Quality Assurance Oversight Program Annual Progress Presentation August 2006 – March 2007

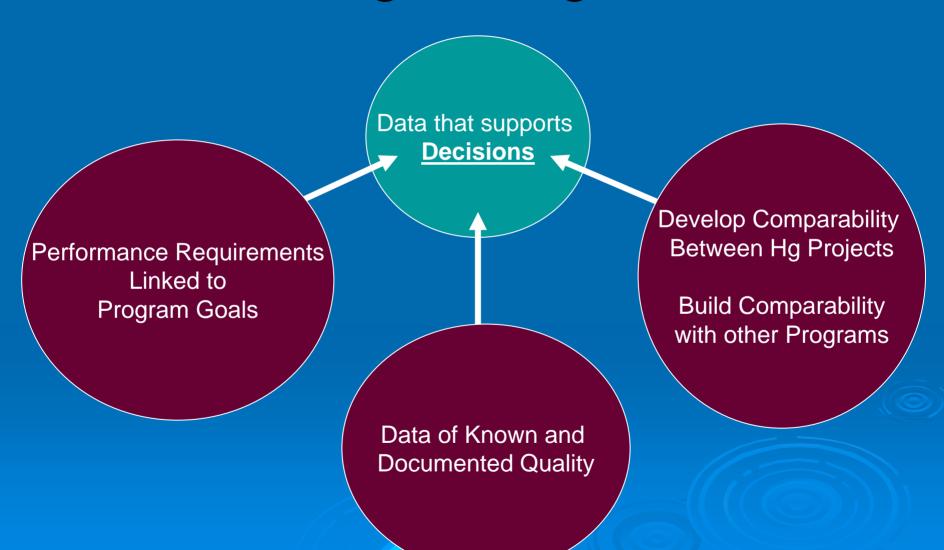
Beverly H. van Buuren, Amara F. Vandervort, Eric J. von der Geest, and Megan V. Kilner April 23, 2007

CALFED Bay-Delta Program

Annual Workshop and Review of Mercury Projects

Red Lion Inn, Sacramento, California

QA Oversight Program Goals



QA Program Components

- Inter-laboratory Comparison Exercises (Round-robin)
- Split Sample Analysis (5% frequency)

On Schedule?

- Significant contracting delays
- Some projects not included in the QA program due to the contracting delays

Bid Accepted: June 2004

Contract Awarded: March 2005

Contract Expired: Dec. 2005

sampling started as early as Jan. 2003

- > Amendment Approved: Nov. 2004
- > Amendment Into Contract: June 2006

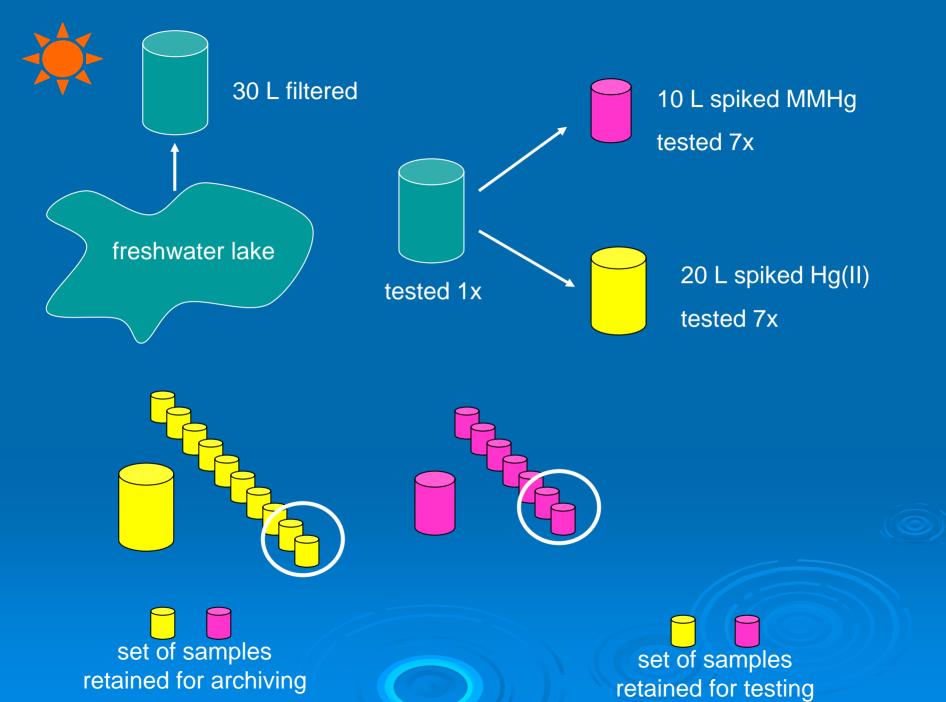
Contract Awarded: August 2006

Contract Expires: Dec. 2007

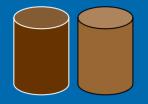
sampling started as early as Nov. 2005

Intercomparison Study Schedule

Analyte and Matrix	Date Samples Ship	Date Final Report
THg Water	June 2005	September 2005
MMHg Sediment	April 2006	January 2007
	May 2007	August 2007
THg Water	November 2005	March 2006
MMHg Water	May 2007	August 2007
THg Tissue MMHg Tissue	November 2007	February 2008
THg Sediment		
MMHg Sediment		



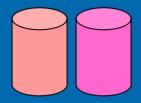




Sediment CRM

Hg(II) and MMHg

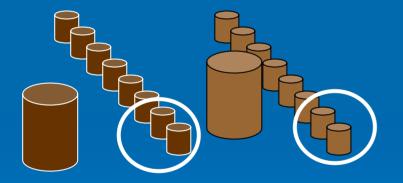
tested 7x if not certified

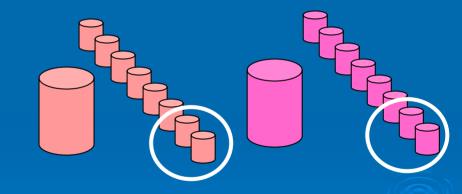


Tissue CRM

Hg(II) and MMHg

tested 7x if not certified









	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G	
		Total	Mercury in	Freshwater	(ng/L)			
mean Study 1	7.08	7.59	7.37	6.75	n/a	n/a	n/a	
mean Study 2	5.90	5.62	5.19	5.05	4.19	n/a	n/a	
mean Study 3	2.68	2.68	3.30	2.50	2.61	2.47	n/a	
z-score Study 1	-1.417	-0.079	-0.656	-2.275	n/a	n/a	n/a	
z-score Study 2	1.223	0.204	-1.343	-1.823	-4.916	n/a	n/a	
z-score Study 3	-0.533	-0.533	3.976	-1.784	-1.018	-2.012	n/a	
	Methylmercury in Freshwater (ng/L)							
mean Study 2	0.175	0.158	0.14	0.194	0.201	n/a	n/a	
z-score Study 2	0.231	-1.696	-3.815	2.466	3.237	n/a	n/a	

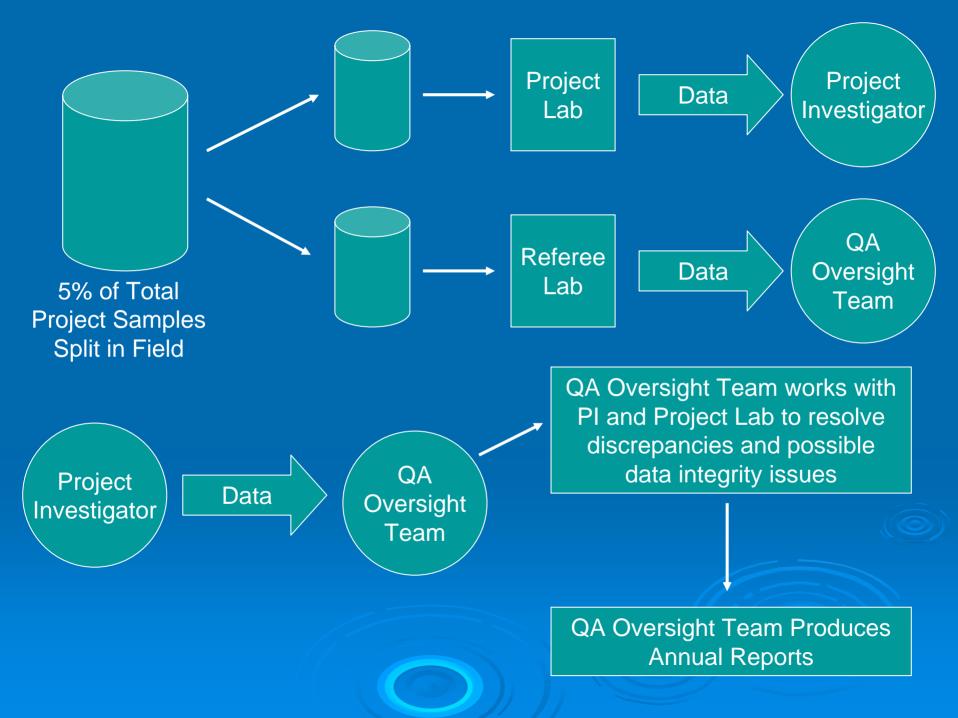
	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G		
	Total Mercury in Freshwater (ng/L)								
mean Study 1	7.08	7.59	7.37	6.75	n/a	n/a	n/a		
mean Study 2	5.90	5.62	5.19	5.05	4.19	n/a	n/a		
mean Study 3	2.68	2.68	3.30	2.50	2.61	2.47	n/a		
z-score Study 1	± 10%	± 10%	± 10%	± 25%	n/a	n/a	n/a		
z-score Study 2	± 10%	± 10%	± 10%	± 10%	± 25%	n/a	n/a		
z-score Study 3	± 10%	± 10%	± 25%	± 10%	± 10%	± 25%	n/a		
	Methylmercury in Freshwater (ng/L)								
mean Study 2	0.175	0.158	0.14	0.194	0.201	n/a	n/a		
z-score Study 2	± 10%	± 10%	± 25%	± 25%	± 25%	n/a	n/a		

	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G
		Methy	Imercury in	Sediment	(ng/g)		
mean Study 1	2.82	3.31	6.29	3.41	3.76	n/a	n/a
mean Study 2	66.1	70.9	112.3	75.5	83.1	n/a	n/a
mean Study 3	15.4	3.72	3.24	4.17	7.43	5.96	n/a
z-score Study 1	-3.585	-0.736	outlier	-0.155	1.860	n/a	n/a
z-score Study 2	-2.364	-1.106	9.956	0.145	2.151	n/a	n/a
z-score Study 3	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	n/a
Total Mercury in Sediment (ng/g)							
mean Study 2	119	129.5	120.3	114.7	100.9	119	130
z-score Study 2	-1.692	-0.077	-1.487	-2.354	-4.477	-1.692	0.000

	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G		
	Methylmercury in Sediment (ng/g)								
mean Study 1	2.82	3.31	6.29	3.41	3.76	n/a	n/a		
mean Study 2	66.1	70.9	112.3	75.5	83.1	n/a	n/a		
mean Study 3	15.4	3.72	3.24	4.17	7.43	5.96	n/a		
z-score Study 1	± 25%	± 10%	outlier	± 10%	± 10%	n/a	n/a		
z-score Study 2	± 25%	± 10%	> 25%	± 10%	± 25%	n/a	n/a		
z-score Study 3	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	Not calculated	n/a		
	Total Mercury in Sediment (ng/g)								
mean Study 2	119	129.5	120.3	114.7	100.9	119	130		
z-score Study 2	± 10%	± 10%	± 10%	± 25%	± 25%	± 10%	± 10%		

	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G
		Tota	al Mercury i	n Tissue (n	g/g)		
mean Study 2	246	235.7	240.3	n/a	n/a	190	228
z-score Study 2	2.162	1.237	1.652	n/a	n/a	-2.883	0.511
		Metl	nylmercury	in Tissue (n	g/g)		
mean Study 2	176	200.2	186	193	217	n/a	203
z-score Study 2	-2.400	0.023	-1.367	-0.653	1.667	n/a	0.333

	Lab A	Lab B	Lab C	Lab D	Lab E	Lab F	Lab G
		Tota	al Mercury i	n Tissue (n	g/g)		
mean Study 2	246	235.7	240.3	n/a	n/a	190	228
z-score Study 2	± 25%	± 10%	± 10%	n/a	n/a	± 25%	± 10%
		Metl	nylmercury	in Tissue (n	ig/g)		
mean Study 2	176	200.2	186	193	217	n/a	203
z-score Study 2	± 25%	± 10%	± 10%	± 10%	± 10%	n/a	± 10%



5% Split Information March 2005 – present								
Project	Number of Results	Number Requiring Investigation	Percentage					
Project 1	51	8	15.7					
Project 2	90	10	11.1					
Project 3	24	5	20.8					
Project 4	24	13	54.1					
Total	189	36	19.0					

QA Oversight Program Goals

Performance Requirements
Linked to
Program Goals

Maybe?
When was this last evaluated?

Data that supports

Decisions

Data of Known and Documented Quality

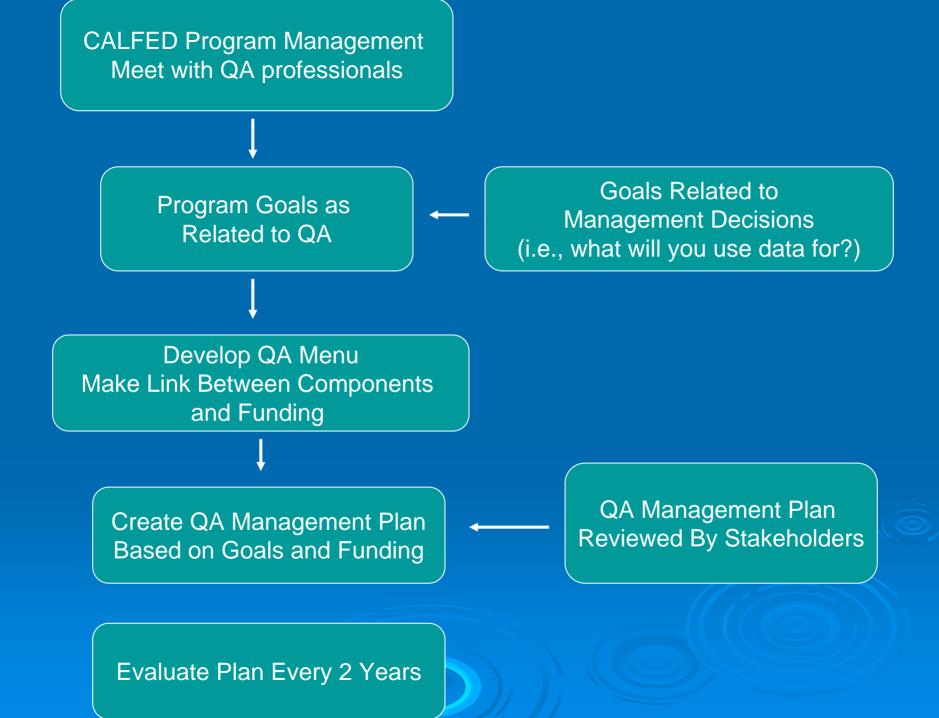
Best guess is some projects.

Poor due to lack of participation.

Develop Comparability
Between Hg Projects

Build Comparability with other Programs

Good



Closing Remarks

- We recommend that the CALFED Bay-Delta Program reassess its goals related to quality assurance
- Contract delays are an issue and should be addressed
- Fantastic work done by participating Pls, their field crews, and laboratories! Excellent laboratory results on intercomparison studies and splits.

QA Team Personnel

Department of Fish and Game

H. Max Puckett, Contract Manager

Quality Assurance Research Group Moss Landing Marine Laboratories

- Beverly van Buuren, QA Manager
- Amara Vandervort, QA Coordinator
- Will Hagan, QA Specialist
- > Megan Kilner, QA Specialist
- Eric von der Geest, QA Specialist
- Jennifer Parker, QA Specialist

Other Projects we're working on:

Surface Water Ambient Monitoring Program (SWAMP)
CA Integrated Water Quality System (CIWQS)

Training Classes for QA/QC

Holding Time Study on Low-level Nutrients

Appropriate QA/QC for Physical Habitat and Bioassessment Studies

QA/QC for Citizen Monitoring

QAPP Review for the SWRCB DFA

Water Environment Research Foundation Grants

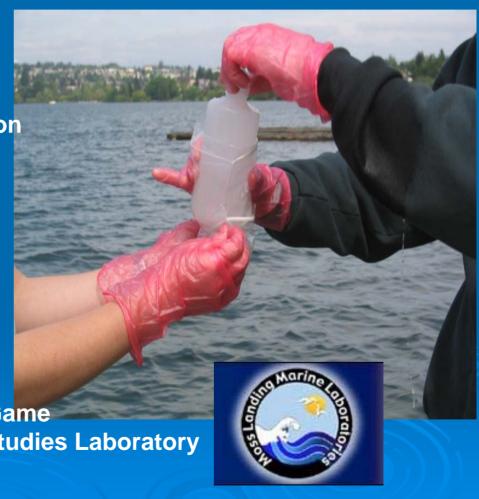
Contact Information

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California Department of Fish and Game Granite Canyon Aquatic Pollution Studies Laboratory c/o: 4580 Blufftop Lane Hydesville, CA 95547



Intercomparison Study 2 - Freshwater

- Sample collected from Lake Washington, Seattle, WA (lat. 47.37, long. -122.19)
- > Filtered (0.45 µm) prior to processing
- Background concentration (n=1) < MDL</p>
- > 20 L of sample was spiked with 100 ng Hg(II)
- \gt Final concentration of 5.56 \pm 0.11 ng/L (n=7)
- > 10 L of sample was spiked with 1.5 ng MMHg
- Final concentration of 0.173 + 0.11 ng/L (n=7)
- > 1-L bottles cleaned and tested prior to use
- Referee Lab analyzed randomly selected subsamples

Intercomparison Study 2 - Sediment

- IAEA-SL-1 Total Mercury in Sediment Reference Sample
- Reference value of 130 ng/g THg (n=5)
- Study reference value of 3.44 ± 0.36 ng/g (n=7) obtained by Referee Lab
- > ERM-CC580 Estuarine Sediment for methylmercury
- Certified value of 75 ng/g (n=11); total Hg reference value 132 ng/g
- Tested lot# of 20-mL vials prior to use
- Samples stored in a dedicated sample desiccator
- Referee Lab analyzed randomly selected sub-samples

Intercomparison Study 2 - Tissue

- IAEA-407 Total Mercury in Fish Tissue Reference Sample
- Reference value of 222 ng/g THg (n=74)
- IAEA-407 Methylmercury in Fish Tissue Reference Sample
- Reference value of 200 ng/g MMHg (n=16)
- Tested lot# of 20-mL vials prior to use
- Samples stored in a dedicated sample desiccator
- Referee Lab analyzed randomly selected subsamples