The South Florida Water Management District's

Trace Metal and Mercury Monitoring Program:

A Request to the Everglades Technical Oversight Committee

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January 25, 2000

Purpose

- To improve the overall data quality and cost effectiveness of the trace metals and mercury sampling programs.
- The proposed changes will:
  - update and improve trace metals and mercury sampling methodologies,
  - update and improve analytical methods for mercury,
  - provide more meaningful and accurate data

Mandates

- Everglades National Park (ENP) MOA
  - Purpose: To assure water delivered to ENP is of sufficient purity to protect and preserve the park.
  - Executed in 1984.
  - Frequency: semi-annually
  - Analytes: Mercury, Cadmium, Copper, Lead, Iron, Zinc and Arsenic
  - Can be amended by mutual consent of all parties
  - Recognizes the need for periodic review and amendment.
  - Changes proposed and needs to be updated

- Settlement Agreement
  - Purpose: To guarantee water quality and quantity needed to preserve and restore ENP and Loxahatchee Wildlife Refuge.
  - Implemented in 1991
  - Requires water quality sampling every other week at all Park and Refuge delivery points, representative interior marsh stations, and permanent Refuge stations.
  - Analytes: Arsenic, Cadmium, Copper, Iron, Mercury, Lead, and Zinc.
  - Amended in 1992
  - Changes proposed to trace metals and mercury programs

Non-ECP Permit

- Purpose: To authorize the District to operate and maintain 37 structures with discharges to, within or from the Everglades Protection Area (and not within the Everglades Construction Project)
- Issued in 1998
- Trace Metals monitored semi-annually
- Major ions (Fe) monitored quarterly
- Analytes: Cadmium, Copper, Zinc and Iron (listed as a Major Ion)
- In 1999, FDEP approved deleting trace metal monitoring at all "within" and "from" structures and deleting Iron, Magnesium, and Calcium. No changes proposed

EFA Stormwater Treatment Area (STA) 1W Permit

- Purpose: To authorize the District to construct and operate STA1W.
- Issued in May 1999.
- Frequency: Quarterly
- Analyte: Silver at the inflow point.
- STA1W not yet operational; no silver data have been collected.
- No changes proposed

MOA with the Seminole Tribe

- Purpose: To protect water quality and quantity to the Brighton Seminole Reservation.
- Signed in 1995
- Frequency: Quarterly (ions), Biannually (metals)
- Analytes: Arsenic, Cadmium, Copper, Iron, Lead, Zinc, Calcium, Magnesium, Potassium and Sodium.
- Requires surface water quality monitoring for the C-139, L-28 (C-139 Annex) and L-28 Interceptor Basins.
- Changes proposed for trace metals program

Trace Metals Monitoring

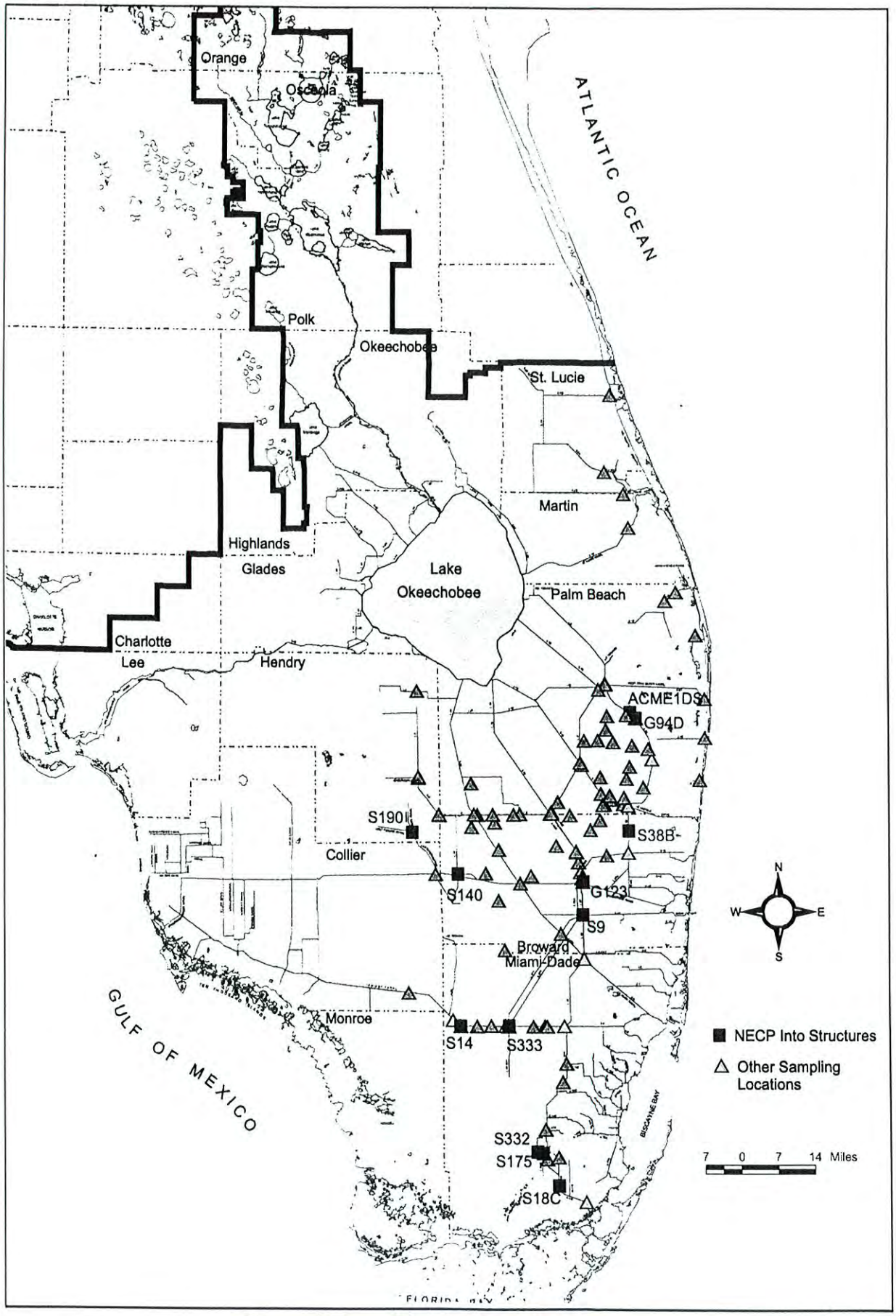
Current Trace Metals Program

(as governed by the TOC)

- Mandates: ENP Memorandum of Agreement, Settlement Agreement, Non-ECP Permit, Everglades Forever Act, STA1W Operating Permit and Seminole MOA.
- Analytes: Total Silver, Arsenic, Beryllium, Cadmium, Chromium, Copper, Iron, Mercury, Nickel, Lead, Antimony, Selenium,Thallium, Zinc
- 116 monitoring stations
- Frequencies: biweekly if flowing to semi-annually depending on mandate.

Sampling Techniques for Trace Metals

- Current:
  - Grab sampling using 1998 SFWMD CompQAP.
- Proposed:
  - Modified EPA Method 1669 using Clean Hands/Dirty Hands (CH/DH) Techniques and peristaltic pump as per 1999 SFWMD CompQAPP.



Current Trace Metals Sampling Locations

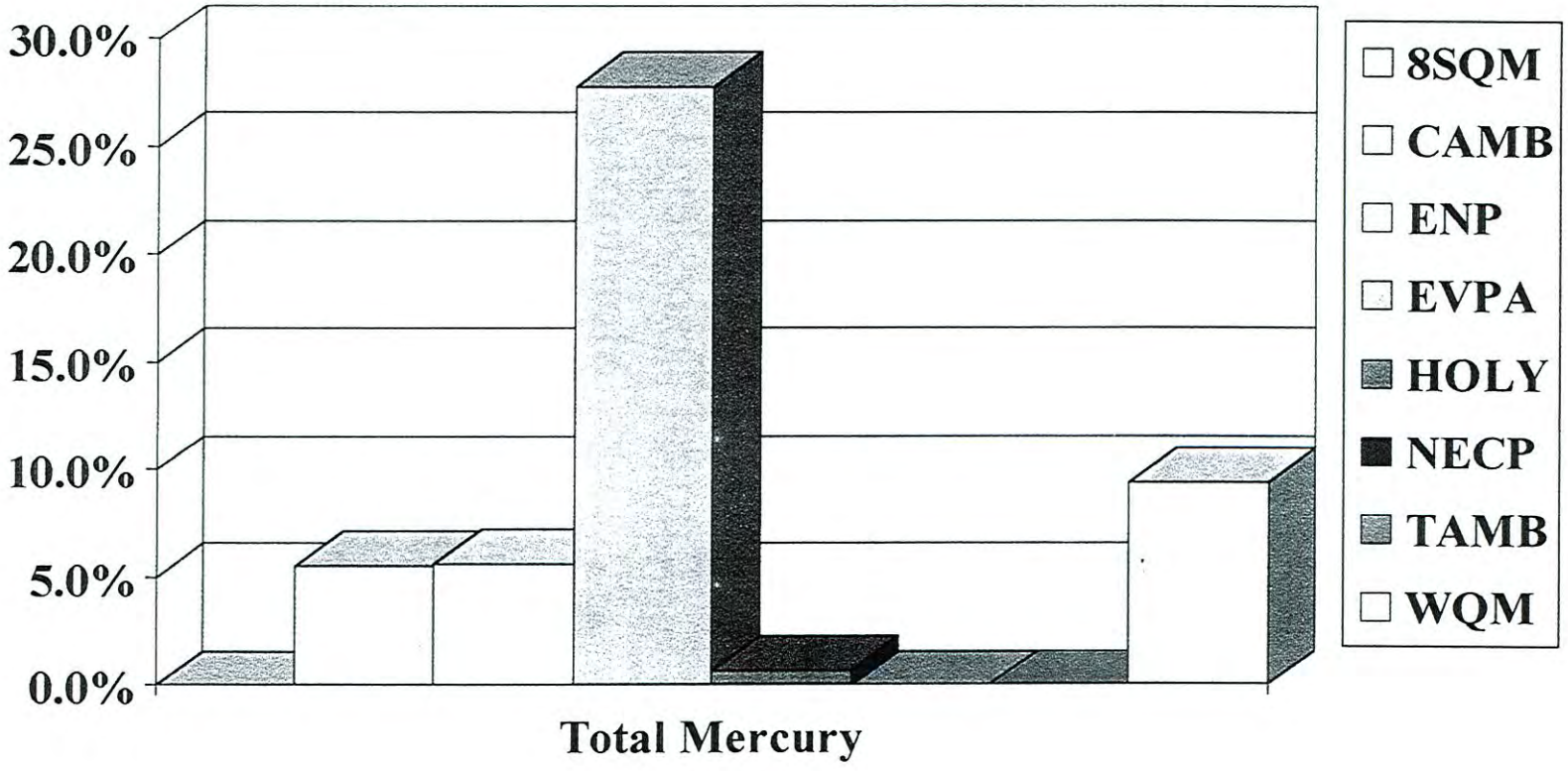
Ratio of Excursions from Class III Standards to Number of Samples

	Total Silver	Total Arsenic	Total Beryllium	Total Cadmium	Total Chromium	Total Copper	Total Iron	Total Mercury	Total Nickel	Total Lead	Total Antimony	Total Selenium	Total Thallium	Total Zinc
8SQM		(0:1)		(0:8)		(0:8)	(0:8)	(0:6)		(0:1)				(0:8)
CAMB		(0:1042)		(2:1056)		(3:1053)	(30:2171)	(53:963)		(2:1056)				(2:1057)
NECP				(0:20)		(0:20)	(0:43)							(0:20)
ENP		(0:715)		(3:716)		(0:713)	(5:1384)	(39:694)		(2:715)				(0:718)
EVPA		(0:514)		(5:515)		(6:516)	(5:2108)	(131:472)		(65:511)				(21:514)
HOLY	(1:279)	(0:273)	(11:279)	(4:279)	(0:279)	1:277)	(1:230)	(2:287)	(0:279)	(1:279)	(0:279)	(0:279)	(0:279)	(4:271)
TAMB		(0:8)		(0:8)		(0:8)	(0:18)	(0:8)		(0:8)				(0:8)

Percent Excursions from Class III Water Quality Standards per Trace Metal (1988-Present)

Project	Total Silver	Total Arsenic	Total Beryllium	Total Cadmium	Total Chromium	Total Copper	Total Iron	Total Mercury	Total Nickel	Total Lead	Total Antimony	Total Selenium	Total Thallium	Total Zinc
8SQM		0.0%		0.0%		0.0%	0.0%	0.0%		0.0%				0.0%
CAMB		0.0%		0.2%		0.3%	1.4%	5.5%		0.2%				0.2%
ENP		0.0%		0.4%		0.0%	0.4%	5.6%		0.3%				0.0%
EVPA		0.0%		1.0%		1.2%	0.2%	27.8%		12.7%				4.1%
HOLY	0.4%	0.0%	3.9%	1.4%	0.0%	0.4%	0.4%	0.7%	0.0%	0.4%	0.0%	0.0%	0.0%	1.5%
NECP				0.0%		0.0%	0.0%							0.0%
TAMB		0.0%		0.0%		0.0%	0.0%	0.0%		0.0%				0.0%
WQM		0.0%		0.0%		1.0%	2.0%	9.4%		0.7%				1.0%
TOTAL EXCURSIONS PER PARAMETER	0.36%	0.00%	3.94%	0.49%	0.00%	0.45%	0.80%	9.28%	0.00%	2.53%	0.00%	0.00%	0.00%	1.04%

Percent Excursions from Class III Water Quality Standards for Mercury from (1988-Present)



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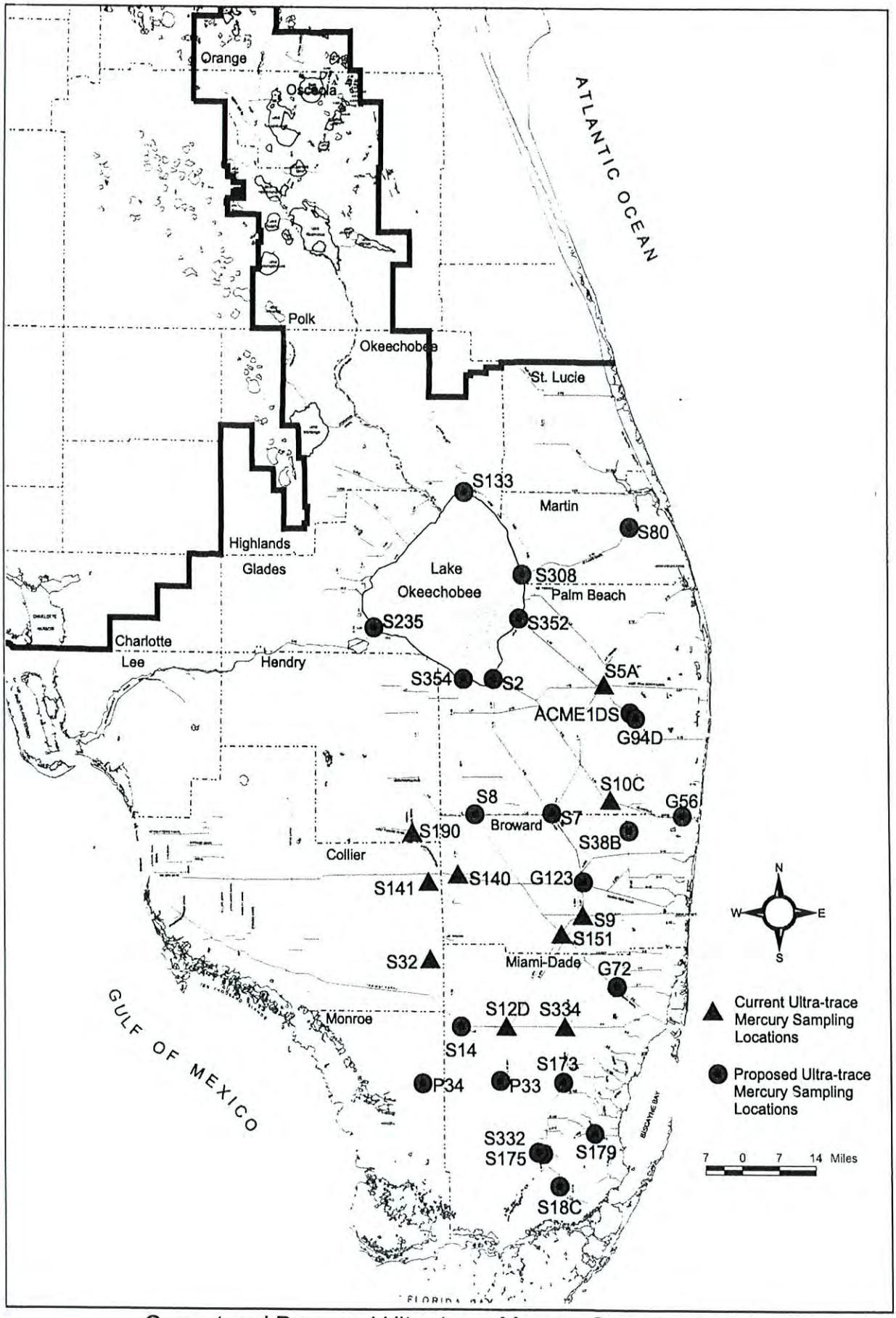
Proposed Ultra-Trace Mercury Monitoring

- Discontinue mercury analysis by cold vapor atomic adsorption method.
- Flag all positive (>mdl) total mercury data generated by cold vapor method in database.
- Maintain current ultra-trace monitoring according to *Ultra-trace Mercury Monitoring Plan.*
- Add key ultra-trace mercury monitoring sites and monitor quarterly.
- Adopt an adaptive response strategy.

Benefits of Proposed Ultra-Trace Mercury Program

- More comprehensive program
- Improved sampling methodology
- Improved analytical method
- More meaningful and accurate data



Current and Proposed Ultra-trace Mercury Sampling Locations

Proposed Ultra-Trace Mercury Monitoring Sites

Permitted WQ Sampling Site	NECP Class	Current Trace Metals Freq.	Current Ultra-trace Mercury Freq.*	Proposed Trace Metals Freq.	Proposed Ultra-trace Mercury Freq.
S14	Into	SA		SA	QTR
G94D	Into	SA		SA	QTR
ACME1DS	Into	SA		SA	QTR
S140	Into	SA	QTR	SA	QTR
S190/L28	Into	SA	QTR	SA	QTR
S38B	Into	SAF		SAF	QTR
S9	Into	SA	QTR	SA	QTR
G123	Into	SA		SA	QTR
S175	Into	MNTHLY		SA	QTR
S18C	Into	MNTHLY		SA	QTR
S332	Into	MNTHLY		SA	QTR
S12D	Within	MNTHLY	QTR	0	QTR
S151	Within	SA	QTR	0	QTR
S334	From	0	QTR	0	QTR
S5A		BWF/M	QTR	QTR	QTR
S10C		SA	QTR	0	QTR
S7		SA		0	QTR
S8		SA		0	QTR
S-141			QTR		QTR
S-32			QTR		QTR
S-80					QTR
S-133					QTR
S-308					QTR
S-352					QTR
S-2					QTR
S-354					QTR
S-235					QTR
G-56					QTR
G-72					QTR
S-173					QTR
S-179					QTR
S-332D					QTR
P33					QTR
P34					QTR

Summary

- The proposed changes to the trace metals and mercury monitoring programs will:
  - update and improve trace metals and mercury sampling methodologies,
  - update and improve analytical methods for mercury, and
  - provide more comprehensive and meaningful trace metal and mercury data