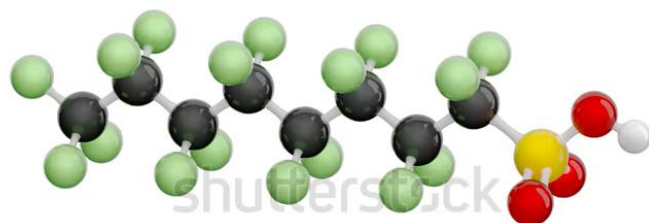
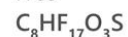


PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

MIAMI-DADE COUNTY DEPARTMENT OF ENVIRONMENTAL RESOURCES MANAGEMENT (DERM) PERSPECTIVE

Perfluorooctanesulfonic acid

PFOS



PRESENTED BY
WILBUR MAYORGA, M.S., P.E., CHIEF
ENVIRONMENTAL MONITORING AND RESTORATION DIVISION - DERM

FLORIDA LOCAL ENVIRONMENTAL RESOURCE AGENCIES (FLERA) 2026 ANNUAL CONFERENCE
SEPTEMBER 16, 2026

OUTLINE

1. BACKGROUND
2. HEALTH CONCERNS
3. REGULATIONS UPDATE
4. MIAMI-DADE COUNTY (MDC) PFAS MANAGEMENT
 - a. PFAS STRATEGY
 - b. MDC DRINKING WATER PROTECTION
 - ✓ PFAS SOURCES AND CURRENT DRINKING WATER QUALITY
 - ✓ WATER TREATMENT EFFORTS BY MDC WATER & SEWER DEPARTMENT (WASD)
 - ✓ DERM'S ONGOING EFFORTS
5. CONCLUSION: PLAN OF ACTION

The background features a light blue to white gradient. In the top-left and bottom-right corners, there are clusters of realistic water droplets of various sizes. A faint, large circular pattern, resembling a ripple or a stylized sun, is centered in the upper half of the image.

BACKGROUND

The background features a light blue gradient with numerous realistic water droplets of various sizes. A faint, circular logo is visible in the upper center, containing a stylized 'E' and the word 'EARTH' below it.

**BETTER KNOWN AS:
FOREVER CHEMICALS**

FOREVER AND EVERYWHERE CHEMICALS

EVERYWHERE PFAS

- ❖ **GLOBAL PRECIPITATION** RECENT MODELS REVEAL OVER 335,000 TONNES OF TFA (TRIFLUOROACETIC ACID, A HIGHLY PERSISTENT PFAS VARIANT) HAVE DEPOSITED GLOBALLY SINCE 2000, CREATING AN "INVISIBLE CHEMICAL RAIN" THAT DEFIES LOCAL SAFETY THRESHOLDS. SOURCE: LANCASTER UNIVERSITY / GEOPHYSICAL RESEARCH LETTERS
- ❖ **THE CRYOSPHERE ATMOSPHERIC** TRANSPORT DEPOSITS LEGACY AND NOVEL HYDROGEN-SUBSTITUTED PFAS DEEP INTO THE ARCTIC, WITH RECENT DATA CONFIRMING TRACE-LEVEL CONTAMINATIONS IN HIGH ALTITUDE GLACIAL MELTWATER (MT. EVEREST). SOURCE: ENVIRONMENTAL SCIENCE & TECHNOLOGY (2026)
- ❖ **THE DEEP BIOSPHERE** VERTICAL DEPTH OFFERS NO BARRIER. CONTAMINATION HAS BEEN ROBUSTLY VERIFIED IN THE MARIANA TRENCH AND SUBTERRANEAN AQUIFERS COMPLETELY ISOLATED FROM SURFACE RUNOFF. SOURCE: ENVIRONMENTAL SCIENCE & TECHNOLOGY (2026)
- ❖ **THE BIOTA BASELINE** WITH MEASURABLE DETECTIONS IN THE BLOOD SERUM OF OVER 97% OF THE UNITED STATES POPULATION, FINDING A TRUE "ZERO-PFAS" BIOLOGICAL CONTROL GROUP REMAINS VIRTUALLY IMPOSSIBLE. SOURCE: CDC - ATSDR (2024)



PFAS BASICS

- PFAS ARE A GROUP OF MAN-MADE FLUORINATED CHEMICALS (>14,000), INCLUDING POLYMERS AND NON-POLYMERS.
- PFAS HAVE BEEN MANUFACTURED AND WIDELY USED IN INDUSTRIAL AND CONSUMER WORLDWIDE, INCLUDING IN THE UNITED STATES SINCE 1940S.
 - ✓ MORE CURRENT USES: SEMICONDUCTOR, HYDRAULIC FLUIDS, DATA CENTER, LITHIUM-ION BATTERIES, ETC.
- KEY SUBGROUPS (COMMONLY DETECTED, AVAILABLE HUMAN HEALTH AND ECOLOGICAL EFFECTS, QUANTITATIVE AND/OR UNDER REGULATION (OR CONSIDERATION)):
 - PFCAS (E.G., PFOA)
 - PFSAS (E.G., PFOS)
 - FLUOROTELOMERS
 - PRECURSORS
- PFAS HAS BEEN FOUND IN MANY COMMON HOUSEHOLD PRODUCTS



SOURCE: [HTTPS://WWW.PBS.ORG/NEWSHOUR/SCIENCE/RESEARCHERS-HAVE-DEVELOPED-A-WAY-TO-BREAK-DOWN-LONG-LASTING-PFAS-COMPOUNDS-USING-LIGHT](https://www.pbs.org/newshour/science/researchers-have-developed-a-way-to-break-down-long-lasting-pfas-compounds-using-light)

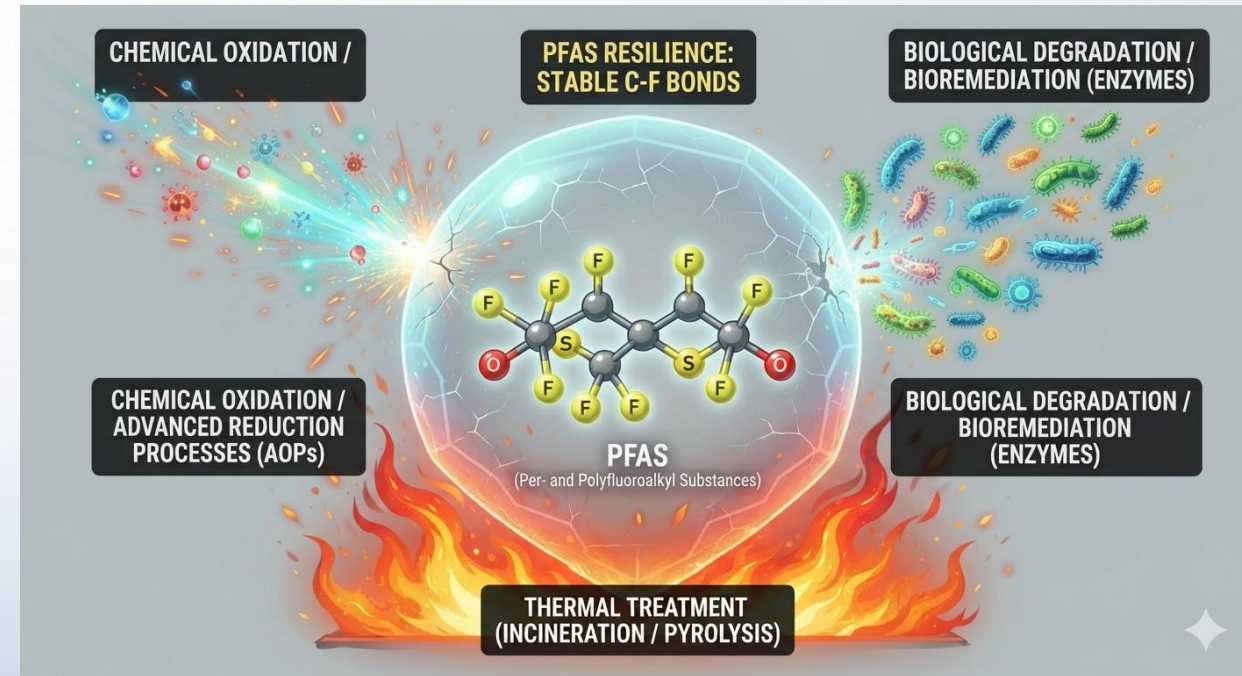
CORE PROPERTIES RELY ON ULTRA-STRONG C-F BONDS

❖ STABILITY AND PERSISTENCE:

- ✓ THE STRONGEST SINGLE BOND IN ORGANIC CHEMISTRY (~485/KJ/MOL)
- ✓ DENSE FLUORINE ELECTRONS CREATE STERIC SHIELDING AGAINST THERMAL, MICROBIAL AND CHEMICAL DEGRADATION

❖ EXTREMELY COMPLEX OCCURRENCE, FATE AND TRANSPORT BEHAVIOR DRIVEN BY:

- ✓ AMPHIPHILIC STRUCTURE
- ✓ CHAIN LENGTH
 - LONG-CHAIN (C7 AND LONGER)
 - SHORT-CHAIN (C4-C6)
 - ULTRASHORT-CHAIN (C1 – C3)
- ✓ FUNCTIONAL GROUPS
- ✓ PRECURSOR DILEMMA



CHARACTERIZING THE FULL SPECIATION PROFILE AND PRECURSOR RESERVOIR MAY BE NECESSARY DURING SITE ASSESSMENT FOR REMEDIATION.

PERSISTENCE IN ENVIRONMENTAL MEDIA

EXAMPLES OF PFAS HALF-LIVES IN ENVIRONMENTAL MEDIA (IN YEARS) *VARIES DEPENDING ON ENVIRONMENTAL CONDITIONS*

COMPOUND	WATER	SOIL, SEDIMENT OR BIOSOLIDS
PFOA	92	
PFOS	41	
PFCAS		1.1 – 2.4
FLUOROTELOMER BASED POLYMERS		DECADES
SULFONAMIDO PRECURSOR		>66
C6 SULFONAMIDO PRECURSORS		~340
C4 SULFONAMIDE PRECURSORS		~670

SOURCE: KHALID & SAUVE (2026)
VIERKE ET AL.(2012)
VENKATESAN AND HALDEN (2014)

The background features a light blue gradient with several realistic water droplets of varying sizes. A faint, circular logo is visible in the upper center, containing the text "The University of" and "California".

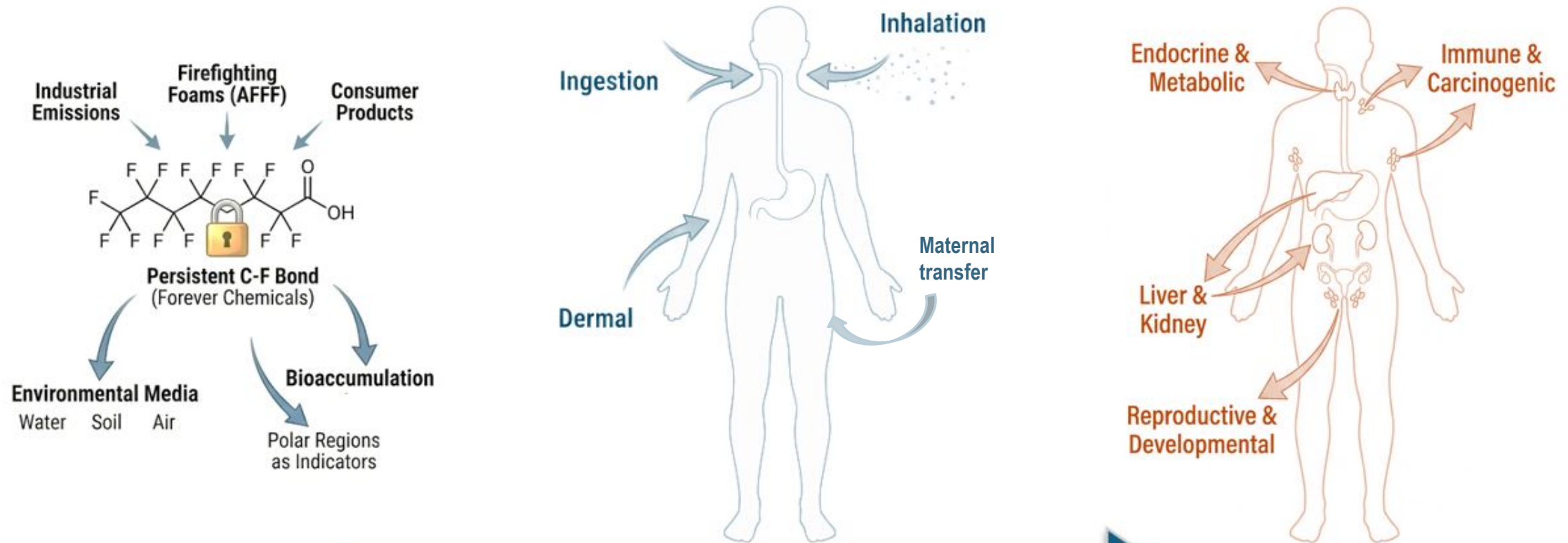
HEALTH CONCERNS

HUMAN HEALTH RISK

SOURCES & ENVIRONMENTAL PERSISTENCE

HUMAN EXPOSURE PATHWAYS

HUMAN HEALTH RISK

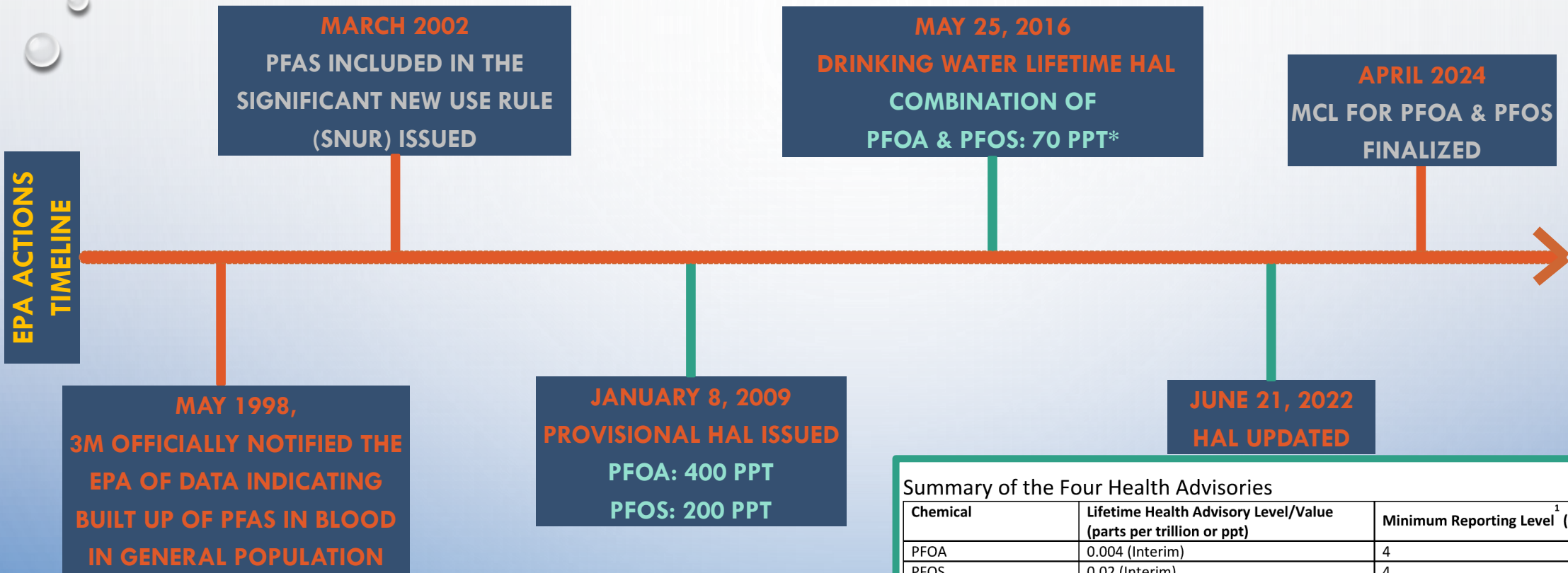


FROM SOURCE TO EFFECT

HUMAN HEALTH RISK

- Reproductive effects such as decreased fertility or increased high blood pressure in pregnant women.
- Developmental effects or delays in children, including low birth weight, accelerated puberty, bone variations, or behavioral changes.
- Increased risk of some cancers, including prostate, kidney, and testicular cancers.
- Reduced ability of the body's immune system to fight infections, including reduced vaccine response.
- Interference with the body's natural hormones.
- Increased cholesterol levels and/or risk of obesity

EPA PFAS HEALTH ADVISORY LEVEL (HAL) TIMELINE



* FDEP PROVISIONAL GROUNDWATER CLEANUP TARGET LEVELS

Summary of the Four Health Advisories

Chemical	Lifetime Health Advisory Level/Value (parts per trillion or ppt)	Minimum Reporting Level ¹ (ppt)
PFOA	0.004 (Interim)	4
PFOS	0.02 (Interim)	4
GenX Chemicals	10 (Final)	5
PFBS	2,000 (Final)	3

¹ Unregulated Contaminant Monitoring Rule (UCMR) 5 MRL is the minimum quantitation level that, with 95 percent confidence, can be achieved by capable analysts at 75 percent or more of the laboratories using a specified analytical method. These MRLs are based on the UCMR 5 requirement to use Method 533.

The background features a light blue gradient with several realistic water droplets of varying sizes. Some droplets are in the top left corner, some in the top right, and a cluster is in the bottom right. A faint, circular logo is visible in the upper center, containing the text "FEDERAL RESERVE BANK OF NEW YORK" and "NEW YORK, NY".

REGULATORY UPDATE

EPA

EPA established the original National Primary Drinking Water Regulation (NPDWR) for 6 specific per- and polyfluoroalkyl substances on April 10, 2024

COMPOUND	ORIGINAL 2024 NPDWR	MAY 18, 2026 PROPOSED RULE	REGULATORY RATIONALE
PFOA	4.0 PPT MCL (APRIL 2029)	RETAINED (4.0 PPT) 2-YR EXTENSION TO 2031	SUPPORTED BY ROBUST TOXICOLOGY; EXTENSION PROVIDES CAPITAL PLANNING TIME
PFOS	4.0 PPT MCL (APRIL 2029)	RETAINED (4.0 PPT) 2-YR EXTENSION TO 2031	SUPPORTED BY ROBUST TOXICOLOGY; EXTENSION PROVIDES CAPITAL PLANNING TIME
PFHxS & PFNA	10 PPT INDIVIDUAL MCLS	PROPOSED FULL RESCISSION	PRIOR RULEMAKING FAILED TO MEET SDWA STATUTORY COST-BENEFIT REQUIREMENTS
GenX & HAZARD INDEX	10 PPT GenX / HI = 1.0	PROPOSED FULL RESCISSION	CORRECTS PROCEDURAL DEFICIENCIES; FOCUSES FEDERAL MANDATE STRICTLY ON PFOA/PFOS

COMPLIANCE EXTENSION (TO 2031)

- WATER SYSTEMS CAN REQUEST 2 ADDITIONAL YEARS (TO APRIL 26, 2031) TO INSTALL TREATMENT
- PROVIDES CRITICAL WINDOW TO DEPLOY FEDERAL BIPARTISAN INFRASTRUCTURE LAW GRANT FUNDING

FDEP

- FDEP issued provisional cleanup target levels for PFOA and PFOS in soil and groundwater in 2018 and for surface water in 2020

Provisional PFOA and PFOS Cleanup Target Levels/Screening Levels							
Media	Groundwater - PGCTL**	Soil - PSCTL			Irrigation - IWSL		
		Residential	Commercial/Industrial	Leachability	Residential	Commercial/Industrial	Produce
Perfluorooctanoic acid (PFOA)	70 ng/L (0.07 µg/L)	1.3 mg/kg	25 mg/kg	0.002 mg/kg	6.7 µg/L	750 µg/L	NA
Perfluorooctane sulfonate (PFOS)		1.3 mg/kg	25 mg/kg	0.007 mg/kg	72 µg/L	370 µg/L	0.6 µg/L

PFOA and PFOS Surface Water Screening Levels			
Criteria	Human Health	Ecological	
		Freshwater	Marine
Perfluorooctanoic acid (PFOA)	0.5 µg/L	1,300 µg/L	ND
Perfluorooctane sulfonate (PFOS)	0.01 µg/L	37 µg/L	13 µg/L

FDEP

Florida Statute § 376.91(2026)

- “If the United States Environmental Protection Agency has not finalized its standards for PFAS in drinking water, groundwater, and soil by January 1, 2027, the department shall adopt by rule statewide cleanup target levels for PFAS in drinking water, groundwater, and soil using criteria set forth in s. 376.30701, with priority given to PFOA and PFOS. The rules for statewide cleanup target levels may not take effect until ratified by the Legislature.”
- The EPA has not promulgated standards for PFAS in groundwater or soils, neither has the FDEP initiated rule making for development of cleanup target levels for PFAS in soil and groundwater
- FDEP continues to regulate based on the provisional cleanup target levels

The background features a light blue gradient with several realistic water droplets of varying sizes. Some droplets are at the top, appearing to fall, while others are at the bottom. A faint, circular seal of the State of Florida is visible in the upper center.

MIAMI-DADE COUNTY PFAS MANAGEMENT

MIAMI-DADE COUNTY STRATEGY

MDC'S RESPONSE TO PFAS IN ENVIRONMENTAL MEDIA IS RECEPTOR DRIVEN

- **INVESTIGATE KNOWN SOURCES**
- **SAMPLE THOSE RECEPTORS (POTABLE WELLS, IRRIGATION WELLS, ETC.,) IN THE VICINITY OF KNOW SOURCES. IF PFAS CONTAMINATION IS DOCUMENTED AT THE SOURCE PROPERTY.**
- **IF RECEPTORS IMPACTED IS DOCUMENTED REFER TO FDEP AND FDOH.**
 - FDEP AND FDOH PROVIDES ALTERNATE DRINKING WATER SOURCE
 - BOTTLED WATER
 - TREATMENT (FILTERS)
- **DERM CONTINUES TO UTILIZE THE PROVISIONAL CLEANUP TARGET LEVELS WHILE AWAITING FDEP ACTION ON RULE MAKING AND SUBSEQUENT RATIFICATION BY THE FL LEGISLATURE**

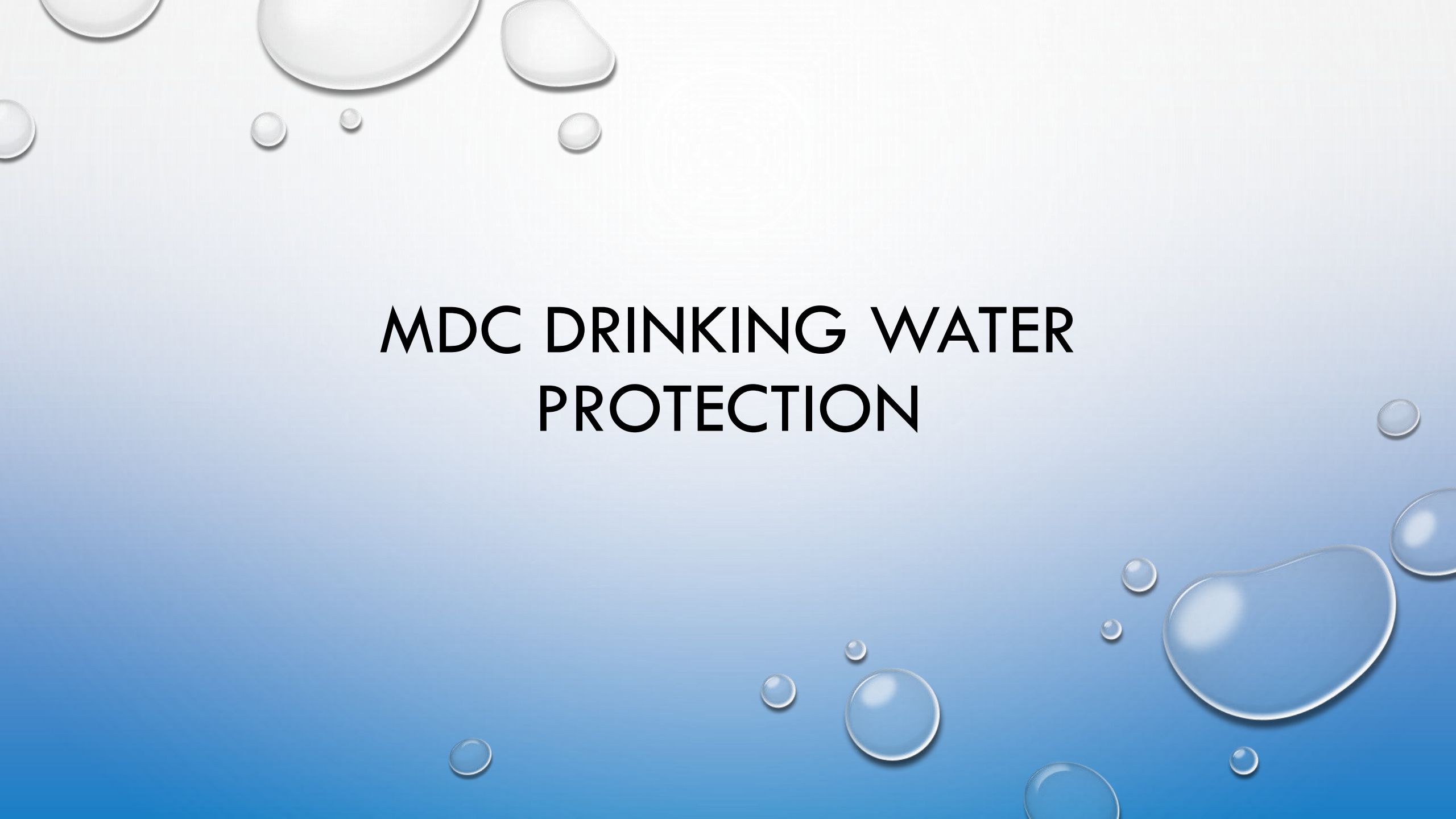
MDC AVIATION AND MDC FIRE DEPARTMENT

- THE USE OF PFAS-CONTAINING FIREFIGHTING FOAM REPRESENTS ONE OF THE MOST SIGNIFICANT POINT SOURCES OF PFAS POLLUTION.
- IN 2019, THE MDC INITIATED EFFORTS AT MIA TO ASSESS THE EXTENT OF PFAS IMPACTS TO GROUNDWATER. THESE EFFORTS ARE ONGOING AND ARE CONCURRENT WITH THE EVALUATION OF REMEDIATION TECHNOLOGIES TO TREAT THE PFAS GROUNDWATER PLUME.
- MDC AVIATION IS PHASING OUT THE USE OF AFFF AS FLUORINE-FREE FOAM (“F3”) FORMULATIONS ARE DEVELOPED AND APPROVED AS EFFECTIVE PFAS-FREE FIRE FIGHTING SUBSTITUTES.
- MDC FIRE DEPARTMENT ALREADY REPLACED THEIR AFFF WITH F3 FOR TRAINING.



**AQUEOUS FILM-FORMING FOAM (AFFF) AS THE PRIMARY POINT SOURCE OF
HIGH-CONCENTRATION SOIL AND GROUNDWATER PLUMES**

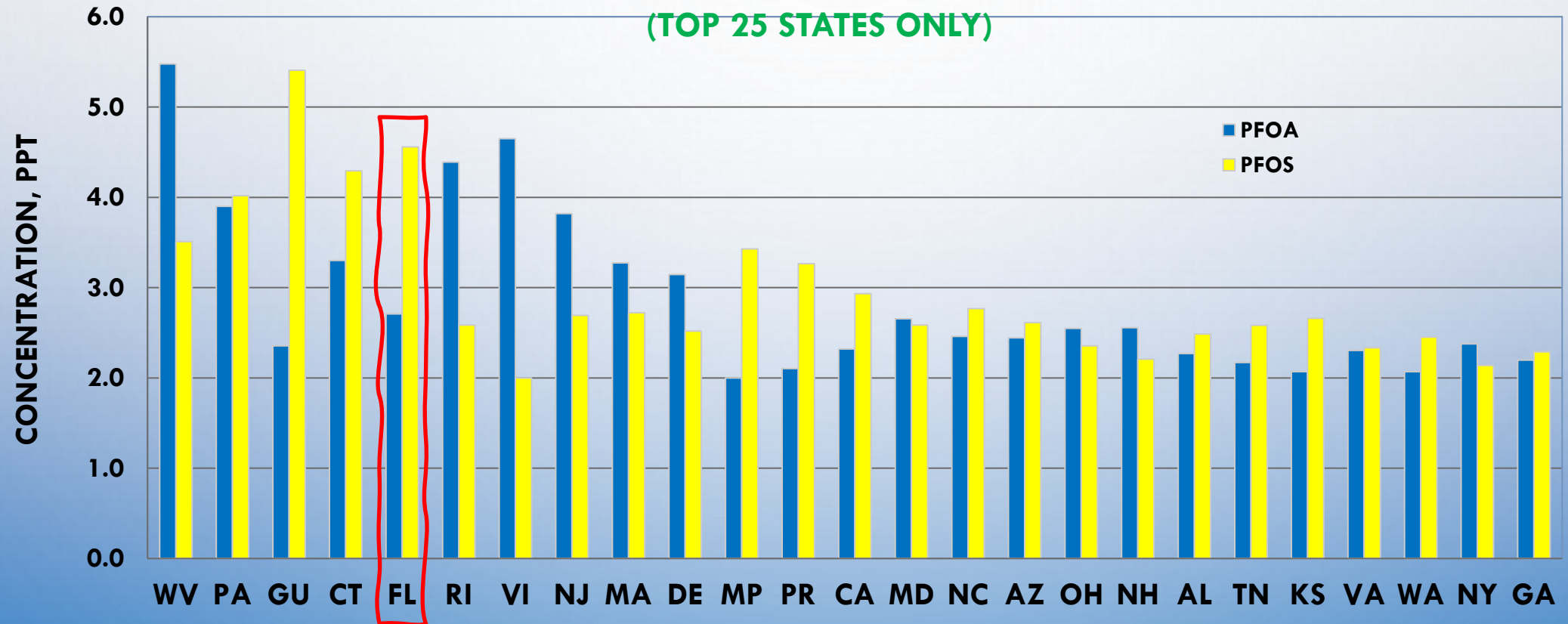


The background features a gradient from light blue at the top to a deeper blue at the bottom. Scattered throughout are numerous water droplets of varying sizes, some with highlights and shadows, giving them a three-dimensional appearance. In the upper center, there is a faint, circular logo or watermark that is not clearly legible.

MDC DRINKING WATER PROTECTION

DRINKING WATER QUALITY SNAPSHOT -UCMR5

AVERAGE PFOA AND PFOS CONCENTRATIONS BY STATE IN THE ORDER OF COMBINATION OF PFOA AND PFOS FROM HIGHEST TO LOWEST (TOP 25 STATES ONLY)



- FL RANKS NO.5 BASED ON COMBINATION OF PFOA AND PFOS
- FL RANKS NO. 2 FOR PFOS AND NO. 9 FOR PFOA

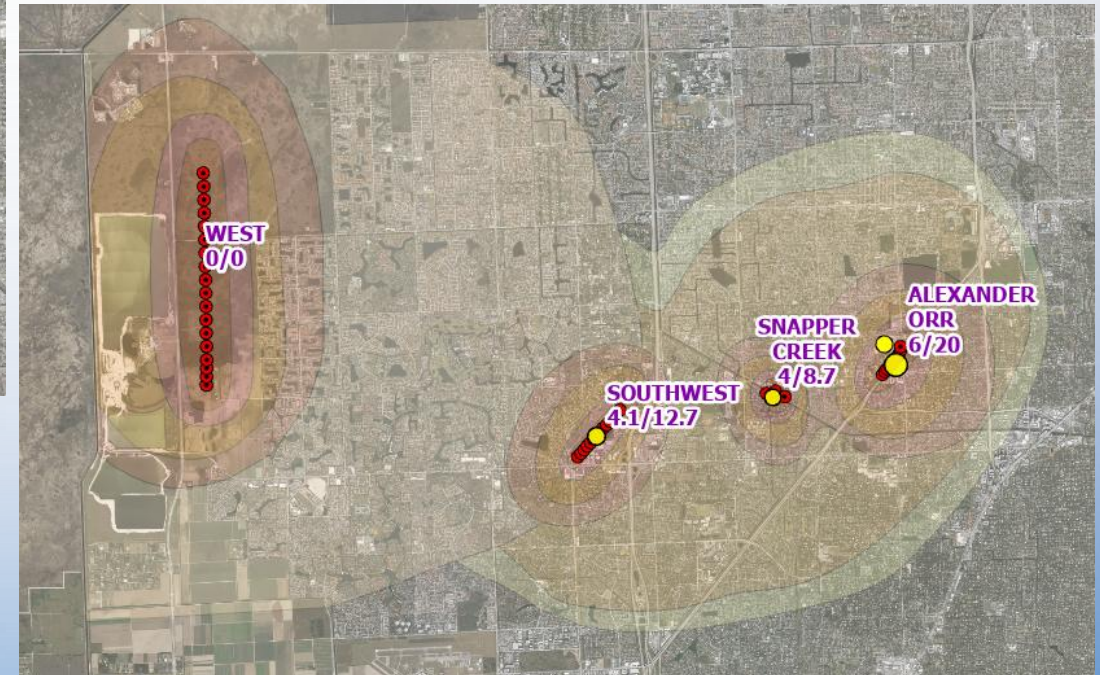
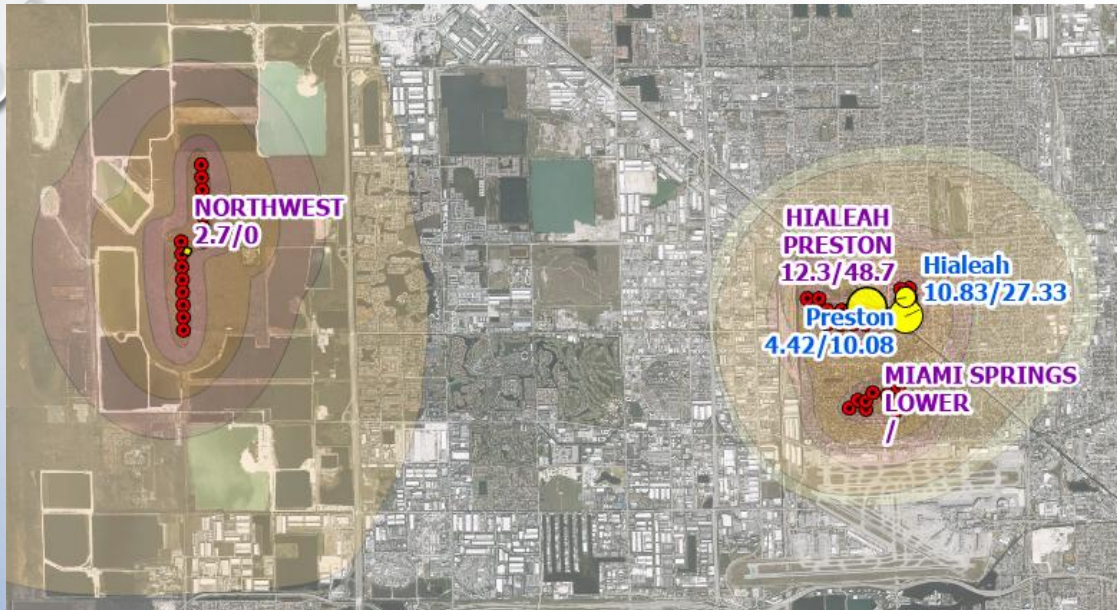
MDC WASD DRINKING WATER TREATMENT SYSTEMS

WELLFIELDS	NO. OF WELLS	TREATMENT PLANT/SYSTEM	PERMITTED FLOW
- HIALEAH - JONH E PRESTON - MIAMI SPRINGS (UPPER AND LOWER) - NORTHWEST	45	HIALEAH/ PRESTON	225 MGD
- ALEX ORR - SNAPPER CREEK - SOUTHWEST - WEST	34	ALEX ORR	214.7 MGD
- LEISURE CITY - EVERGLADES - ELEVATED TANK - NEWTON - NARANJA	12	SOUTH DADE WATER SYSTEM	14.19 MGD



SOURCE: WASD, HAZEN, BLACK&VEATCH (2026)

MDC PRODUCTION WELLS WATER QUALITY SUMMARY



- Wellfield Production Wells PFOA/PFOS (ppt): average concentrations from all sampled production wells in each wellfield in 2019

MDC WATER TREATMENT PLANT – POE WATER QUALITY SUMMARY

Hialeah-Preston WTP

Permitted Capacity
225 MGD combined

PFAS Driver

PFOS (~20–50 ng/L)
PFOA (~8–15 ng/L)

TOC

3.3–7.5 mg/L

Alexander Orr WTP

Permitted Capacity
214.7 MGD

PFAS Driver

PFOS (~10–13 ng/L)
PFOA (~4–6 ng/L)

TOC

2.5–3.5 mg/L

South-Dade Wellfields

Permitted Capacity
14.19 MGD combined

PFAS Driver

PFOS (~15–35 ng/L)
PFOA (ND–10 ng/L)
varies by wellfield

TOC

1–2 mg/L

- **PFOA and PFOS** (in ppt):
AVERAGE CONCENTRATIONS SAMPLED QUARTERLY AT POINT OF ENTRY OF EACH TREATMENT PLANT DURING 2023 THROUGH 2025
- PFOS IS THE MAIN DRIVER OF TREATMENT
- TOC concentrations important since TOC competing with PFAS for treatment media

WASD PFAS TREATMENT – GOAL AND PILOT TEST

THE MDC WATER AND SEWER DEPARTMENT HAS PROACTIVELY CONDUCTED A PILOT STUDY TO EVALUATE THE EFFECTIVENESS AND FEASIBILITY OF DIFFERENT TREATMENT SYSTEMS.

TREATMENT GOAL

SHORT TERM: MINIMIZE PFOA & PFOS
LONG TERM: MEET MCLS FOR PFOA & PFOS

TESTED TECHNOLOGIES

- GAC
- ION EXCHANGE
- FLUOROSORB
- REVERSE OSMOSIS/ NANOFILTRATION

CONSISTENT WITH CURRENT MUNICIPAL TREATMENT PRACTICE

➤ **CAPITAL COST PLANNING LEVEL \$1.8B - \$2.4B**



SOURCE: WASD, HAZEN,
BLACK&VEATCH (2026)

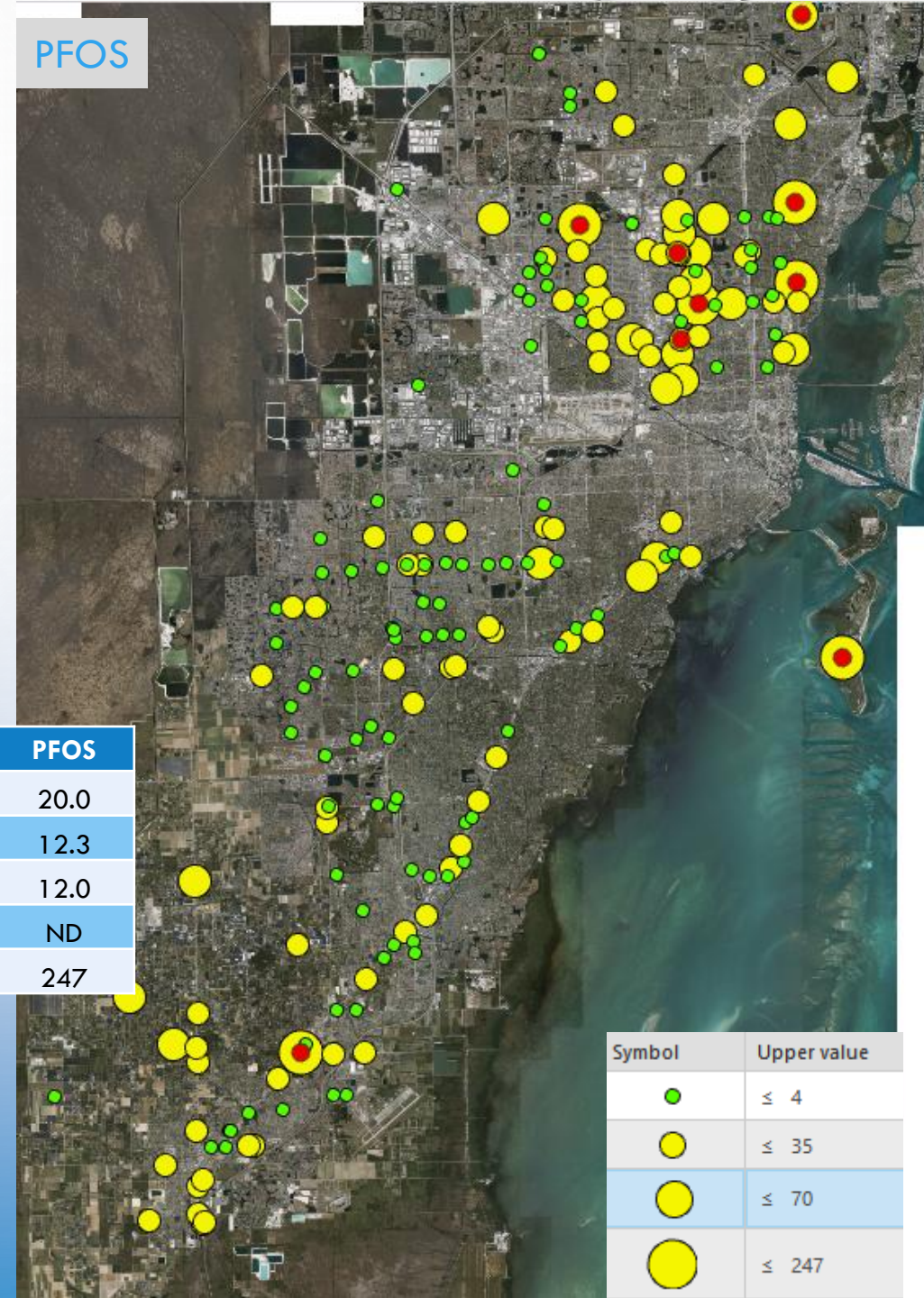
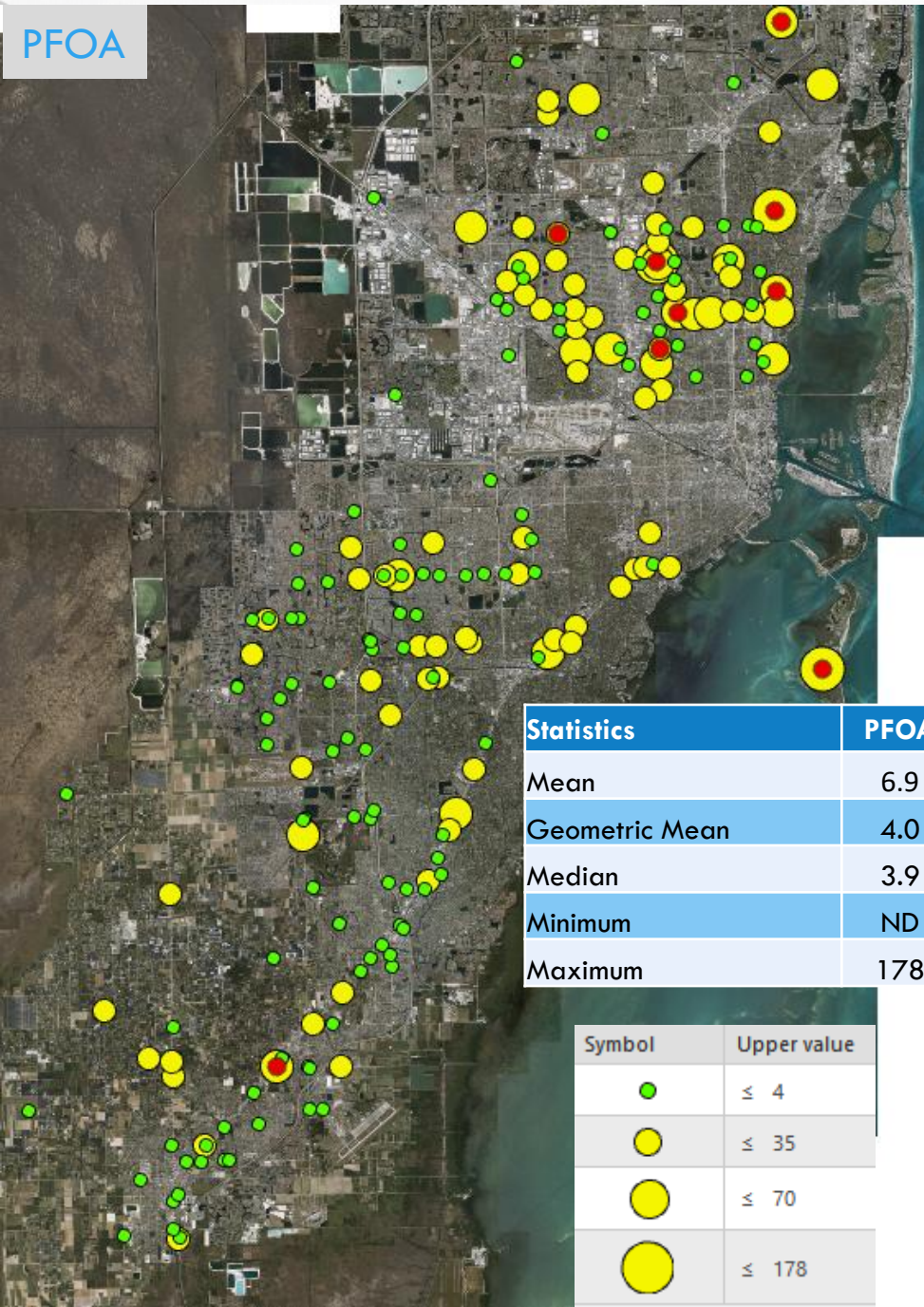
DERM ONGOING EFFORTS

- ASSESS GROUNDWATER QUALITY AT POTENTIAL SOURCE SITES BASED ON THE FDEP PROVISIONAL CTLS.
- EVALUATE FOR IMPACTS TO RECEPTORS DOWNGRADIENT OF IMPACTED SOURCE SITES
- COORDINATE WITH FDEP AND FDOH FOR ALTERNATIVE DRINKING WATER SUPPLY FOR IMPACTED PRIVATE WELLS (AS APPLICABLE)
- FOCUS ON UNDERSTANDING COUNTY-WIDE GROUNDWATER QUALITY
 - ✓ SYNOTPIC SAMPLING
 - ✓ DRY CLEANERS SAMPLING

DERM SYNOPTIC SAMPLING

DISTRIBUTION OF PFOS AND PFOA IN MDC GROUNDWATER AND POTENTIAL POINT SOURCES

- A COMBINED total of 239 shallow monitoring wells sampled in 2020 and 2025
- 171 samples in 2025 and 68 samples in 2019 with 29 locations overlapped in 2 events

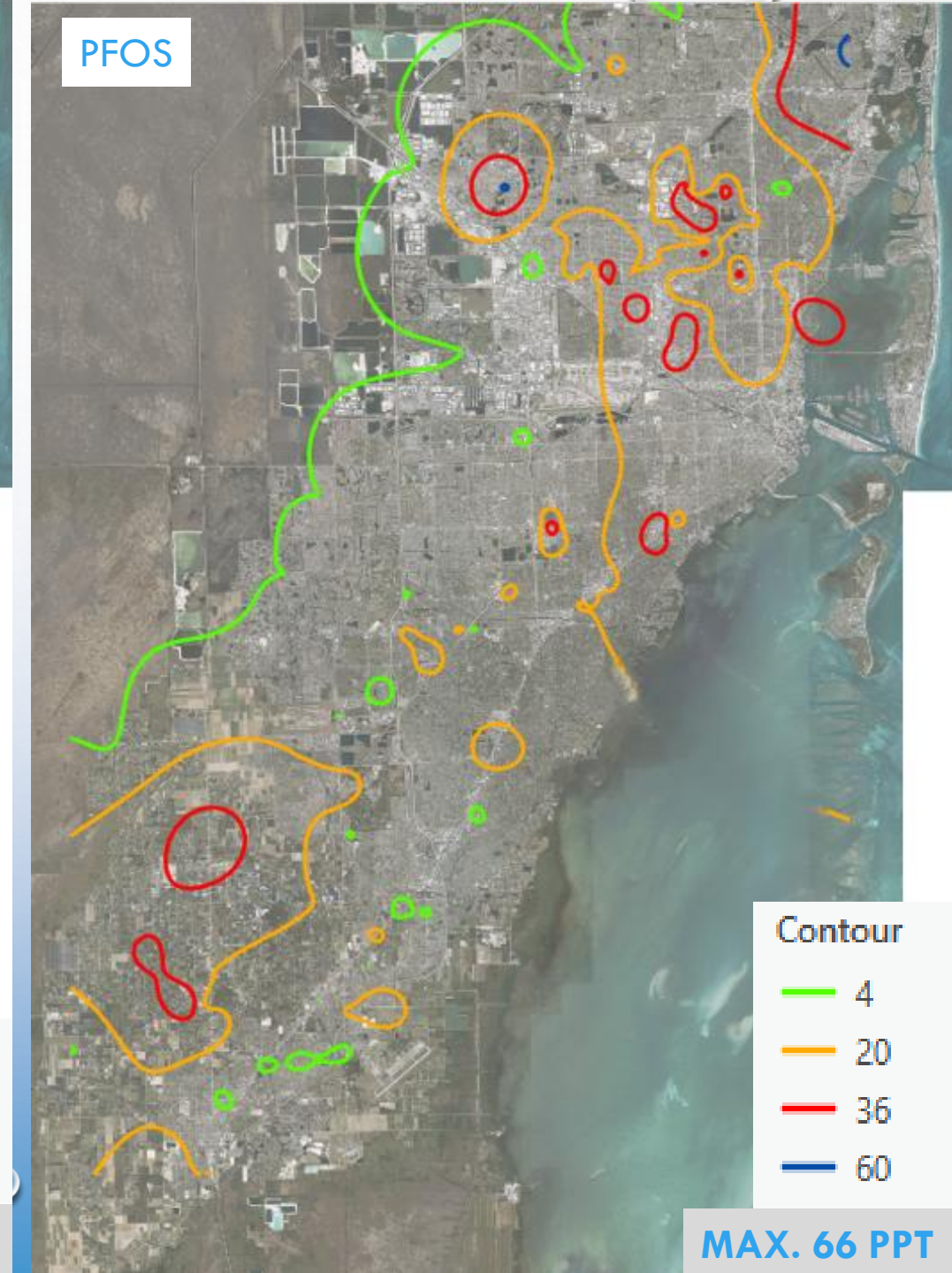
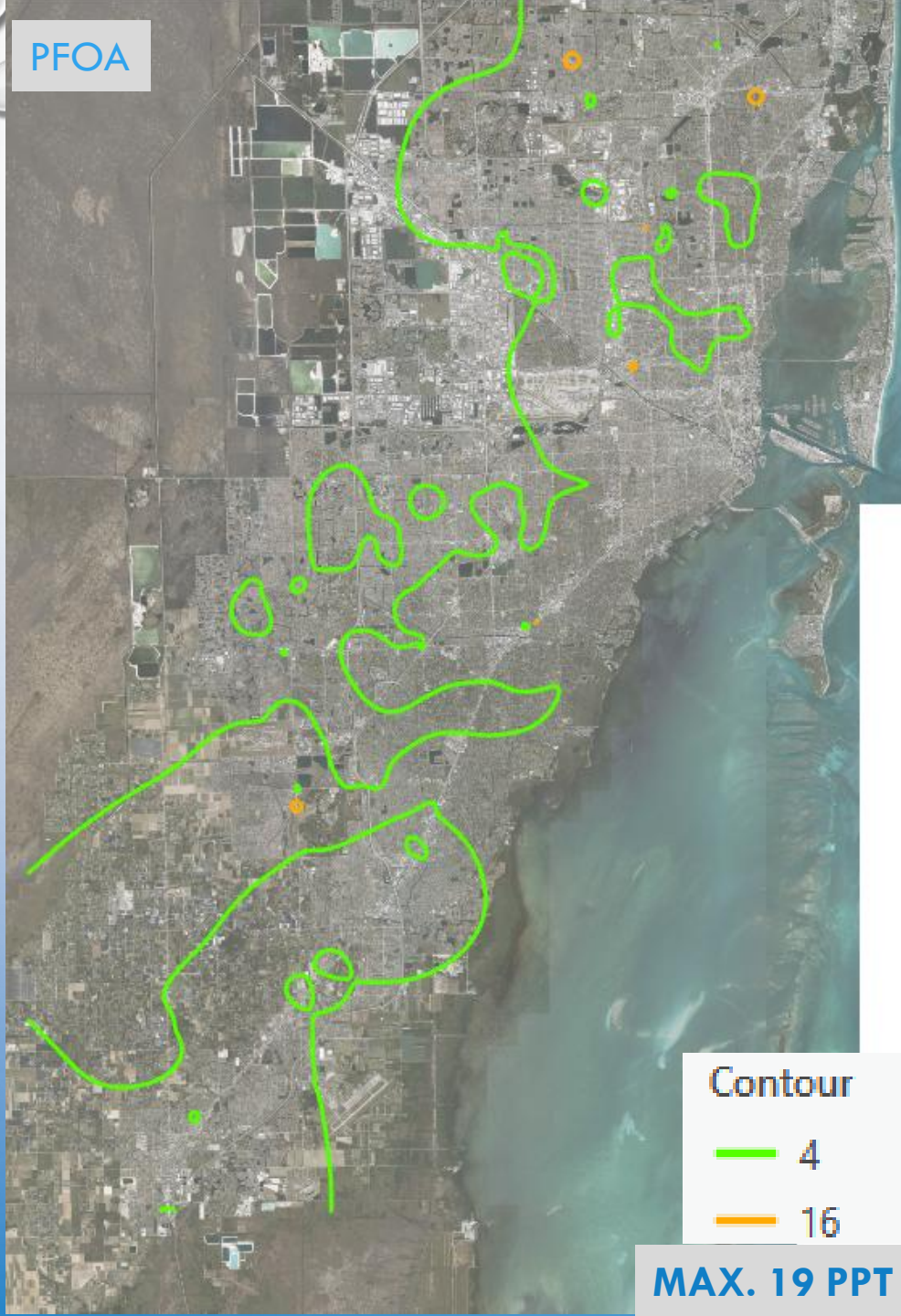


CONCENTRATIONS IN PPT

● IDENTIFIED
PFAS SOURCES

PFAS
DISTRIBUTION

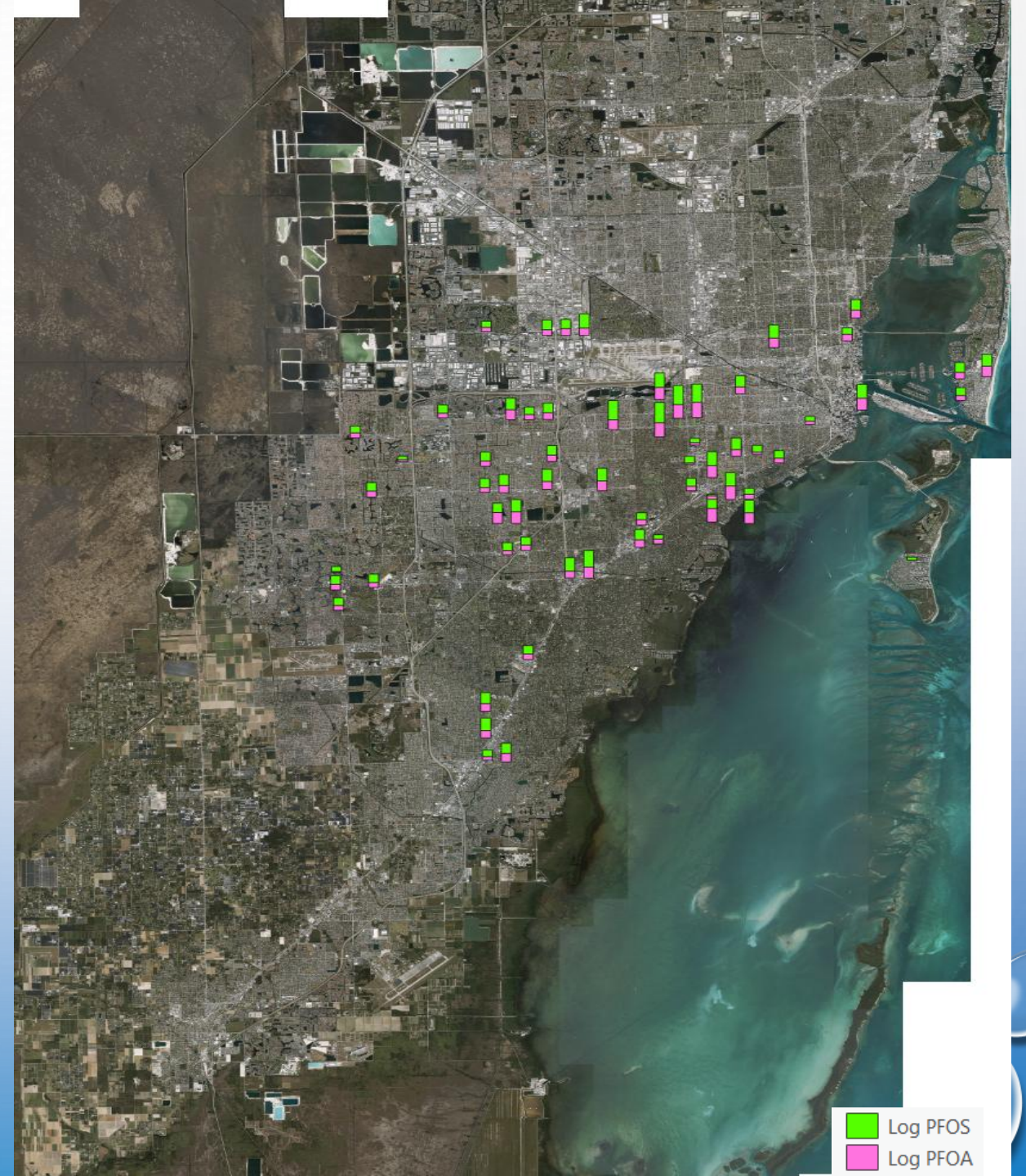
EXCLUDING THE
DATA AT
IDENTIFIED
SOURCE SITES



DERM AND FDEP DRY CLEANER SAMPLING SNAPSHOT

- **DERM SAMPLED: 73 SITES (73 SAMPLES)**
- **FDEP SAMPLED: 8 SITES (23 SAMPLES)**

Data Range (ppt)	PFOA (ppt)	PFOS (ppt)
<4	19	7
4 PPT – 70	69	67
>70	8	22
MAX. CONCENTRATION	2,640	3,480



CONCLUSION: PLAN OF ACTION

1. **CONTINUE TO WORK WITH OUR PARTNERS FEDERAL, STATE, COUNTY, AND OUR COMMUNITY**
2. **TARGET OUR MOST SENSITIVE RECEPTORS TO ENSURE THE PROTECTION OF PUBLIC HEALTH.**
3. **CONTINUE TO INVENTORY AND REPLACE, AS FEASIBLE, COUNTY DEPARTMENTS USE OF PFAS PRODUCTS (E.G., AFFF)**
4. **CONTINUED PARTICIPATION AS APPLICABLE AND APPROPRIATE IN THE DEVELOPMENT OF STANDARDS AND CRITERIA FOR REGULATING PFAS IN THE ENVIRONMENT.**

1. **RESEARCH.** INVEST IN RESEARCH, DEVELOPMENT, AND INNOVATION TO INCREASE UNDERSTANDING OF PFAS EXPOSURES AND TOXICITIES, HUMAN HEALTH AND ECOLOGICAL EFFECTS, AND EFFECTIVE INTERVENTIONS THAT INCORPORATE THE BEST AVAILABLE SCIENCE.
2. **RESTRICT.** PURSUE A COMPREHENSIVE APPROACH TO PROACTIVELY PREVENT PFAS FROM ENTERING AIR, LAND, AND WATER AT LEVELS THAT CAN ADVERSELY IMPACT HUMAN HEALTH AND THE ENVIRONMENT.
3. **REMEDiate.** BROADEN AND ACCELERATE THE CLEANUP OF PFAS CONTAMINATION TO PROTECT HUMAN HEALTH AND ECOLOGICAL SYSTEMS.



- **IF YOU ARE CONCERNED ABOUT THE LEVEL OF PFAS IN YOUR DRINKING WATER:**
 - CONTACT YOUR STATE ENVIRONMENTAL PROTECTION AGENCY OR HEALTH DEPARTMENT AND YOUR LOCAL WATER UTILITY TO FIND OUT WHAT ACTIONS THEY RECOMMEND.
 - CONSIDER INSTALLING IN-HOME WATER TREATMENT (E.G., FILTERS) THAT ARE CERTIFIED TO LOWER THE LEVELS OF PFAS IN YOUR WATER.
 - [LEARN ABOUT CERTIFIED IN-HOME WATER TREATMENT FILTERS.](#)

Thank
you



