Kidney  
cancer

Testicular  
cancer

Thyroid  
disease

Pre-  
eclampsia

A photograph of laboratory glassware, including two graduated cylinders and an Erlenmeyer flask, set against a blue background. The glassware is reflected on a surface below it. The Erlenmeyer flask in the foreground is labeled '50 mL ±5%' and has volume markings at 20, 30, and 40. The graduated cylinders have markings from 1 to 10.

# What is EPA Doing to Address PFAS?

## EPA's Strategic PFAS Roadmap

Address PFAS in Clean Water Act permitting, analytical methods, water quality criteria & fish advisories (2022 & ongoing) through:

- Effluent Guidelines
- Sampling Methodology
- Analytical Methods
- Water Quality Criteria
- Funding

# EPA Industrial Effluent Limitation Guidelines

## EPA's [Plan 15](#) Summarizes New Rules and Studies Related to PFAS

- ❑ Regulatory actions for:
  - Organic Chemicals and Plastic Manufacturing
  - Electroplating and Metal Finishing
- ❑ Effluent guidelines for Landfills
- ❑ Textile mills study
- ❑ No further PFAS action planned for:
  - Electrical and Electronic Components
  - Pulp, Paper, and Paperboard Manufacturing





# Analytical Methods and Sampling

## EPA is in the process of finalizing rules

- EPA Method 1621 – final by end of Jan. 2024
- EPA Method 1633 - final by end of Jan. 2024

## Other Methods that have been used

- EPA Method 533, 537 and 537.1 (drinking water)
- EPA Method 8327 (non-potable water)

## **PFAS Analytical Methods Development and Sampling Research**

<https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research>

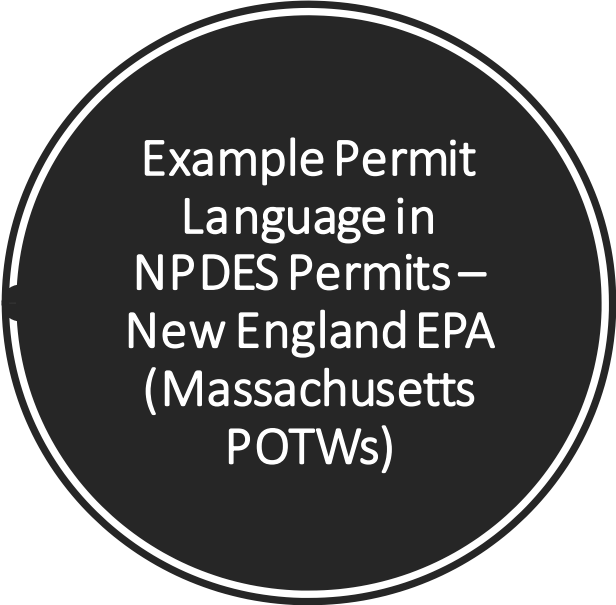
# EPA's NPDES Permit Direction to States on PFAS

## [December 2022 Memo From EPA to State Permitting Authorities:](#)

- ❑ Recommends **quarterly PFAS monitoring** at POTWs (influent, effluent, biosolids)
- ❑ Recommends Pretreatment Actions:
  - Update **Industrial User Inventory** to include categories expected to discharge PFAS
  - **Quarterly monitoring** of industries
  - Develop **BMPs or local limits that focus on pollution prevention and source reduction**
  - State pretreatment coordinators encouraged to **work with POTWs without authorities on source reduction**
- ❑ Include **BMPs for fire-fighting foam** (“AFFF”) in stormwater permits

# Industry NAICS Codes identified in proposed EPA PFAS rulemaking

- 488119 Aviation operations
- 314110 Carpet manufacturers
- 811192 Car washes
- 325 Chemical manufacturing
- 332813 Chrome electroplating, anodizing, and etching services
- 325510 Coatings, paints, and varnish manufacturers
- 325998 Firefighting foam manufacturers
- 562212 Landfills
- 339112 Medical Devices
- 922160 Municipal and fire departments and firefighting training centers
- 322121 and 322130 Paper mills
- 325320 Pesticides and Insecticides
- 324 Petroleum and coal product manufacturing
- 324110 and 424710 Petroleum refineries and terminals
- 352992 Photographic film manufacturers
- 325211 Polymer manufacturers
- 323111 and 325910 Printing facilities where inks are used in photolithography
- 313210, 313220, 313230, 31324, 313320 Textile mills (textiles and upholstery)
- 562 Waste management and remediation services
- 221320 Wastewater treatment plants



Example Permit  
Language in  
NPDES Permits—  
New England EPA  
(Massachusetts  
POTWs)

6. Beginning the first full calendar year after the effective date of the permit, the Permittee shall commence annual sampling of the following types of industrial discharges into the POTW:
- Commercial Car Washes
  - Platers/Metal Finishers
  - Paper and Packaging Manufacturers
  - Tanneries and Leather/Fabric/Carpet Treaters
  - Manufacturers of Parts with Polytetrafluoroethylene (PTFE) or teflon type coatings (*e.g.*, bearings)
  - Landfill Leachate
  - Centralized Waste Treaters
  - Known or Suspected PFAS Contaminated Sites
  - Fire Fighting Training Facilities
  - Airports
  - Any Other Known or Expected Sources of PFAS

Sampling shall be conducted using Method 1633 for the PFAS analytes listed in Attachment E. The industrial discharges sampled, and the sampling results shall be summarized and included in the annual report (see Part I.E.3).

# EPA PFAS Pollution Prevention Strategies and Best Management Practices



## BEST MANAGEMENT PRACTICES: WHERE TO START?

For some pollutants, developing numeric discharge limits may not be feasible.

The NPDES and Pretreatment regulations allow for Best Management Practices (BMPs) to be used in lieu of numeric, end-of-pipe limits in such instances. See 40 CFR 122.44(k) and 40 CFR 403.5(c)(4).

EPA has published guidance on implementing BMPs for NPDES and Pretreatment:

- EPA Guidance for Developing Best Management Practices <https://www3.epa.gov/npdes/pubs/owm0274.pdf>
- Chapter 9 of the NPDES Permit Writer's Manual [https://www.epa.gov/sites/default/files/2015-09/documents/pwm\\_chapt\\_09.pdf](https://www.epa.gov/sites/default/files/2015-09/documents/pwm_chapt_09.pdf)
- Guides to Pollution Prevention: Municipal Pretreatment Programs [https://www3.epa.gov/npdes/pubs/pretreatment\\_mun\\_guide.pdf](https://www3.epa.gov/npdes/pubs/pretreatment_mun_guide.pdf)
- Pretreatment Streamlining Rule Fact Sheet 7.0: Best Management Practices [https://www.epa.gov/sites/default/files/2015-10/documents/pretreatment\\_streamlining\\_7.0.pdf](https://www.epa.gov/sites/default/files/2015-10/documents/pretreatment_streamlining_7.0.pdf)

## PFAS IN INDUSTRIAL WASTEWATER

PFAS can be found in the wastewater discharges of certain industrial facilities subject to NPDES permitting or pretreatment requirements (U.S. EPA, 2021).

Permit writers and pretreatment coordinators are encouraged to include PFAS monitoring in permits for facilities where PFAS are suspected of being present in the discharge. For some facilities where PFAS are found, it may be appropriate to require permit limits. In some cases, numeric discharge limits based on treatment technologies using granular activated carbon, ion exchange resins, reverse osmosis may be appropriate, but for others, pollution prevention practices and BMPs may be more appropriate.

Permit writers and pretreatment coordinators have observed some of the following pollution prevention practices for industries in their state or service area.

### CHROME FINISHING

PFAS can be found in the effluent discharged from chrome plating facilities due to the use of PFAS-containing chemical fume suppressants used primarily in hexavalent chrome plating operations. Many of these facilities discharge to wastewater treatment plants (U.S. EPA, 2009). According to EPA's [Effluent Guidelines Program Plan 15](#) published in January 2023, preliminary investigations by EPA have indicated that some facilities may have the option of switching operations to trivalent chromium, which does not require the use of chemical fume suppressants, and that PFAS-free alternatives exist or are in development for processes

which require hexavalent chromium (U.S. EPA, 2023). Additionally, because historic use of PFOS-containing fume suppressants is believed to be a legacy source of PFAS discharges, some agencies have found that equipment replacement has been necessary to achieve reductions in PFAS concentrations in effluent from these facilities (Michigan Department of Environment, Great Lakes and Energy, 2020).



EPA-833/F-23-  
008 July 2023

<https://www.epa.gov/system/files/documents/2023-07/PFAS-BMP-Fact-Sheet.pdf>

Product elimination and substitution

PFAS-containing aqueous film-forming foam (AFFF) emergency use only

Cleaning and decontamination of equipment

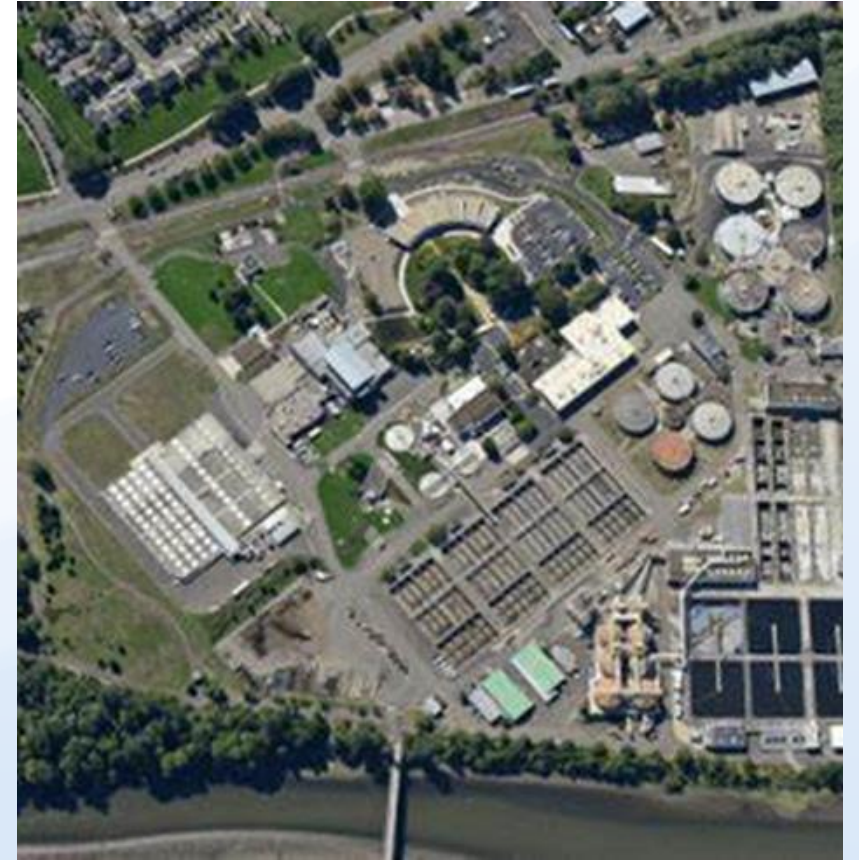
Replacement of equipment

Good housekeeping and spill prevention practices

## **PFAS – Typical Best Management Practice Examples**

# Proposed EPA PFAS POTW Study

- Purpose of study:
  - Identify categories of IUs discharging wastewater contaminated with PFAS.
  - Collect data on PFAS concentrations in domestic wastewater influent to POTWs.
  - Characterize PFAS currently being discharged from IUs and domestic sources.
  - Collect data on adsorbable organic fluorine (AOF) concentrations in wastewater.
  - Better understand PFAS pass-through in POTWs to biosolids and effluent.
- Estimated start: end of 2024, start of 2025



# EPA Actions to Address PFAS - FUNDING

## \$2 Billion in Bipartisan Infrastructure Law Funding for PFAS and Emerging Contaminants in Drinking Water

- In February 2023, EPA announced the availability of \$2 billion from President Biden's Bipartisan Infrastructure Law to address emerging contaminants, including PFAS, in drinking water across the country. This investment, which is allocated to states and territories, will be made available to communities as grants through EPA's Emerging Contaminants in Small or Disadvantaged Communities grant program. These funds will promote access to safe and clean water in small, rural, and disadvantaged communities while supporting local economies.
  - [Learn more about this funding.](#)

[Key EPA Actions to Address PFAS | US EPA](#)

<https://www.epa.gov/pfas/key-epa-actions-address-pfas>



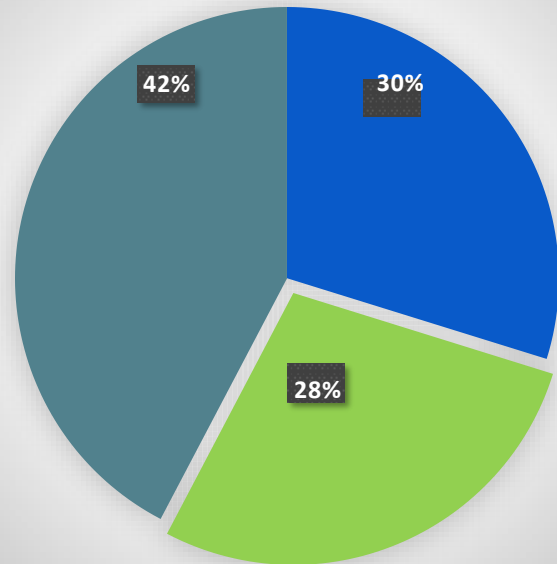


# Michigan PFAS Initiative

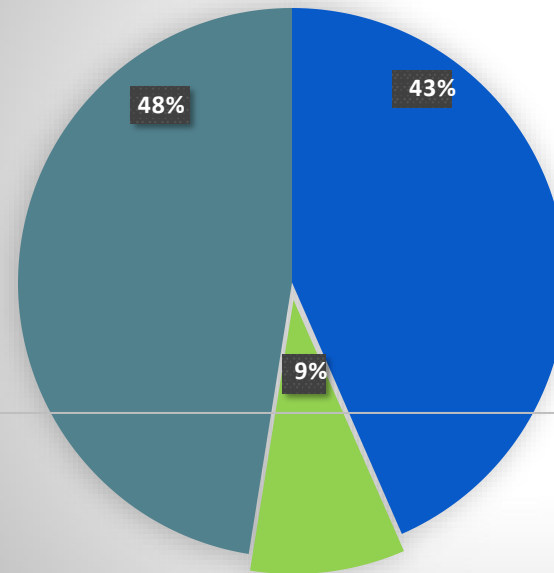
# Michigan EGLE – Pretreatment Initiative Results

## What Were Michigan's Discharge Compliance Results?

December 2019



June 2023



- WWTP Discharge Meets PFOS Criteria, but PFOS Source(s) Identified
- WWTP Discharge Does Not Meet PFOS Criteria and PFOS Source(s) Identified
- No Source(s) of PFOS Identified



# Minnesota PFAS Initiative



## **Evaluation of Current Alternatives and Estimated Cost Curves for PFAS Removal and Destruction from Municipal Wastewater, Biosolids, Landfill Leachate, and Compost Contact Water**

Prepared for  
Minnesota Pollution Control Agency



May 2023

Prepared by:  
Barr Engineering Co., Hazen and Sawyer

4300 MarketPointe Drive, Suite 200  
Minneapolis, MN 55435  
952.832.2600

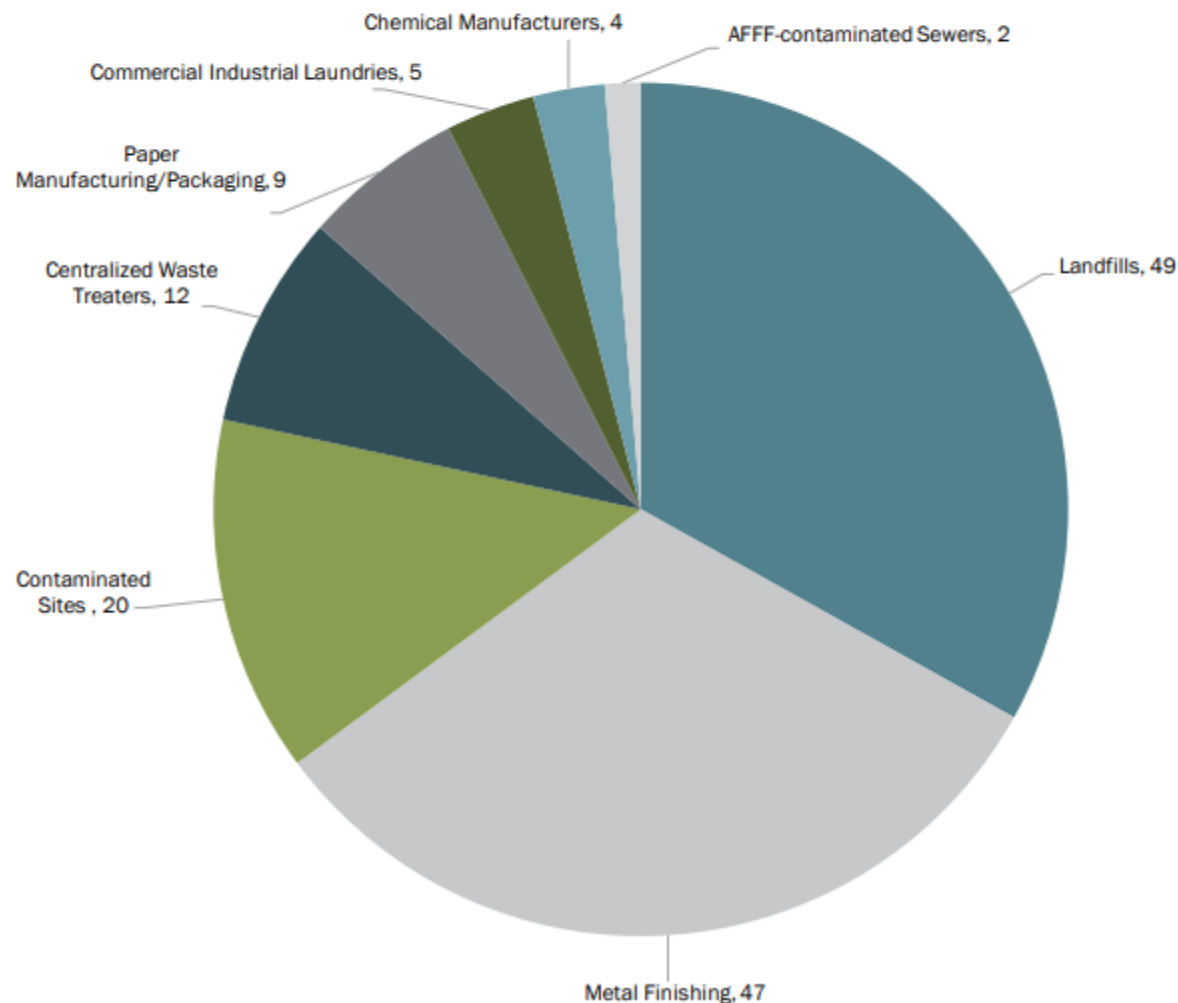
# PFAS SEPERATION TECHNOLOGIES

Full Scale with a High Degree of Commercialization including Municipal Wastewater

Technology	Technology description
<b>Nanofiltration (NF)/Reverse Osmosis (RO) Membrane Separation</b>	PFAS separated into a concentrate stream by physical separation via high-pressure membranes
<b>Foam Fractionation</b>	PFAS stripped from liquid phase as foam using fine air bubbles
<b>Granular Activated Carbon (GAC)</b>	PFAS sorbs to hydrophobic GAC surface in a fixed-bed pressure vessel.
<b>Reactivated GAC</b>	Similar to virgin GAC, PFAS sorbs to the hydrophobic GAC surface in a fixed-bed pressure vessel.
<b>Colloidal Activated Carbon</b>	PFAS sorbs to colloidal activated carbon particles in aqueous suspension
<b>Ion Exchange Resins (SingleUse Media)</b>	PFAS attaches to resin via surface charge interactions in a fixed bed pressure vessel.
<b>Ion Exchange Resins (Regenerable Media)</b>	PFAS attaches to resin via surface charge interactions with resin support material in a fixed-bed pressure vessel
<b>Modified Clay</b>	PFAS attaches to clay minerals, sometimes modified, via surface charge interactions. Media is in a fixed bed pressure vessel
<b>Ion Exchange Resin Solvent Regeneration</b>	A proprietary solvent brine solution removes PFAS from the IX media by targeting removal of the ionic head and desorption of the fluorinated carbon tail from the media

# Michigan PFAS Initiative – Industrial Pretreatment Programs

Figure 1. Sources of PFOS, Number by Type



## Partnerships – "common interests"

- National Association of Clean Water Agencies (NACWA)
- Association of Clean Water Administrators (ACWA)
- Water Environment Federation (WEF)
- Water Research Foundation (WRF)
- American Public Works Association (APWA)
- American Water Works Association (AWWA)
- Rural Water Utilities Association (RWUA)
- Other Local/State Utility Associations
- Health Departments (State)
- Drug and Other Takeback Program Participation

What can we do to help?

- ❖ Build Awareness
- ❖ Educate the Public
- ❖ Get Involved
- ❖ Eliminate Availability
- ❖ Reduce Demand

# ACWA's Perspectives on PFAS Management Approaches in Oregon

## BACKGROUND

- ACWA PFAS Work Group established in 2019
- Over 50 members – ACWA, DEQ, Local Drinking Water Partners guide the work
- Developed strategies and “white paper” policy report



## ACWA STRATEGIES AND RECOMENDATIONS

- Track the state of PFAS science, policy, and actions
- Establish a sound scientific basis for policy decisions and coordinate research opportunities
- Identify sources and make “upstream” source reduction the top priority
- Provide communications and outreach tools for ACWA members



# ACWA Policy Report: What is Needed from Federal and State Government?

- Restrict PFAS in consumer products
  - *Use TSCA authorities and new Congressional and State Legislation*
- Partner with local government on scientific research
  - *Determining sources, pathways, risks, mitigation solutions*
- Avoid reliance on wastewater treatment technologies and unattainable limits
  - *e.g., Requirements that can be met through pollution reduction plans*
- PFAS limits on industrial sources
- Exempt WWTPs from CERCLA liabilities
  - ***Passive Receivers ≠ Sources***



PFAS Strategic Roadmap:  
EPA's Commitments to Action  
2021-2024





## **SESSION 2**

# **BUSINESS CASE & EMERGING CONTAMINANTS OF CONCERN SUMMARY SLIDE**

### **Session 1**

- Establishing The Need For A FOG Program
- Data Needed
- Excess Operation & Maintenance Costs
- Program Development Costs (Part 1)

### **Session 2**

- Planning
- Program Development Costs (Part 2)
- Data Acquisition and Management
- Cost-Benefit Analysis
- Emerging Contaminants of Concern

# **SESSIONS 3 & 4 PROGRAM IMPLEMENTATION**

## **SESSION 3**

- **YOUR EXISTING FOG PROGRAM**
- **ESTABLISHING LEGAL AUTHORITY**
- **STAKEHOLDERS**
- **FOG TRIAGE**
- **FOG MANAGEMENT PRACTICES**
- **FSE EFFECTIVE FOG PRETREATMENT**

## **SESSION 4**

- **FOG AND WATER SEPARATION**
- **GREASE REMOVAL DEVICES (GRD)**
- **FSE INSPECTIONS**
- **PREFERRED PUMPER PROGRAMS**

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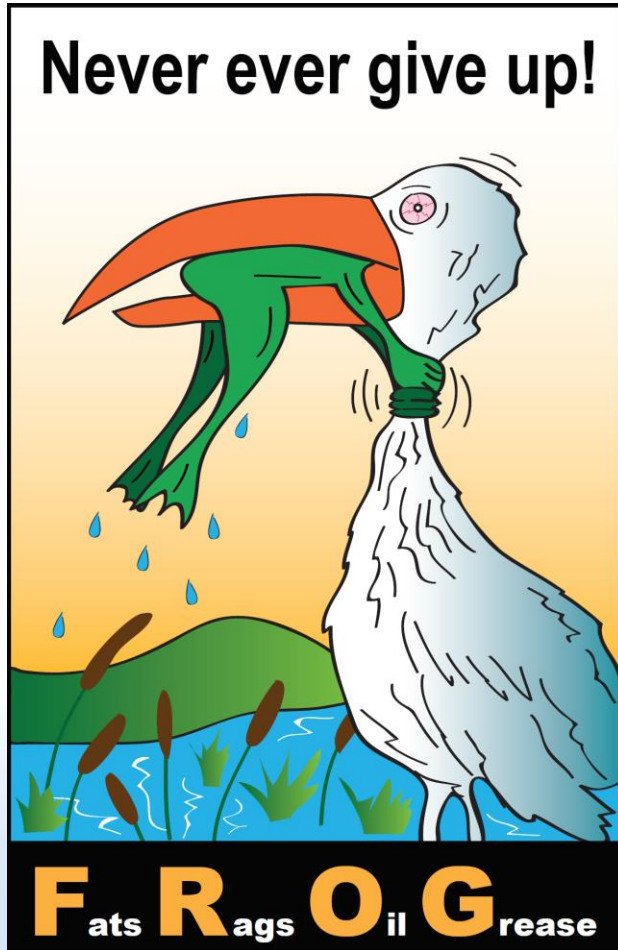
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**THANK YOU FOR ATTENDING SESSION 2  
USDA FOG PRETREATMENT TRAINING**

**RAPID RESPONSE --**

<https://pprc.org/rapid-response/>

*PPRC provides free and well-researched answers to specific questions about pollution prevention, with thorough and unbiased answers to inform decision making.*



# End of Session 2

See you next week!