

Item #8

Nutrients in the Bay:

Developing Nutrient Numeric Endpoints for California Estuaries

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RMP TRC meeting presentation

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Preliminary : Do not cite or quote

Table x. Reported harmful algal blooms in San Francisco Bay since 1995.

| Map ID | Author | Bloom Type | Bloom Location(s) | Bloom Date(s) |
|--------|-------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------|
| 1 | Lehman and Waller, 2003 | Cyanobacteria: <i>Microcystis aeruginosa</i> | Delta | July-November, 1999-2002 |
| 2 | Herndon et al., 2003 | Red Tide: raphidophyte <i>Heterosigma akashiwo</i> | Richardson Bay | June, July, and Sept 2002 |
| 3 | Cloern et al., 2003 | Red Tide: raphidophyte <i>Heterosigma akashiwo</i> | Central Bay | September 2002 |
| 4 | Lehman et al., 2005 | Cyanobacteria: <i>Microcystis aeruginosa</i> | 180 km of waterways in northern SF Bay (Carquinez Straight to Suisun and Rivers segments). | October 2003 |
| 5 | Lehman et al., 2008 | Cyanobacteria: <i>Microcystis aeruginosa</i> | Rivers | August, September 2004 |
| 6 | Cloern et al., 2005 | Red Tide: dinoflagellate <i>Akashiwo sanguinea</i> | Central and South Bay (Angel Island down into South Bay) | September 2004 |



So what is a NNE?

| Nutrient sources, concentrations, loads | Nutrient numeric endpoint (NNE) | Beneficial use |
|-----------------------------------------------|-------------------------------------------------|-------------------|
| Phosphate | Algal / macro-algal / macrophyte blooms | REC1 |
| Total P | Algal / macro-algal / macrophyte blooms | COMM |
| Nitrate | Harmful algal blooms (HAB) | MIGR |
| Nitrite | Hypoxia/anoxia | SPWN |
| Ammonia | Submerged aquatic vegetation (SAV) trends | REC2 |
| TKN | Ammonia toxicity and effects | WILD |
| Total N | Enhanced aquatic transfer of trace contaminants | RARE |
| Organic N and P | | SHELL |
| | | EST |



Objectives

- EPA 2008 identified a need to better summarize the state of the existing science in SF Bay, identify data gaps, and propose a specific suite of work elements required to address these data gaps...
- The objective is to review the information to determine the validity (sensitivity and data availability) of each indicator variable for tracking water quality
- The objective is not to review water quality in SF Bay with regard to beneficial uses or water quality criterion



California Estuarine Classification

Estimated Number of Estuaries by Class

| Class | RB 1 | RB 2 | RB 3 | RB 4 | RB 8 | RB 9 | Total |
|-------------------------------|------|------|------|------|------|------|-------|
| Enclosed Embayment | 2 | 1 | 1 | 8 | 2 | 4 | 18 |
| Perennially Tidal Lagoon | 4 | 3 | 5 | 5 | 3 | 6 | 26 |
| Seasonally Tidal Lagoon | 5 | 4 | 29 | 3 | 0 | 5 | 46 |
| Nontidal Lagoon | 9 | 3 | 10 | 2 | 0 | 7 | 31 |
| Perennially Tidal River Mouth | 4 | 0 | 0 | 6 | 2 | 6 | 18 |
| Seasonally Tidal River Mouth | 68 | 5 | 61 | 13 | 2 | 1 | 150 |
| SF Estuary | | 1 | | | | | 1 |
| Total | 92 | 17 | 106 | 37 | 9 | 29 | 290 |

Source (EPA 2008)



Contract outline

- **TASK 1 – Project Administration and Reporting**
- **TASK 2 – Summarize Existing Science of SF Bay nutrient cycling and eutrophication**
- ***TASK 3 – General Technical Support to SCCWRP***



Contract outline

- **Task 2.1 – Outline for Literature Review and Workplan
(Hand out)**

- **Task 2.2 Develop and coordinate a San Francisco Bay
Technical Team
(Hand out)**

- **Task 2.3 – Literature Review**

- **Task 2.4 - Develop and recommend a work plan to address
data gaps**



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San Leandro Bay

(05/26/09)

