Adaptive Monitoring

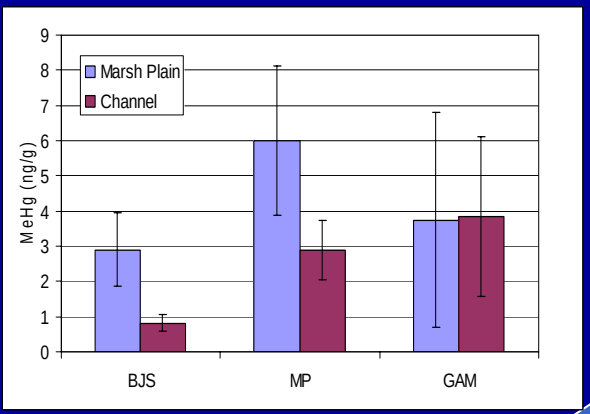
Meg Sedlak
San Francisco Estuary Institute

RMP Annual Meeting
September 12th, 2006

Mt Kilimanjaro ~ 1970s

Mt Kilimanjaro today

Adaptive Monitoring and the RMP



Regulatory Priorities

Understanding of the Bay

Management of Bay

Astronaut photograph of the South Bay Salt Ponds. Image courtesy of the Image Analysis Laboratory, NASA Johnson Space Center.

Adapt the RMP through:

1) Pilot Studies/Special Studies (short term)
2) Status & Trends (longer term)

Adaptive Management Requires Quick Turnaround

AXYS TECHNOLOGIES INC.

Organics (Water): Todd Fisher, Dale Hoover, Georgina Brooks, & Richard Grace

BROOKSRAND TRACE METALS ANALYSIS & PRODUCTS

Metals: Colin Davies & Elizabeth Madonick

East Bay Municipal Utility District

Organics (Sediment): Nirmela Arsem, Francois Rodigari & Saskia van Bergen

UC SANTA CRUZ Environmental Toxicology Linking Human Health, Microbiology and the Environment

Metals: Russ Flegal, Genine Scelfo, Sharon Hibdon, & Kit Conaway

UCDAVIS UNIVERSITY OF CALIFORNIA

Toxicity: Brian Anderson & Bryn Phillips, John Hunt

SEAL OF THE CITY AND COUNTY OF SAN FRANCISCO

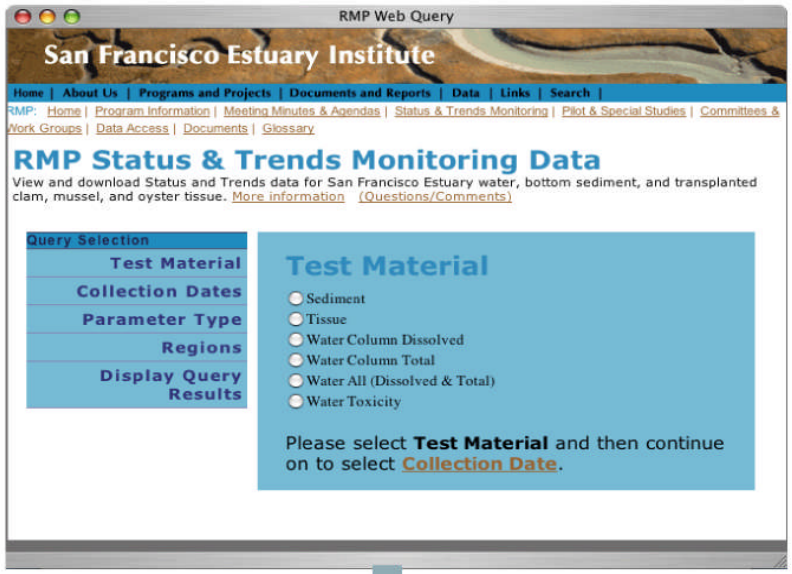
Metals (Sediment): Lonnie Butler & Toni Rattonetti

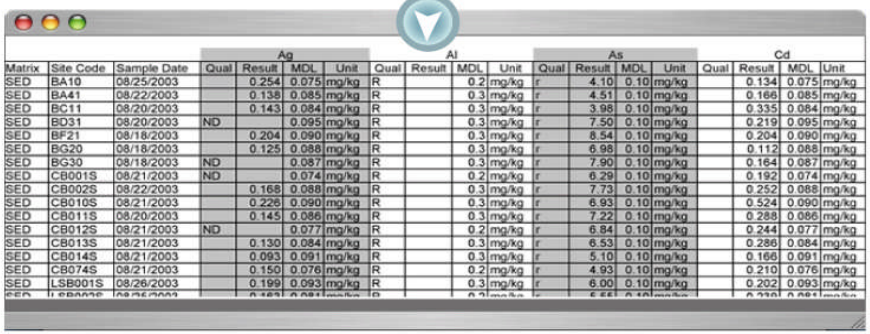
CALIFORNIA DEPARTMENT FISH&GAME

Tissues: Dave Crane & Loc Nguyen


AXYS TECHNOLOGIES INC.
BROOKSRAND
TRACE METALS ANALYSIS & PRODUCTS
UCDAVIS
UNIVERSITY OF CALIFORNIA
East Bay Municipal Utility District
Environmental Toxicology
CALIFORNIA
FISH&GAME
APPLAUSE

Adaptive Management Requires Easily Accessible Data

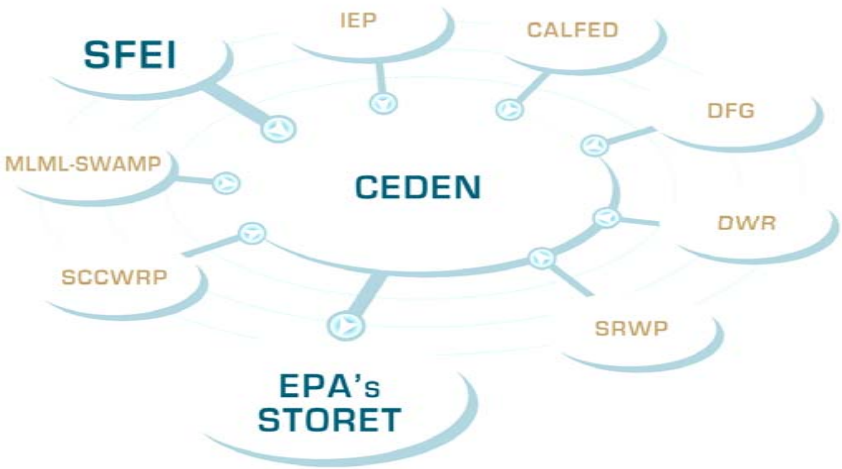




Matrix	Site Code	Sample Date	Ag Qual	Ag Result	Ag MDL	Ag Unit	Al Qual	Al Result	Al MDL	Al Unit	As Qual	As Result	As MDL	As Unit	Cd Qual	Cd Result	Cd MDL	Cd Unit
SED	BA10	08/25/2003		0.254	0.075	mg/kg	R		0.2	mg/kg	r	4.10	0.10	mg/kg		0.134	0.075	mg/kg
SED	BA41	08/22/2003		0.138	0.085	mg/kg	R		0.3	mg/kg	r	4.51	0.10	mg/kg		0.166	0.085	mg/kg
SED	BC11	08/20/2003		0.143	0.084	mg/kg	R		0.3	mg/kg	r	3.98	0.10	mg/kg		0.335	0.084	mg/kg
SED	BD31	08/20/2003	ND		0.095	mg/kg	R		0.3	mg/kg	r	7.50	0.10	mg/kg		0.219	0.095	mg/kg
SED	BF21	08/18/2003		0.204	0.090	mg/kg	R		0.3	mg/kg	r	8.54	0.10	mg/kg		0.204	0.090	mg/kg
SED	BG20	08/18/2003		0.125	0.088	mg/kg	R		0.3	mg/kg	r	6.98	0.10	mg/kg		0.112	0.088	mg/kg
SED	BG30	08/18/2003	ND		0.087	mg/kg	R		0.3	mg/kg	r	7.90	0.10	mg/kg		0.164	0.087	mg/kg
SED	CB001S	08/21/2003	ND		0.074	mg/kg	R		0.2	mg/kg	r	6.29	0.10	mg/kg		0.192	0.074	mg/kg
SED	CB002S	08/22/2003		0.168	0.088	mg/kg	R		0.3	mg/kg	r	7.73	0.10	mg/kg		0.252	0.088	mg/kg
SED	CB010S	08/21/2003		0.226	0.090	mg/kg	R		0.3	mg/kg	r	6.93	0.10	mg/kg		0.524	0.090	mg/kg
SED	CB011S	08/20/2003		0.145	0.086	mg/kg	R		0.3	mg/kg	r	7.22	0.10	mg/kg		0.288	0.086	mg/kg
SED	CB012S	08/21/2003	ND		0.077	mg/kg	R		0.2	mg/kg	r	6.84	0.10	mg/kg		0.244	0.077	mg/kg
SED	CB013S	08/21/2003		0.130	0.084	mg/kg	R		0.3	mg/kg	r	6.53	0.10	mg/kg		0.286	0.084	mg/kg
SED	CB014S	08/21/2003		0.093	0.091	mg/kg	R		0.3	mg/kg	r	5.10	0.10	mg/kg		0.166	0.091	mg/kg
SED	CB074S	08/21/2003		0.150	0.076	mg/kg	R		0.2	mg/kg	r	4.93	0.10	mg/kg		0.210	0.076	mg/kg
SED	LSB001S	08/26/2003		0.199	0.093	mg/kg	R		0.3	mg/kg	r	6.00	0.10	mg/kg		0.202	0.093	mg/kg

http://www.sfei.org/RMP/report

- Increasing data access
  - Web query
  - State network node
- Formats that are comparable with state agencies



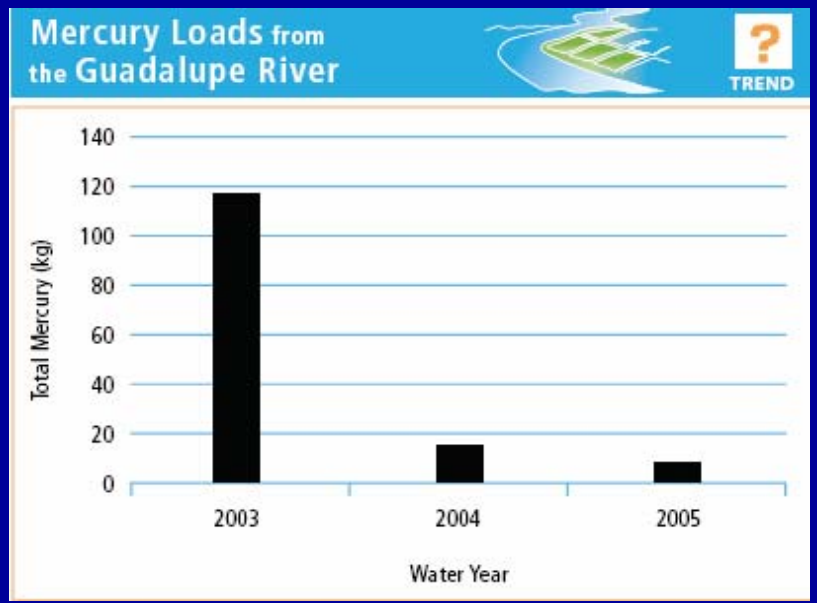
Providing Information

- Pulse
- Annual Monitoring Results
- Newsletters
  - RMP Newsletter/ Hg News
- Workshops
  - Hg
  - PAHs
  - Pyrethroids
  - Benthos
- Annual Meeting

RMP ANNUAL MEETING 2006

Measuring fluxes into the Bay….

- SS 2007: Small Tributary Loading Study
  - Continuation of characterization of loads from urban runoff
  - Small industrialized watershed



Measuring fluxes into the Bay... and out of the Bay

- SS 2007: Remote Sensing of the Bay
  - Using satellite images to characterize fluxes during episodic events

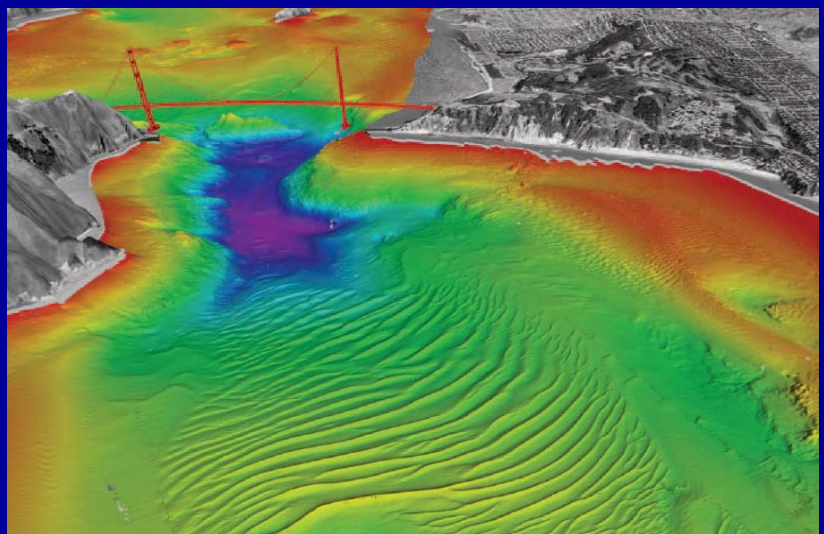
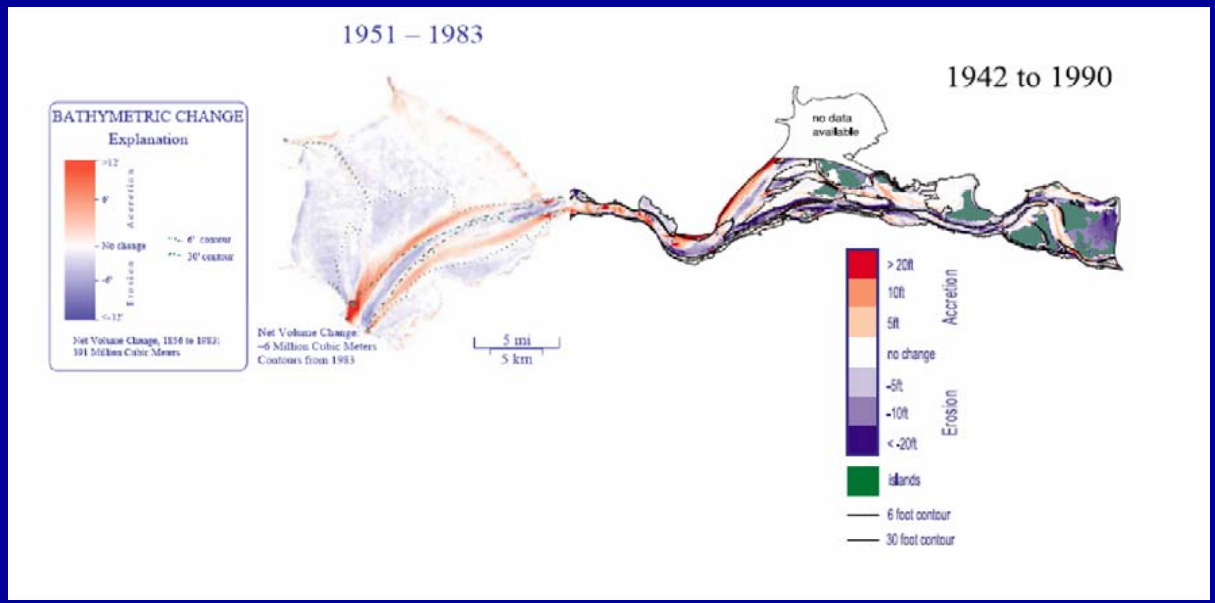


Photo courtesy of USGS

2006 SS CEP/RMP Coring Study

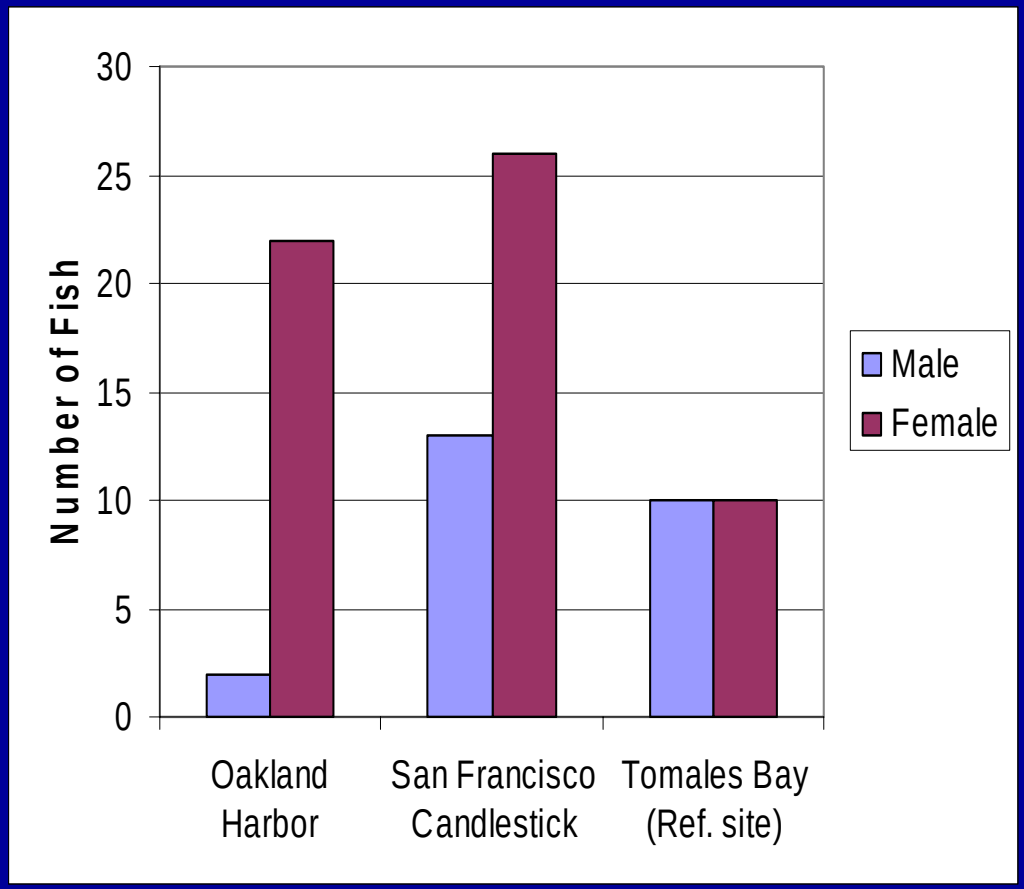
- Sediment inventory will control recovery
- SFEI/AMS collecting cores in Bay and wetlands
  - Segment, radiodate and conduct chemical analyses



Exposure & Effects Pilot Study

- Changing regulatory focus:
  - Increase focus on biota in TMDL (e.g., fish and birds)
- Changing management of Bay
  - Need to understand impact of wetland restoration
- EEPS goal:
  - Develop tools for assessing impacts to biota. Incorporate into S&T.

EEPS 2006
Shiner Surfperch



- Effects of contamination on health
  - Examining wide variety of indices (sex ratios, offspring, choriogenin, histopathology)
- Altered sex ratios in the Bay

Source: Spies and Springman, unpub. data

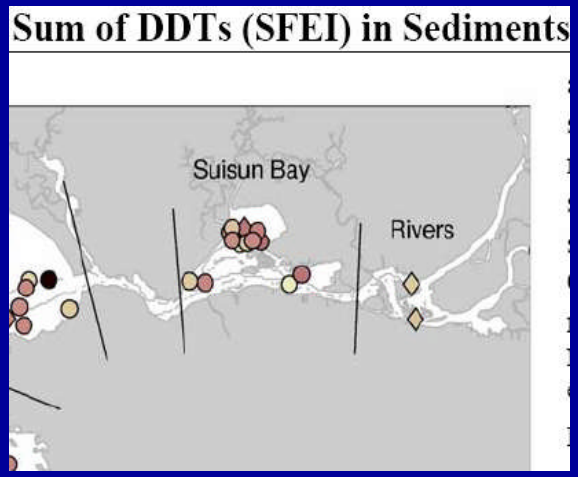
EEPS 2006
Endocrine disruption in fish

- Impairment of endocrine system in fish in So CA Bight
  - Kevin Kelley, CSU-Long Beach
  - Suppression of growth, defense capabilities & reproduction
- RMP study
  - Measure cortisol, estradiol, testosterone, and insulin-like growth factors in SF fish

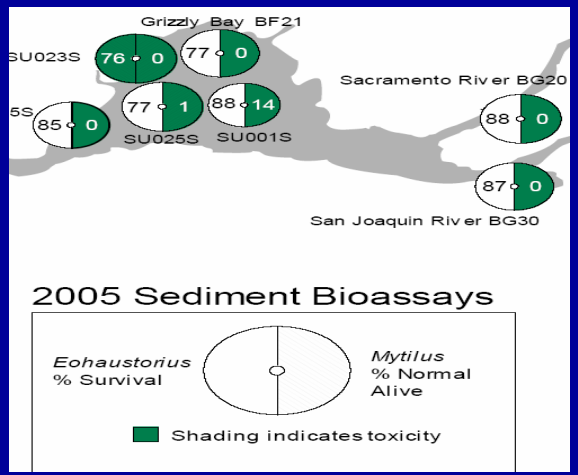
Shiner surfperch

Pacific staghorn sculpin

Sediment chemistry



Sediment toxicity



Benthic assemblage

EEPS 2006: Benthos

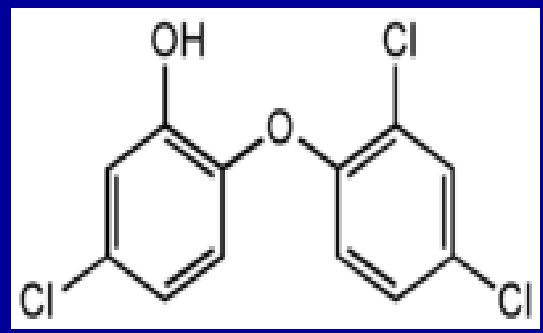
- Sediment Quality Objectives (SQOs)
  - Triad approach
  - Scheduled to be promulgated 2008
- Need to understand causes of sediment toxicity

Emerging Contaminants

- Increasing focus on emerging contaminants (EC)
- RMP formed EC Workgroup
  - Strategy for identifying ECs
  - Criteria for inclusion into S&T
  - Recommendations for 2007 PS/SS
    - Pharmaceuticals/personal care products in Bay
    - PFOS/PBDE in seals

Emerging Contaminants in Effluent and the Bay

- Determine concentrations of pharmaceuticals and personal care products in:
  - Influent/effluent from two WWTP
  - Ten stations in South Bay
- In-kind contributions
  - City of Palo Alto (Karin North)
  - City of San Jose (Dave Tucker)
  - AXYS analytical (Million Woudneh)



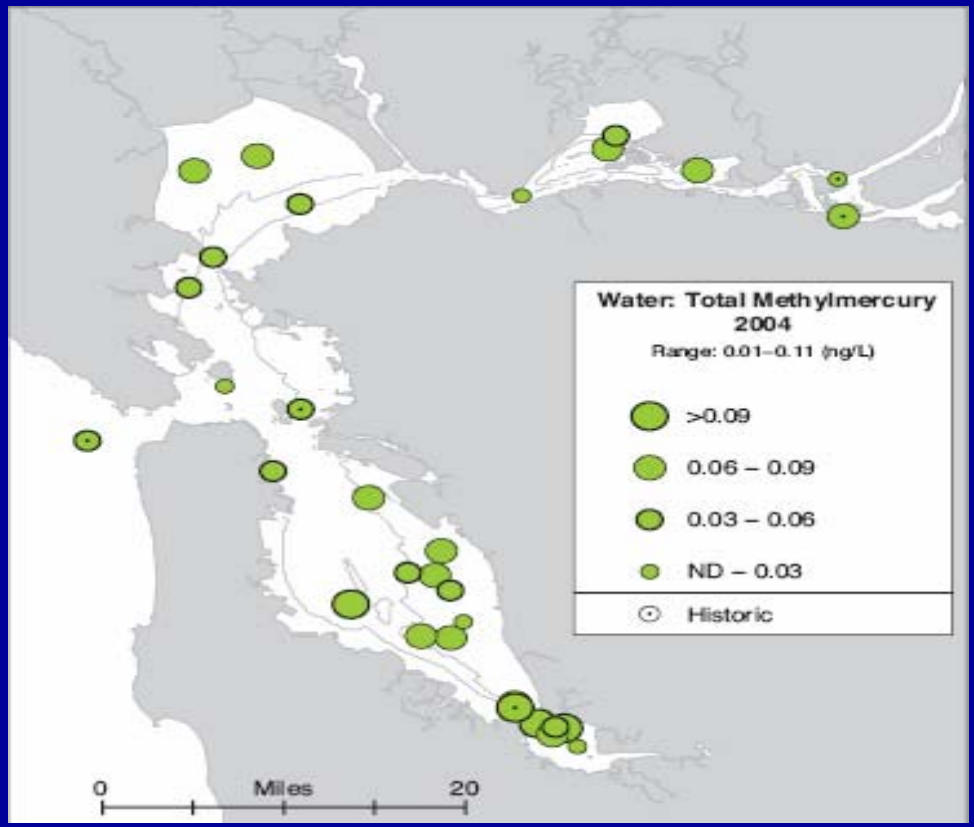
Triclosan

Perfluorinated Compounds

- Widely-used
- Detected worldwide
- Deleterious health effects
- Collaborating w/ Marine Mammal Center to look at apex predators

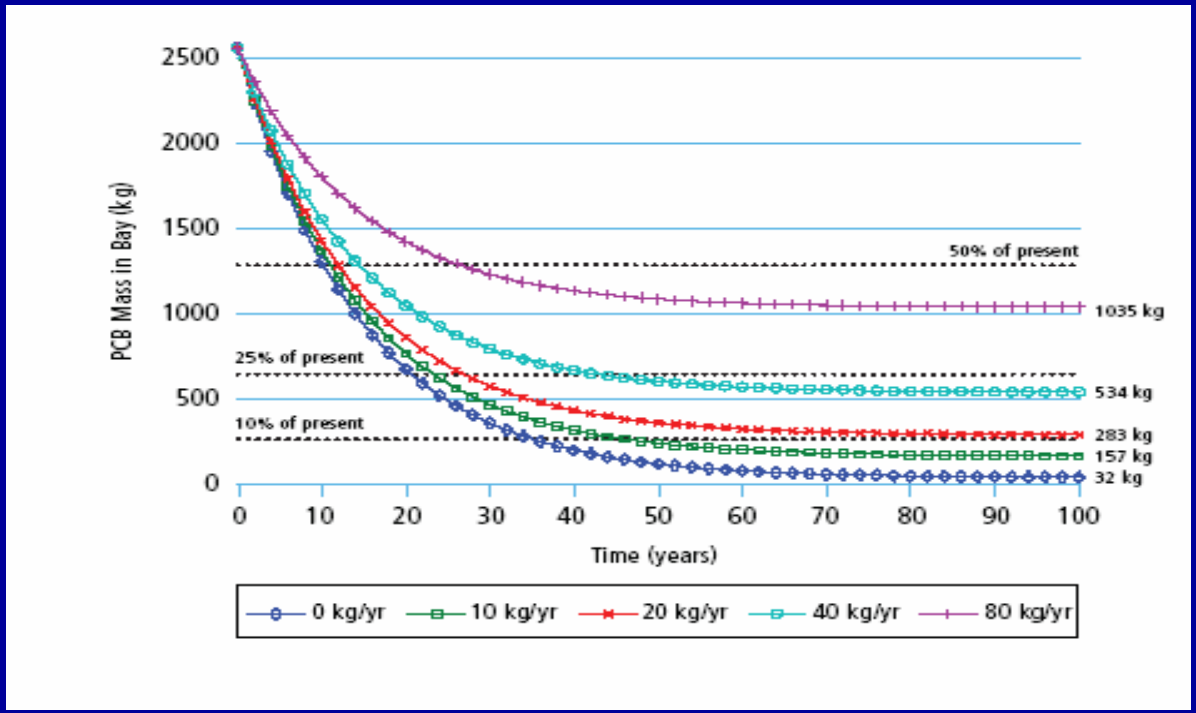
Adaptive Monitoring Redesigning S&T

- Addressing RMP Objectives?
  - 1. Describe distribution and trends



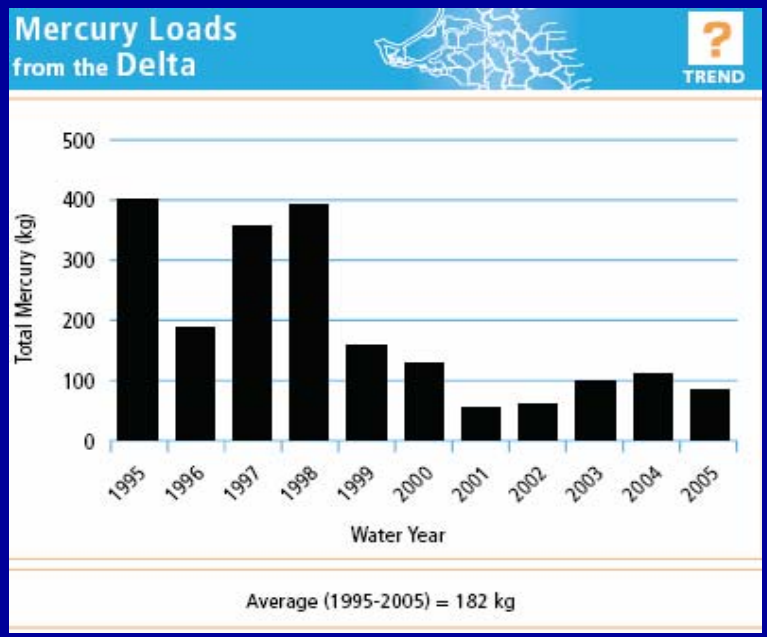
Adaptive Monitoring Redesigning S&T

- Addressing RMP Objectives?
  - 1. Describe distribution and trends
  - 2. Project future contaminant status and trends



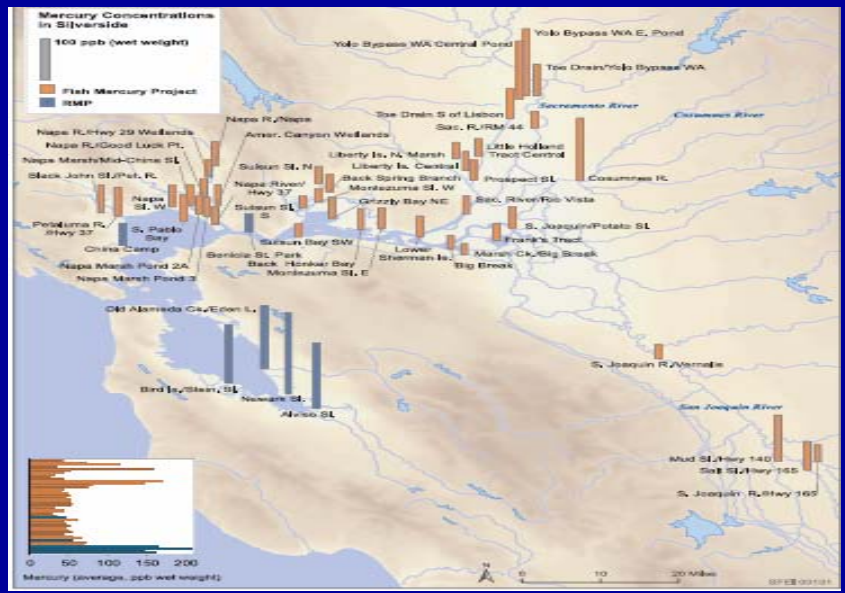
Adaptive Monitoring Redesigning S&T

- Addressing RMP Objectives?
  - 1. Describe distribution and trends
  - 2. Project future contaminant status and trends
  - 3. Describe sources pathways and loading of pollutants



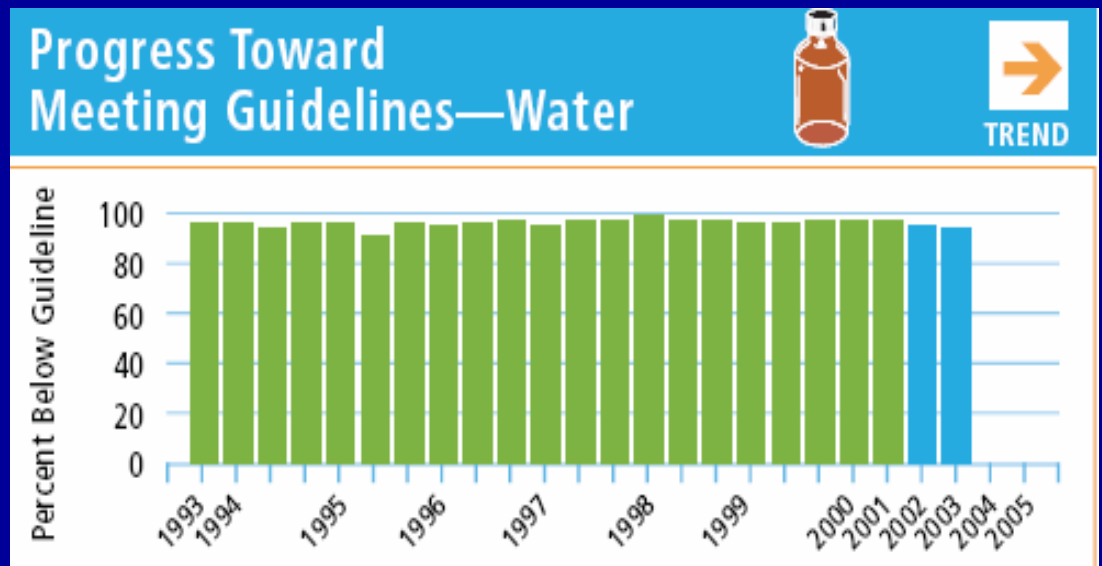
Adaptive Monitoring Redesigning S&T

- Addressing RMP Objectives?
  - 1. Describe distribution and trends
  - 2. Project future contaminant status and trends
  - 3. Describe sources pathways and loading of pollutants
  - 4. Measure exposure and effects



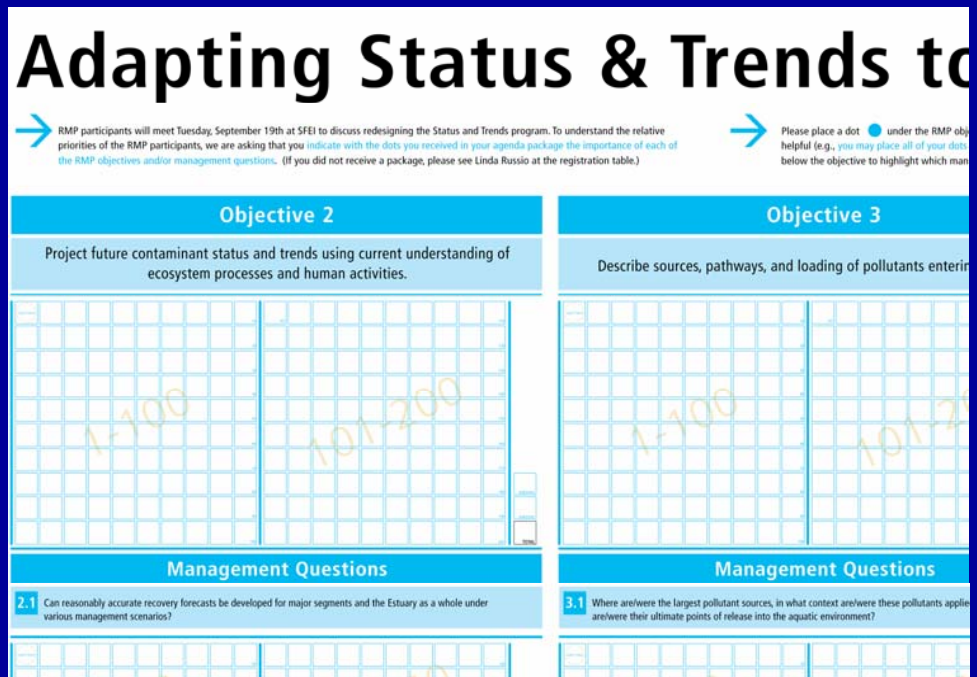
Adaptive Monitoring Redesigning S&T

- Addressing RMP Objectives?
  - 1. Describe distribution and trends
  - 2. Project future contaminant status and trends
  - 3. Describe sources pathways and loading of pollutants
  - 4. Measure exposure and effects
  - 5. Compare to guidelines (TMDLs, WQOs, SQOs, etc.)



Adaptive Monitoring Redesigning S&T

- Redesign Meeting -- September 19th
- Asking for your vote TODAY
  - Dots in your agenda package
  - Can vote for RMP objective or specific management question
- Votes compiled for meeting
- RSVP for a good seat
  - Meg@sfei.org


Adapting Status & Trends to

RMP participants will meet Tuesday, September 19th at SFEI to discuss redesigning the Status and Trends program. To understand the relative priorities of the RMP participants, we are asking that you indicate with the dots you received in your agenda package the importance of each of the RMP objectives and/or management questions. (If you did not receive a package, please see Linda Russio at the registration table.)

Please place a dot under the RMP obj
helpful (e.g., you may place all of your dots
below the objective to highlight which man

Objective 2

Project future contaminant status and trends using current understanding of ecosystem processes and human activities.

Management Questions

2.1 Can reasonably accurate recovery forecasts be developed for major segments and the Estuary as a whole under various management scenarios?

Objective 3

Describe sources, pathways, and loading of pollutants enterir

Management Questions

3.1 Where are/were the largest pollutant sources, in what context are/were these pollutants applie
are/were their ultimate points of release into the aquatic environment?

Adaptive Monitoring

- *Change is the law of life. And those who look only to the past or present are certain to miss the future.*

John F. Kennedy (35th US President)

Adaptive Monitoring

- *Change is the law of life. And those who look only to the past or present are certain to miss the future.*

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- *I skate to where the puck is going to be, not where it has been.*

  Wayne Gretzky (US Hockey Player)

Questions?

Photo courtesy of Nicole David