# SB 1070 Theme-Based Portals and Fact Sheets

## Introduction

This document describes a concept for using "theme-based web portals" as a means for organizing broader access to water quality and related data in California in order to meet the goals of SB 1070. These themes correspond to broad questions of interest both to managers and to the public and the portals are envisioned as providing a variety of levels of access to data analysis and assessment results, as well as to information on study designs and raw monitoring data.

The proposed themes reflect the strategic set of topics identified by the Surface Water Ambient Monitoring Program (SWAMP) for organizing a wide-reaching, statewide assessment program. The current status of the state's ability to readily provide information on each theme is illustrated with representative webpages and assessment products and evaluated in terms of the 10 Elements of a State Water Monitoring and Assessment Program (USEPA 2003), which define the basic elements of an effective water quality monitoring program:

1. Strategy
2. Monitoring objectives
3. Monitoring design
4. Indicators
5. Quality assurance
6. Data management
7. Data analysis and assessment
8. Reporting
9. Programmatic evaluation
10. General support and infrastructure planning

These elements are essential to any monitoring and assessment effort that seeks to provide information useful in decision making and have been adopted by the Surface Water Ambient Monitoring Program (SWAMP) as the core structure of its statewide assessment program (Comprehensive Monitoring and Assessment Strategy, http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/cw102swampcmas.pdf).

The example cases presented for each theme are intended to fulfill the following purposes:

- Illustrate how the 10 elements provide a framework for evaluating monitoring and assessment programs and for highlighting aspects that require additional development
- In doing so, provide an initial set of benchmarks for tracking progress toward meeting the goals of SB 1070
- Identify themes, and related programs, that have met the criteria for technical rigor, coordination, and public access laid out in SB 1070
- Prioritize themes for further development both in 2008 and in subsequent years

Each theme is described in a fact sheet intended to furnish background information that supports the summary rating on the 10 elements and provides information for discussion by Monitoring Council members. Fact sheets for each theme are organized according to the following template:

- Title

- Website(s) (if applicable)
- Sponsor(s)
- Contact(s) (for purposes of this reporting effort only)
- Brief description, including purpose
- Evaluation of how well the theme meets the 10 elements
- Sample webpages
- Sample assessment products

## Theme-Based Portal Concept

The Monitoring Council described a concept of theme-based portals that would provide ready access to a variety of assessment information.

These themes, though not yet explicitly defined, fall into two categories. One category would address core assessment questions or concerns, such as: Is seafood safe to eat? Is it safe to swim at the beach? What is the condition of streams? A second category would include certain kinds of foundational data (e.g., flow, landscape maps) that are needed for the assessment of questions about condition, status, or trends. Most of the case studies fall into the first category, with the remainder falling into the second.

The term portal refers to a web-based access point that would enable users to access data and assessment results from the perspective of a broadly meaningful question, and download data as needed. An effective portal would enable users to view issues, assessment results, and data from a variety of different views. Such views might include different spatial scales (national, statewide, regional, county, watershed, and local or site-specific). Perspectives could also include different assessment thresholds, supported by pre-programmed tools that would view the data through different screens. For example, USEPA suggests a range of risk levels in their guidance documents for assessing seafood consumption safety, while OEHHA uses a $10^{-4}$ risk level to account for the health benefits of consuming fish. Beach bacteria data provide another example, where users might want to screen the data in terms of comparison to compliance standards, the number and location of advisories, or the report card scores (i.e., A, B, C, D).

Portals should enable users to readily move between larger and smaller spatial scales as desired, and to access relevant data at each scale. For example, a discharger in the San Gabriel River might want to compare their bioassessment data to assessment results from the regional and then the statewide scales. This discharger should be able to obtain the assessment results at those different levels, and then be able to access reports, data, and assessment tools as needed.

A useful template for what a portal should look like is provided by the State of the USA website, www.stateoftheusa.org, which has the National Academies as a strategic partner and is funded by major foundations. This project aims to provide theme-based, question-driven access to reliable data and information on a range of environmental, economic, and social issues.

## Proposed Themes

A variety of assessment programs have identified one or more of the following themes as focal points for their activities. Taken together, these themes the goals of the major ongoing monitoring and assessment efforts currently managed by The Resources Agency, CalEPA (especially the State Water Quality Control Board), and Department of Public Health. The proposed themes include:

- Swimming safety (related to pathogen contamination)
- Seafood consumption safety
- Drinking water safety

- Status of aquatic life

Each theme can be addressed in one or more of the following habitats:

- Streams
- Rivers
- Lakes
- Groundwater
- Coastal waters
- Bays and estuaries
- Wetlands
- Intertidal

Combining these overarching themes and habitats results in the matrix shown in Table 1, each cell of which can potentially be considered a distinct subtheme.

Table 1. Major subthemes resulting from the combination of core assessment questions and relevant habitats throughout the state.

| | Habitats | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Freshwater | | | | Marine and coastal | | | |
| Themes | Streams | Rivers | Lakes | Ground-water | Coastal waters | Bays & estuaries | Wetlands | Intertidal |
| Swimming safety | X | X | X | | X | X | | |
| Seafood consumption safety | X | X | X | | X | X | | |
| Drinking water safety | X | X | X | X | | | | |
| Status of aquatic life | X | X | X | | X | X | X | X |

# Theme Fact Sheets

The following fact sheets score the current status of each theme in terms of the US EPA's ten elements of monitoring program design according to the scoring benchmarks in table 2.

Table 2. Scoring benchmarks for evaluating the degree to which each of the theme-based portals meets the ten evaluation criteria for monitoring and assessment programs.

| Ten elements | Scoring benchmarks |
|---|---|
| Strategy | 0: No core questions; no, or many undifferentiated, target audiences<br>5: Core questions and target audiences implicit in program design<br>10: Core questions standardized, clearly stated, and focused on specific audience(s) |
| Monitoring objectives | 0: Data collection not organized around objectives, or many conflicting objectives<br>5: Objectives implicit but are only partly standardized and used to direct design effort<br>10: Clearly stated and common objectives address standardized core questions and inform all aspects of design |
| Monitoring design | 0: Monitoring efforts uncoordinated, not focused on questions or |

| | |
|---|---|
| | objectives<br>5: Monitoring efforts focused on objectives, but are poorly documented and not coordinated statewide<br>10: Standardized, optimized, and clearly documented design that meets monitoring objectives |
| Indicators | 0: Indicators uncoordinated, not validated<br>5: Indicators validated but not standardized statewide<br>10: Standardized, scientifically validated, and clearly documented indicators |
| Quality assurance | 0: No QA procedures or plan<br>5: QA procedures exist but are poorly matched to objectives and not standardized statewide<br>10: Standardized and clearly documented QA procedures match monitoring objectives |
| Data management | 0: No data management procedures or documentation<br>5: Data management procedures exist but are not standardized statewide and only poorly support access to data<br>10: Standardized and clearly documented data management procedures are standardized statewide and fully support access to data at multiple levels |
| Data analysis and assessment | 0: No data analysis or assessment procedures used or documented<br>5: Data analyzed but methods not standardized; assessment tools exist but not fully validated or standardized<br>10: Data analysis methods and assessment tools fully validated, clearly documented, and standardized statewide |
| Reporting | 0: No reporting process or products<br>5: Intermittent reports, available with some effort<br>10: Readily available regular reports focused on core questions and objectives; ability to create user reports from multiple perspectives |
| Programmatic evaluation | 0: No systematic program evaluation<br>5: Intermittent internal program review<br>10: Regular external program evaluations |
| General support and infrastructure planning | 0: No formal planning<br>5: Intermittent planning that may or may not include infrastructure needs<br>10: Regular planning for all program needs |

Table 3. Scores for each major theme or subtheme on the ten elements of successful monitoring and assessment programs. Scores are assigned relative to the benchmarks in Table 2 and details are provided in the fact sheets below.

| Potential data / issue portals | Ten Essential Assessment Program Elements | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Strategy | Objectives | Design | Indicators | QA | Data Manag | Analysis / Assessment | Reporting | Evaluation | Support / Planning |
| *Swimming safety* | | | | | | | | | | |
| Freshwater: no cases available | 7 | 4 | 0 | 10 | 2 | 0 | 0 | 0 | 0 | 0 |
| Coastal waters, bays & estuaries | 10 | 10 | 7 | 9 | 5 | 8 | 10 | 10 | 0 | 0 |
| *Seafood consumption safety* | | | | | | | | | | |
| Sportfish, all habitats | 8 | 8 | 10 | 10 | 10 | 6 | 10 | 7 | 0 | 0 |
| Shellfish, coastal waters, bays & estuaries | 10 | 10 | 5 | 4 | 5 | 5 | 7 | 8 | 0 | 0 |
| *Drinking water safety* | | | | | | | | | | |
| Surface water | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 8 | 10 | 0 |
| Groundwater | 8 | 8 | 8 | 8 | 5 | 6 | 10 | 9 | 0 | 0 |
| *Status of aquatic life* | | | | | | | | | | |
| Streams (wadeable) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 8 | 3 | 3 |
| Streams – fisheries | 10 | 7 | 7 | 6 | 5 | 7 | 7 | 7 | 0 | 0 |
| Coastal waters – reefs | 7 | 10 | 10 | 10 | 6 | 7 | 6 | 6 | 0 | 0 |
| Coastal waters – aquatic life contamination | 10 | 10 | 10 | 10 | 10 | 0 | 5 | 0 | 0 | 0 |
| Bays and estuaries – sediment quality | 10 | 10 | 5 | 10 | 5 | 3 | 10 | 4 | 0 | 0 |
| Bays and estuaries – San Francisco Bay | 10 | 10 | 10 | 10 | 10 | 10 | 8 | 10 | 10 | 10 |
| Wetlands | 10 | 10 | 7 | 10 | 5 | 7 | 8 | 7 | 0 | 0 |
| Intertidal | 10 | 5X | 10 | 10 | 3 | 4 | 7 | 10 | 0 | 0 |
| *Inventories* | | | | | | | | | | |
| Bay Delta and Tributaries Project (BDAT) | 10 | NA | NA | 5 | 0 | 10 | NA | NA | 0 | 0 |
| California Data Exchange Center (CDEC) | 10 | 10 | 3 | 5 | 2 | 10 | 5 | 8 | 0 | 0 |
| California Spatial Information Library (CaSIL) | 10 | NA | NA | 5 | 0 | 10 | NA | 10 | 0 | 0 |
| California Environmental Information Clearing House (CEIC) | 6 | NA | NA | 2 | 0 | 6 | NA | NA | 0 | 0 |
| San Joaquin River Monitoring & Assessment Strategy – Monitoring Directory | 10 | NA | NA | NA | 6 | 7 | NA | 4 | 0 | 0 |

## *Theme: Swimming safety*

Swimming safety is a concern in streams, rivers, lakes, coastal waters, and bays and estuaries where body contact recreation has been designated as a beneficial use. Risks to human health are managed by freshwater and marine standards for permissible levels of a set of bacterial indicators. There is a coordinated program in place for assessing and reporting on risks in coastal waters and bays and estuaries, but no similar activity for freshwater systems.

### Subtheme: Freshwater swimming safety

**Website:** NA
**Sponsor:** Local and, in some cases, regional water quality agencies.
**Contact:** NA
**Description:** There is no web portal for freshwater monitoring data. There is little coordinated monitoring for human health risk in freshwater systems (i.e., streams, rivers, lakes) and no standardized assessment, reporting, or data access tools.
**Evaluation of 10 elements:**

1. Strategy: Freshwater monitoring (where it exists), focuses on a clear question, with specific audiences in mind
   **Score: 7**
2. Monitoring objectives: The monitoring objective is to meet management / assessment needs and the public's interest in reliable, current information about water quality conditions where body contact recreation occurs. This objective is often poorly articulated for freshwater systems
   **Score: 4**
3. Monitoring design: Monitoring designs for freshwater systems typically do not match the strategy and objectives, follow no standardized guidelines, and are not optimized for efficient information return
   **Score: 0**
4. Indicators: Indicators for all habitats are standardized and well developed
   **Score: 10**
5. Quality assurance: There is no standardized or systematic QA implemented for the various separate freshwater monitoring programs
   **Score: 2**
6. Data management: There are no systematic data management procedures or systems applicable to freshwater monitoring
   **Score: 0**
7. Analysis and assessment: There are no consistent data analysis or assessment procedures established for freshwater monitoring data
   **Score: 0**
8. Reporting: There are no reporting tools available for freshwater monitoring data
   **Score: 0**
9. Programmatic evaluation: There is no periodic program evaluation process for freshwater monitorin
   **Score: 0**
10. Program planning: There is no planning process for freshwater monitoring
    **Score: 0**

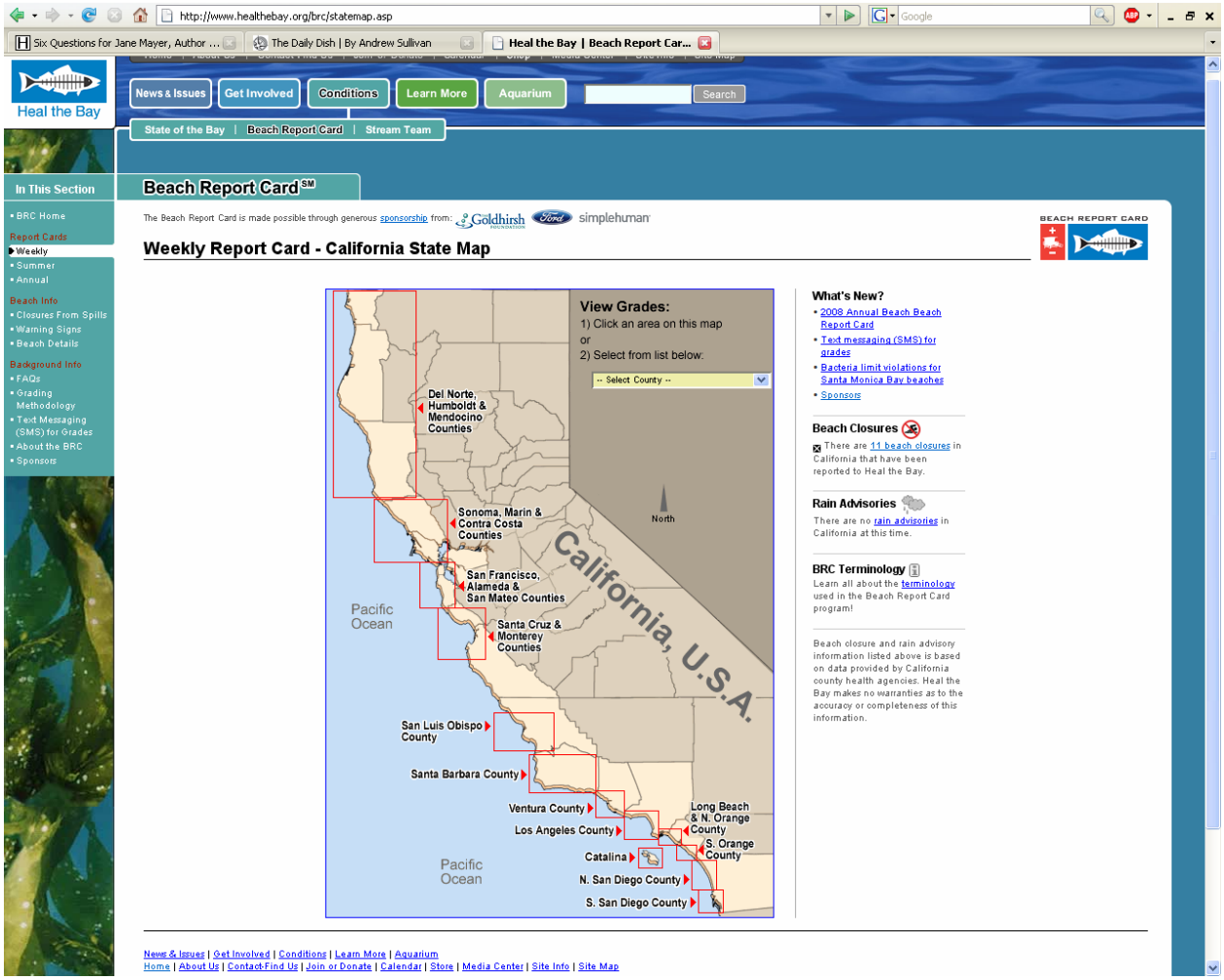
**Sample webpages:** NA
**Sample assessment products:** NA

## Subtheme: Coastal swimming safety

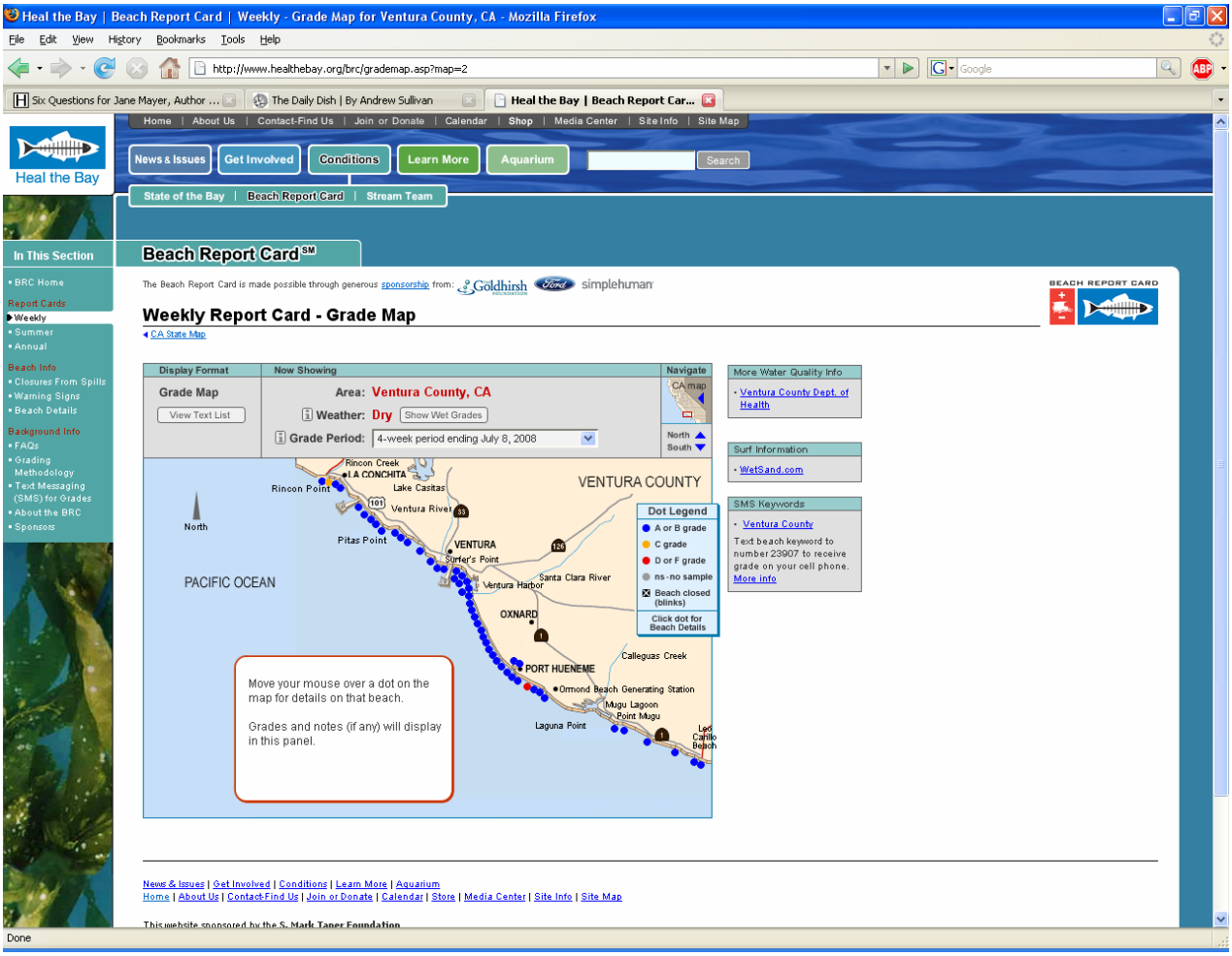
**Website**: http://www.healthebay.org/brc/statemap.asp
**Sponsor**: State Water Board, Heal the Bay
**Contact**: Steve Weisberg, SCCWRP
**Description**: For coastal waters and bays and estuaries, the Beach Report Card system hosted at Heal the Bay's website aggregates shoreline monitoring data collected at the county level into a statewide database. A standardized risk-based water quality grading system applied to all data generates report card grades that are presented on a map-based interface. The beach grading system was developed through a collaborative statewide effort.
**Evaluation of 10 elements**:

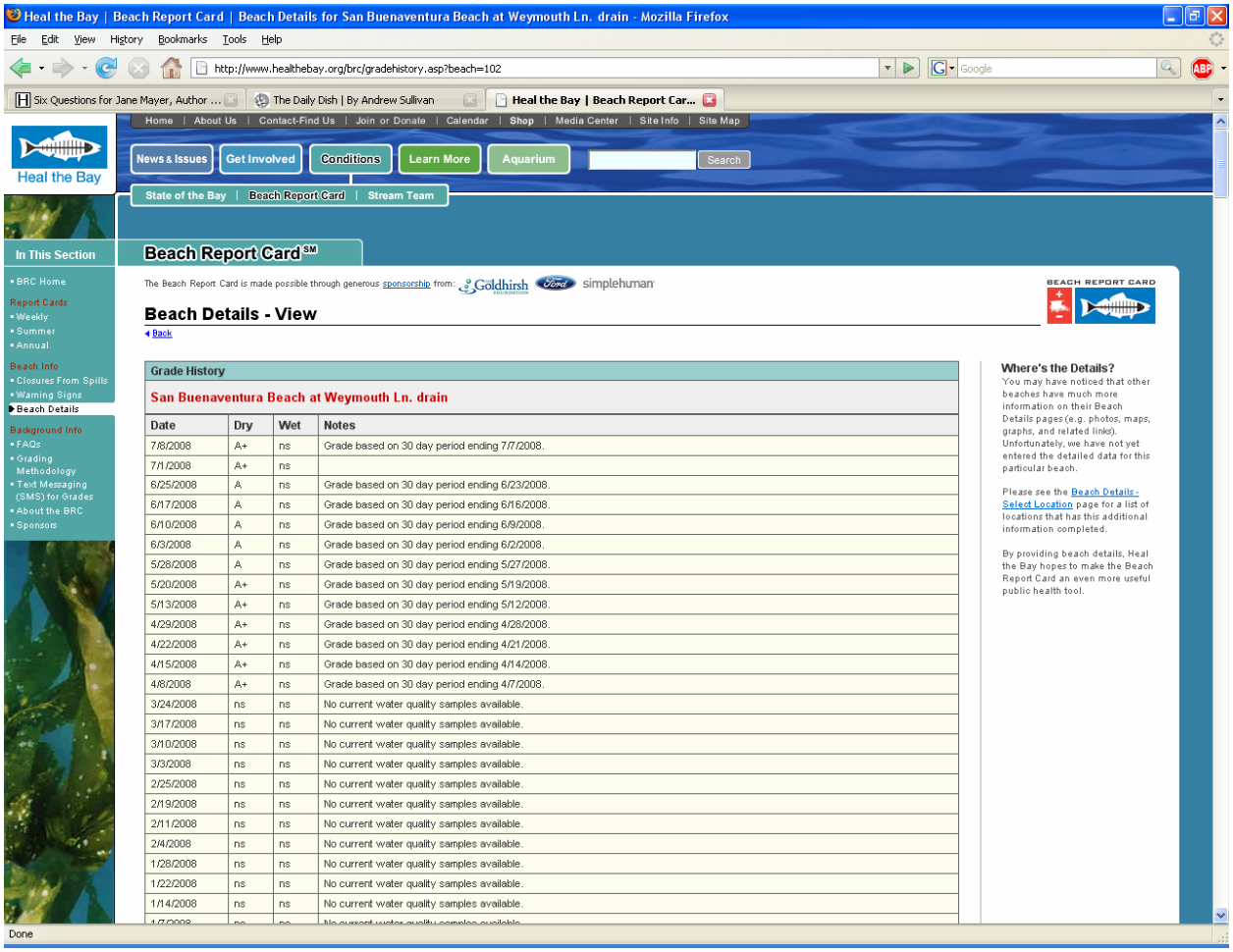
1. Strategy: The program asks and answers a clear question for specific audiences
   **Score: 10**
2. Monitoring objectives: The monitoring objective is clearly articulated and related to monitoring designs. The objective is to meet management / assessment needs and the public's interest in reliable, current information about water quality conditions where body contact recreation occurs
   **Score: 10**
3. Monitoring design: Monitoring designs match the strategy and objective and follow guidelines established by the State Water Board's Beach Water Quality Workgroup. However, designs implemented by local and regional agencies are not fully standardized
   **Score: 7**
4. Indicators: Indicators for all habitats are standardized and well developed; however, they are not described or referenced on the Beach Report Card website
   **Score: 9**
5. Quality assurance: Data pathways and processing are well-developed and standardized among participants. Laboratory intercalibration studies have improved QA at the regional level, but QA implementation is the responsibility of individual reporting agencies. These QA procedures are not described on the Beach Report Card website, except in passing
   **Score: 5**
6. Data management: A standardized set of data management tools enables local and regional agencies to load their data to a statewide database in a common format. However, these data management procedures and systems are not described on the Beach Report Card website. Underlying monitoring data not available for download
   **Score: 8**
7. Analysis and assessment: Analysis and assessment for coastal waters and bays and estuaries follows standardized protocols agreed on by all parties; grading methods are described in detail on the Beach Report Card website, with reference to water quality standards. Assessment results are readily available on the website
   **Score: 10**
8. Reporting: Interactive reporting tools are available on the Beach Report Card website at several levels of detail. The system provides map-based entry for report cards, and history, as well as the ability to search drop-down lists by beach for closures and history. Users have the option of selecting a different month via a drop-down menu on the map. Beach grades are available via texting to cell phone or other hand-held device. The history of grades and closures for each beach is also available
   **Score: 10**
9. Programmatic evaluation: There is no description on the Beach Report Card website of a periodic program evaluation process for coastal waters and bays and estuaries
   **Score: 0**
10. Program planning: There is no information on assessment of or planning for future program needs
    **Score: 0**

## Sample webpages:



## Sample assessment products:




Heal the Bay | Beach Report Card | Beach Details for San Buenaventura Beach at Weymouth Ln. drain - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.healthebay.org/brc/gradehistory.asp?beach=102
Six Questions for Jane Mayer, Author ...
The Daily Dish | By Andrew Sullivan
Heal the Bay | Beach Report Car...
Home | About Us | Contact-Find Us | Join or Donate | Calendar | Shop | Media Center | Site Info | Site Map
Heal the Bay
News & Issues
Get Involved
Conditions
Learn More
Aquarium
Search
State of the Bay | Beach Report Card | Stream Team
In This Section
Beach Report Card SM
BRC Home
Report Cards
Weekly
Summer
Annual
Beach Info
Closures From Spills
Warning Signs
Beach Details
Background Info
FAQs
Grading Methodology
Text Messaging (SMS) for Grades
About the BRC
Sponsors
The Beach Report Card is made possible through generous sponsorship from: Goldhirsh Foundation Ford simplehuman
BEACH REPORT CARD
Beach Details - View
Back
Grade History
San Buenaventura Beach at Weymouth Ln. drain
Date | Dry | Wet | Notes
7/8/2008 | A+ | ns | Grade based on 30 day period ending 7/7/2008.
7/1/2008 | A+ | ns |
6/25/2008 | A | ns | Grade based on 30 day period ending 6/23/2008.
6/17/2008 | A | ns | Grade based on 30 day period ending 6/16/2008.
6/10/2008 | A | ns | Grade based on 30 day period ending 6/9/2008.
6/3/2008 | A | ns | Grade based on 30 day period ending 6/2/2008.
5/28/2008 | A | ns | Grade based on 30 day period ending 5/27/2008.
5/20/2008 | A+ | ns | Grade based on 30 day period ending 5/19/2008.
5/13/2008 | A+ | ns | Grade based on 30 day period ending 5/12/2008.
4/29/2008 | A+ | ns | Grade based on 30 day period ending 4/28/2008.
4/22/2008 | A+ | ns | Grade based on 30 day period ending 4/21/2008.
4/15/2008 | A+ | ns | Grade based on 30 day period ending 4/14/2008.
4/8/2008 | A+ | ns | Grade based on 30 day period ending 4/7/2008.
3/24/2008 | ns | ns | No current water quality samples available.
3/17/2008 | ns | ns | No current water quality samples available.
3/10/2008 | ns | ns | No current water quality samples available.
3/3/2008 | ns | ns | No current water quality samples available.
2/25/2008 | ns | ns | No current water quality samples available.
2/19/2008 | ns | ns | No current water quality samples available.
2/11/2008 | ns | ns | No current water quality samples available.
2/4/2008 | ns | ns | No current water quality samples available.
1/28/2008 | ns | ns | No current water quality samples available.
1/22/2008 | ns | ns | No current water quality samples available.
1/14/2008 | ns | ns | No current water quality samples available.
Where's the Details?
You may have noticed that other beaches have much more information on their Beach Details pages (e.g. photos, maps, graphs, and related links). Unfortunately, we have not yet entered the detailed data for this particular beach.
Please see the Beach Details - Select Location page for a list of locations that has this additional information completed.
By providing beach details, Heal the Bay hopes to make the Beach Report Card an even more useful public health tool.
Done

## *Theme: Seafood consumption safety*

Seafood consumption safety is a concern in streams, rivers, lakes, coastal waters, and bays and estuaries where sport and commercial fishing, and shellfish harvesting, have been designated as beneficial uses. Both federal and state agencies have jurisdiction over this issue, but only the federal Food and Drug Administration (FDA) sets specific action levels and these only for commercial fish. California's Office of Environmental Health Hazard Assessment (OEHHA) sets threshold levels for certain chemicals in sportfish as the basis for establishing site- and species-specific consumption advisories. Neither federal nor state agencies conduct systematic tissue monitoring for risk assessment. OEHHA, however, has used monitoring data collected for other purposes for its assessments. For example, OEHHA has used data from SWAMP's statewide assessments of sportfish tissue contamination, although these studies were not designed to support human health risk assessment. A second program is the statewide monitoring of shellfish and marine biotoxins in coastal waters and bays and estuaries coordinated by the Department of Public Health in cooperation with a number of academic and other institutions.

### Subtheme: Sportfish consumption safety

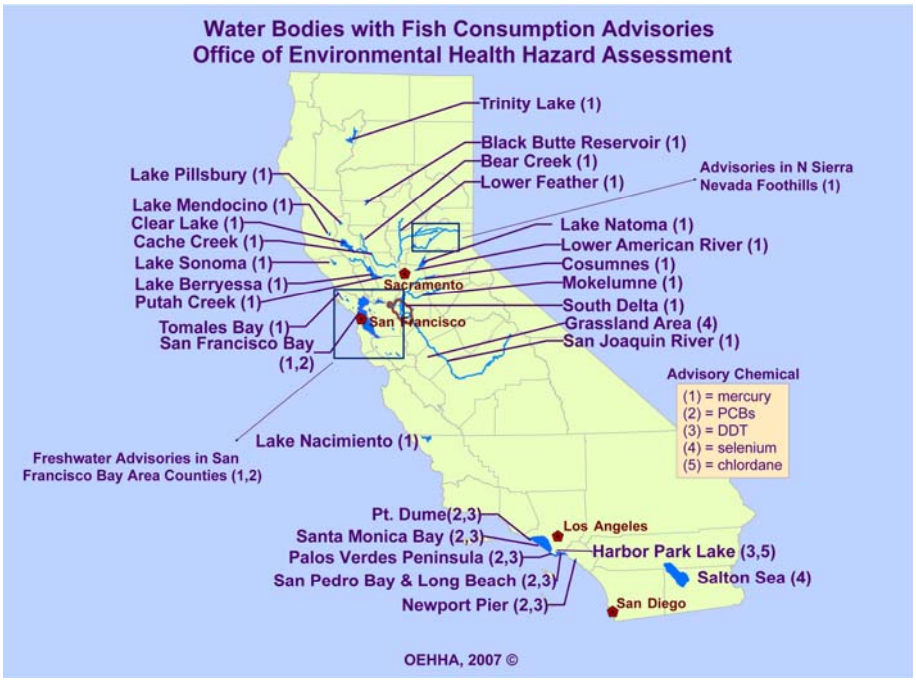
**Website:** www.oehha.ca.gov/fish/so_cal/index.html
**Sponsor:** Office of Environmental Health Hazard Assessment (OEHHA), State Water Board
**Contact:** Robert Brodgerg, OEHHA
**Description:** SWAMP's sportfish tissue assessment is intended to answer key questions about patterns of contamination in sportfish tissue in three major habitat types statewide – lakes, coastal environment, and streams. The major focus of this study is the 305(b) water quality assessment, not specifically human heal risk assessment. Tissue data were obtained from a wide range of available sources to provide an initial statewide assessment. This was followed by a statewide survey of lakes in 2007 and 2008. The coastal habitat will be sampled next, followed by the stream habitat, before cycling back to lakes in subsequent years. There is the possibility that SWAMP's program could be revised to better address seafood consumption risk, but this has not yet occurred.
**Evaluation of 10 elements**:

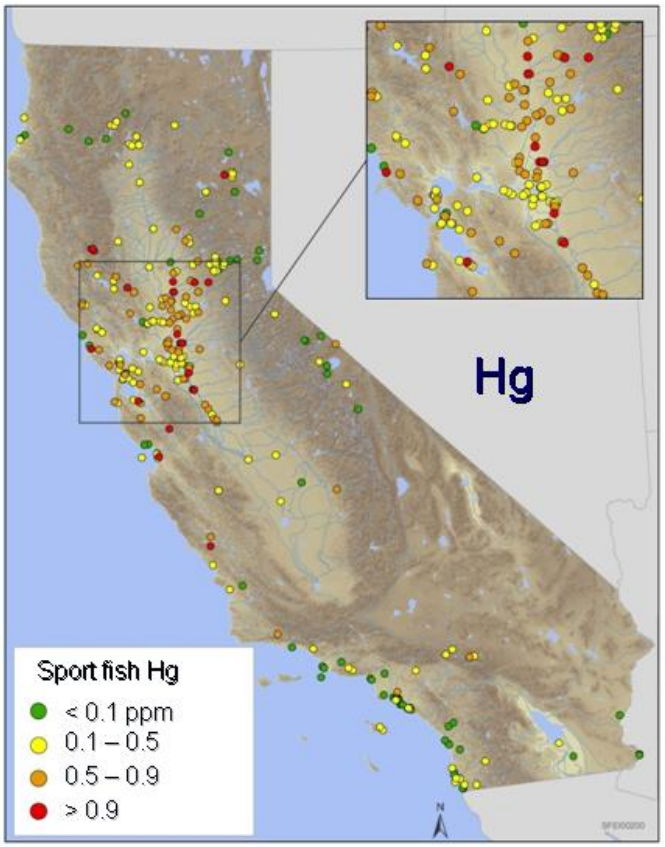
1. Strategy: SWAMP's assessment asks and answers clear questions, with specific audiences in mind; however, this strategy does not focus specifically on consumption safety, nor is it coordinated with those in the shellfish subtheme
   **Score: 8**
2. Monitoring objectives: SWAMP's objective is to provide data for the 303(d) listing and the 305(b) reporting processes (not specifically consumption safety), and is not coordinated with those for the shellfish subtheme
   **Score: 8**
3. Monitoring design: While the program began with an assessment of all readily available data that passed a QA screening, the long-term monitoring design is a combination of probabilistic sampling intended to characterize statewide conditions and targeted sampling that focuses on the most popular fishing sites. This was the design used for the 2007 – 2008 study of tissue levels in lake fish
   **Score: 10**
4. Indicators: Indicators, i.e., tissue measurements, are standardized, with well-developed sampling and laboratory procedures
   **Score: 10**
5. Quality assurance: QA methods are well developed and described in the SWAMP QAPP. Data must meet SWAMP QA standards before entry into the SWAMP database
   **Score: 10**

6. Data management: Data management procedures are well established, but have yet to be placed into a readily available format usable by OEHHA and the State and Regional Water Boards. Data are currently stored at SFEI and are not yet available online
   **Score: 6**
7. Data analysis and assessment: OEHHA has developed a formal data analysis framework for the purpose of developing consumption advisories
   **Score: 10**
8. Reporting: Draft reports are being prepared for the initial phases of this program to meet SWAMP's 305(b) reporting responsibilities. OEHHA posts reports and consumption advisories on its website. The longer-term plan is to make all data available through an online interactive mapping tool being developed at SFEI for the Fish Mercury Project being funded primarily by CALFED
   **Score: 7**
9. Programmatic evaluation: No description of a periodic program evaluation process
   **Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

**Sample webpages**:

**Sample assessment products**:



### Subtheme: Shellfish consumption safety

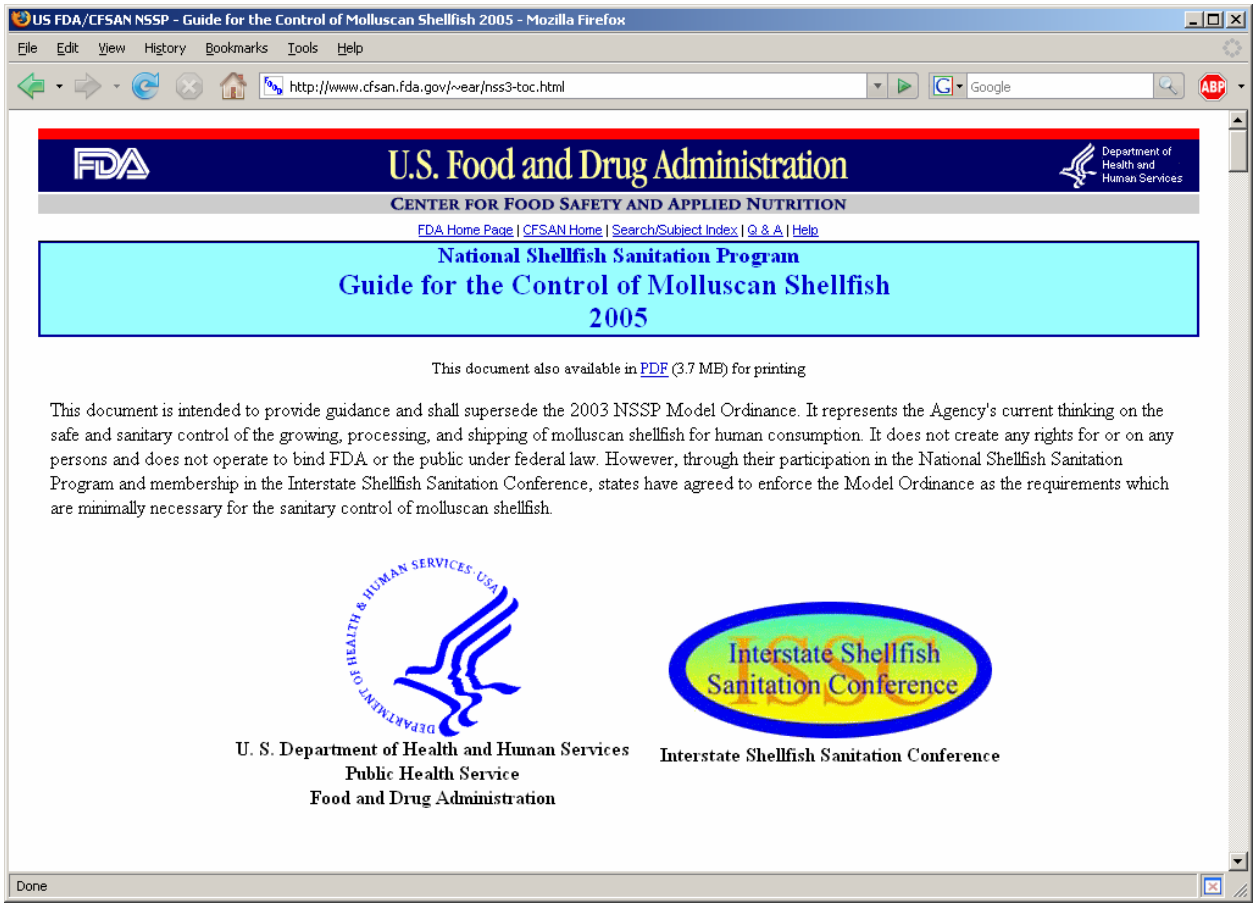
**Website**: http://www.cdph.ca.gov/HealthInfo/environhealth/water/Pages/Shellfish.aspx.
**Sponsor**: Department of Public Health
**Contact**: Gregg Langlois, DPH.
**Description**:. The Department of Public Health's Preharvest Shellfish Protection and Marine Biotoxin Monitoring Program monitors commercial shellfish growing areas in conformance with the National Shellfish Sanitation Program. The program also monitors numerous points along the California coastline for marine biotoxins in shellfish and toxigenic phytoplankton in marine waters. Warnings are issued or quarantines are established as needed for recreational and commercial shellfish harvesting. These programs are separate and not coordinated.
**Evaluation of 10 elements**:

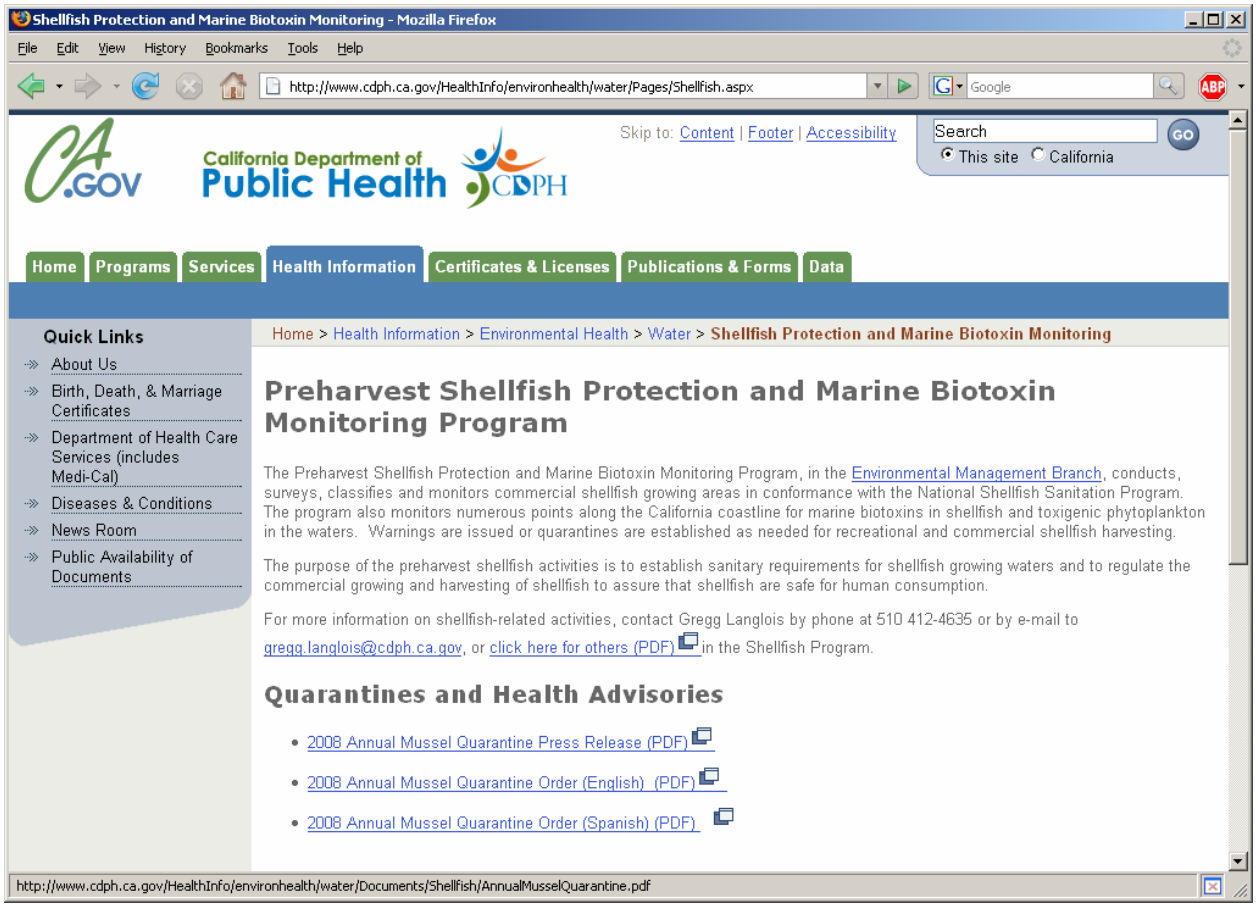
1. Strategy: The program asks and answers clear questions, with specific audiences in mind
   **Score: 10**
2. Monitoring objectives: The objective has been clearly stated and is to describe broad trends over time, and DPH's objective is to establish sanitary requirements for shellfish growing waters and to regulate commercial growing and harvesting to ensure shellfish are safe for human consumption
   **Score: 10**
3. Monitoring design: The monitoring design is based on national guidelines promulgated by the Food and Drug Administration, although these allow for a degree of local flexibility. Monitoring is conducted by a wide range of collaborating local partners and is more organized and consistent for shellfish growing sites than for phytoplankton and toxins in marine waters
   **Score: 5**
4. Indicators: Taxonomic methods for phytoplankton identification and methods for the direct measurement of marine biotoxins are not standardized. However, NOAA is organizing a nationwide methods intercalibration study for 2009, with the goal of improving standardization of methods for species identification and estimating abundance, as well as for toxin identification and measurement
   **Score: 4**
5. Quality assurance: Laboratory QA methods are defined in national procedure manual, however, there is no readily available information on the degree to which these QA standards are met, or on data checking and validation methods further along the data path
   **Score: 5**
6. Data management: There is no readily available information on data management procedures. However, the program produces aggregated statewide reports, which requires that data be collected and housed in a statewide database. The program does not provide users a means to access and download data. However, it has recently implemented a statewide listserve to enable participants to more readily share data and results
   **Score: 5**
7. Data analysis and assessment: Standardized data summarization approaches are used, with assessment thresholds applied to data on toxin levels in shellfish as a basis for regulatory decisions
   **Score: 7**
8. Reporting: The program regularly produces monthly, quarterly, and annual reports, which are posted on the program's website. However, users cannot create reports based on individual criteria
   **Score: 8**
9. Programmatic evaluation: No description of a periodic program evaluation process

**Score: 0**

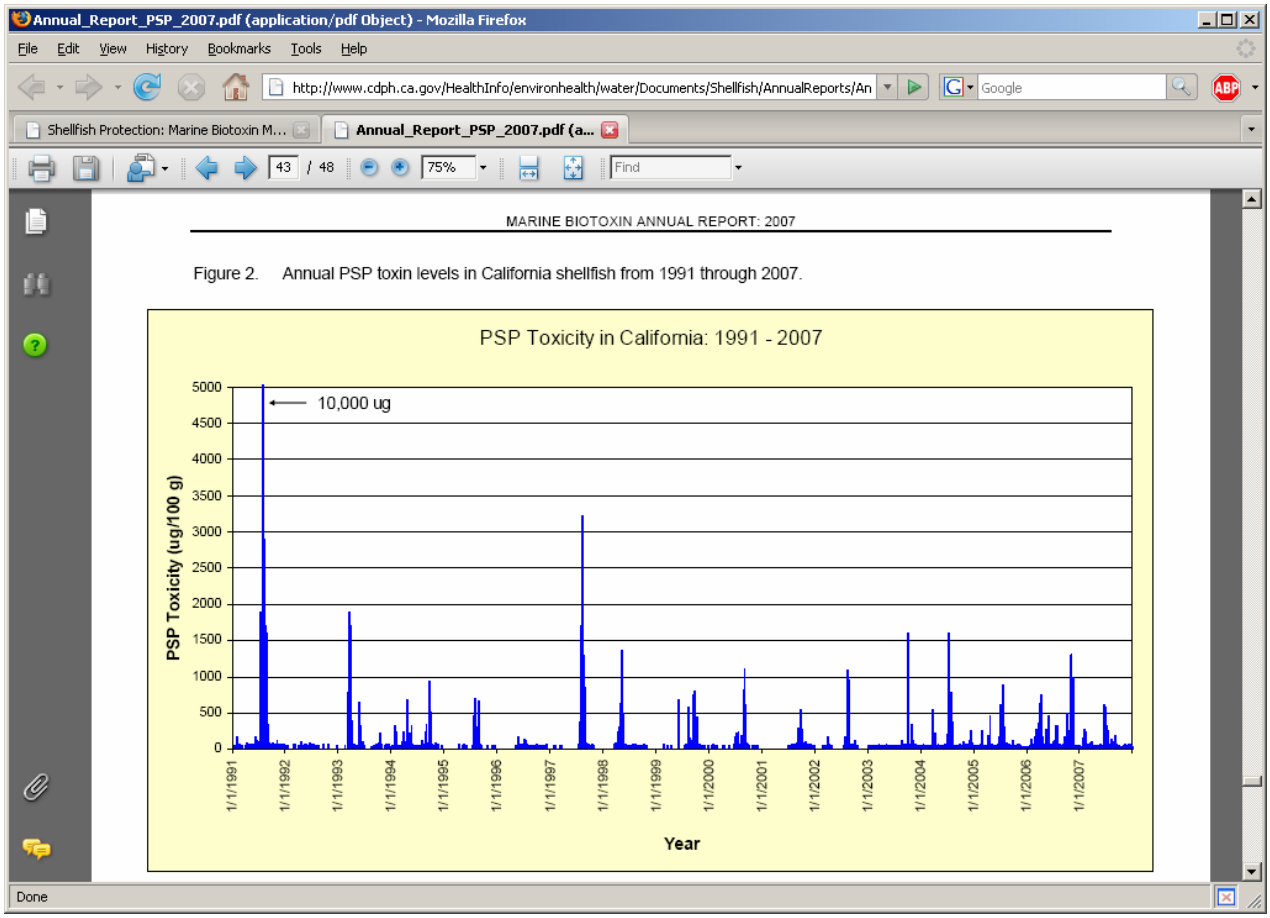
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

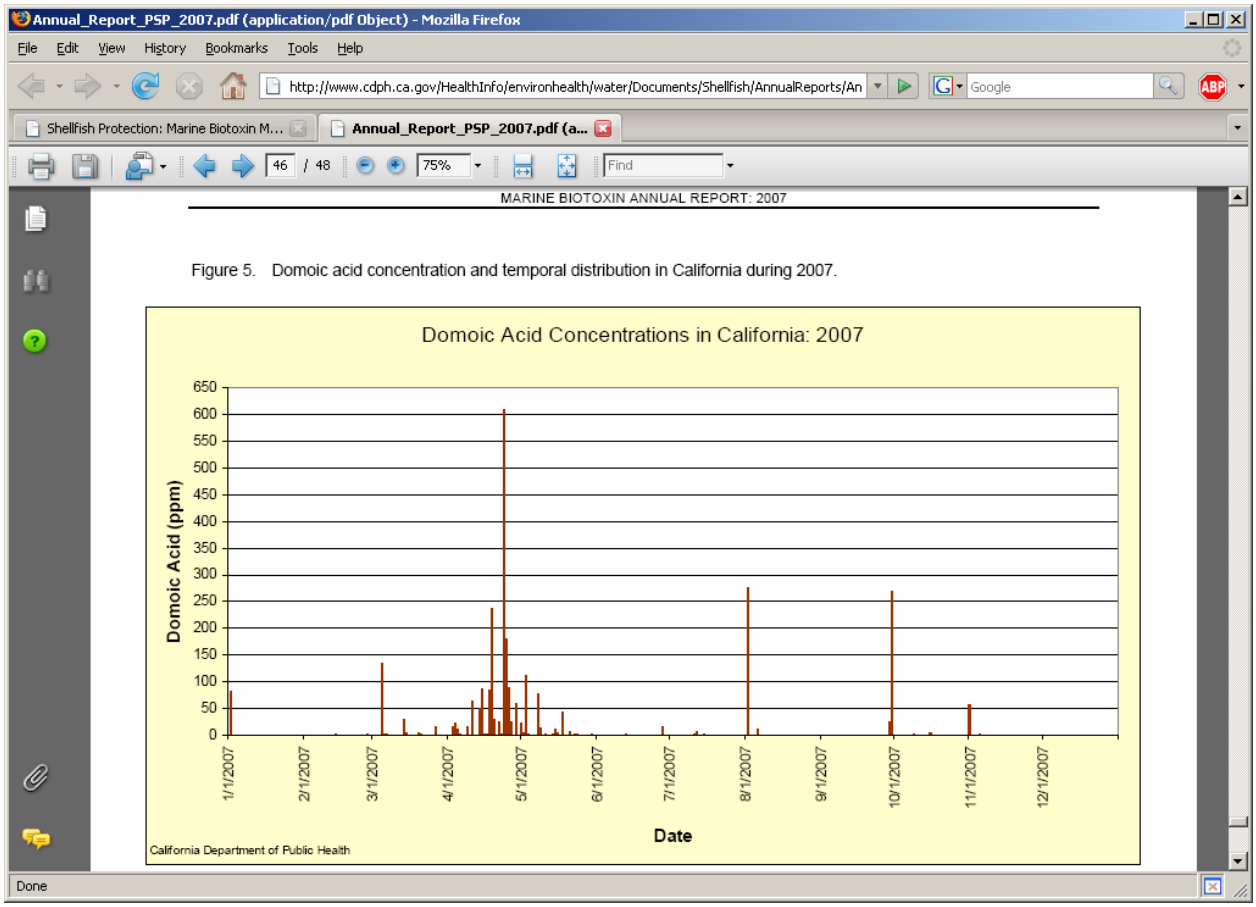
**Sample webpages:**




Shellfish Protection and Marine Biotoxin Monitoring - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.cdph.ca.gov/HealthInfo/environhealth/water/Pages/Shellfish.aspx
Google
Skip to: Content | Footer | Accessibility
Search
This site California
GO
California Department of Public Health
CDPH
Home Programs Services Health Information Certificates & Licenses Publications & Forms Data
Quick Links
About Us
Birth, Death, & Marriage Certificates
Department of Health Care Services (includes Medi-Cal)
Diseases & Conditions
News Room
Public Availability of Documents
Home > Health Information > Environmental Health > Water > Shellfish Protection and Marine Biotoxin Monitoring
Preharvest Shellfish Protection and Marine Biotoxin Monitoring Program
The Preharvest Shellfish Protection and Marine Biotoxin Monitoring Program, in the Environmental Management Branch, conducts, surveys, classifies and monitors commercial shellfish growing areas in conformance with the National Shellfish Sanitation Program. The program also monitors numerous points along the California coastline for marine biotoxins in shellfish and toxigenic phytoplankton in the waters. Warnings are issued or quarantines are established as needed for recreational and commercial shellfish harvesting.
The purpose of the preharvest shellfish activities is to establish sanitary requirements for shellfish growing waters and to regulate the commercial growing and harvesting of shellfish to assure that shellfish are safe for human consumption.
For more information on shellfish-related activities, contact Gregg Langlois by phone at 510 412-4635 or by e-mail to gregg.langlois@cdph.ca.gov, or click here for others (PDF) in the Shellfish Program.
Quarantines and Health Advisories
2008 Annual Mussel Quarantine Press Release (PDF)
2008 Annual Mussel Quarantine Order (English) (PDF)
2008 Annual Mussel Quarantine Order (Spanish) (PDF)
http://www.cdph.ca.gov/HealthInfo/environhealth/water/Documents/Shellfish/AnnualMusselQuarantine.pdf

**Sample assessment products:**




Annual_Report_PSP_2007.pdf (application/pdf Object) - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.cdph.ca.gov/HealthInfo/environhealth/water/Documents/Shellfish/AnnualReports/An
Shellfish Protection: Marine Biotoxin M...
Annual_Report_PSP_2007.pdf (a...
46 / 48
75%
Find
MARINE BIOTOXIN ANNUAL REPORT: 2007
Figure 5. Domoic acid concentration and temporal distribution in California during 2007.
Domoic Acid Concentrations in California: 2007
Domoic Acid (ppm)
650
600
550
500
450
400
350
300
250
200
150
100
50
0
1/1/2007
2/1/2007
3/1/2007
4/1/2007
5/1/2007
6/1/2007
7/1/2007
8/1/2007
9/1/2007
10/1/2007
11/1/2007
12/1/2007
Date
California Department of Public Health
Done

## *Theme: Drinking water safety*

Drinking water safety is a concern for all bodies of freshwater, both surface water and groundwater, that may be sources of drinking water. Risks to human health are managed by state and local standards for permissible levels of certain contaminants. Surface water quality is monitored by the USGS National Water Quality Assessment program, as well as by a large number of NPDES and regional assessment programs. Groundwater quality is monitored and tracked by the State Water Board's GAMA and GeoTracker programs, respectively.

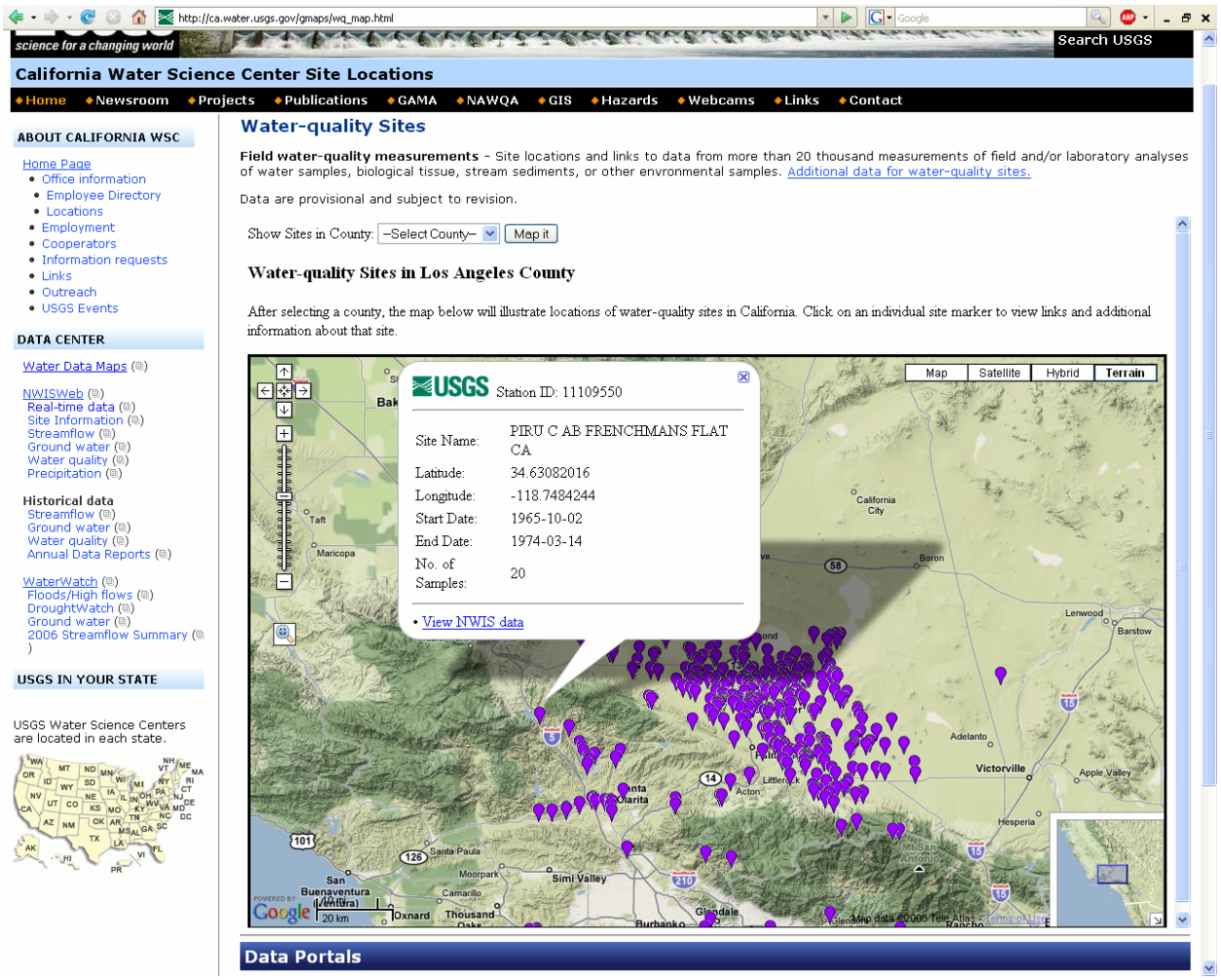
### Subtheme: Surface water safety

**Website**: http://ca.water.usgs.gov/nawqa.html; NA for NPDES programs
**Sponsor:** US Geological Survey, Regional Water Boards
**Contact:** Mike Shulters, USGS; Val Connor, State Water Board
**Description:** Surface waters are monitored by an integrated, statewide monitoring program designed and implemented by USGS as part of its National Water Quality Assessment Program (NAWQA). NAWQA was initiated in 1991 to assess the status of and trends in the quality of freshwater streams and aquifers, and to provide a sound understanding of the natural and human factors that affect the quality of these resources. Monitored assessment areas account for 60 to 70 percent of the Nation's water use and population served by public water supplies, and cover about one-half of the land area of the Nation. At the other extreme of organization, surface water quality, including for drinking water beneficial uses, is monitored throughout the state under the terms of NPDES permits for point and nonpoint discharges, as well as by a number of regional monitoring and/or assessment programs. These NPDES programs are typically completely independent and uncoordinated.
**Evaluation of 10 elements**:

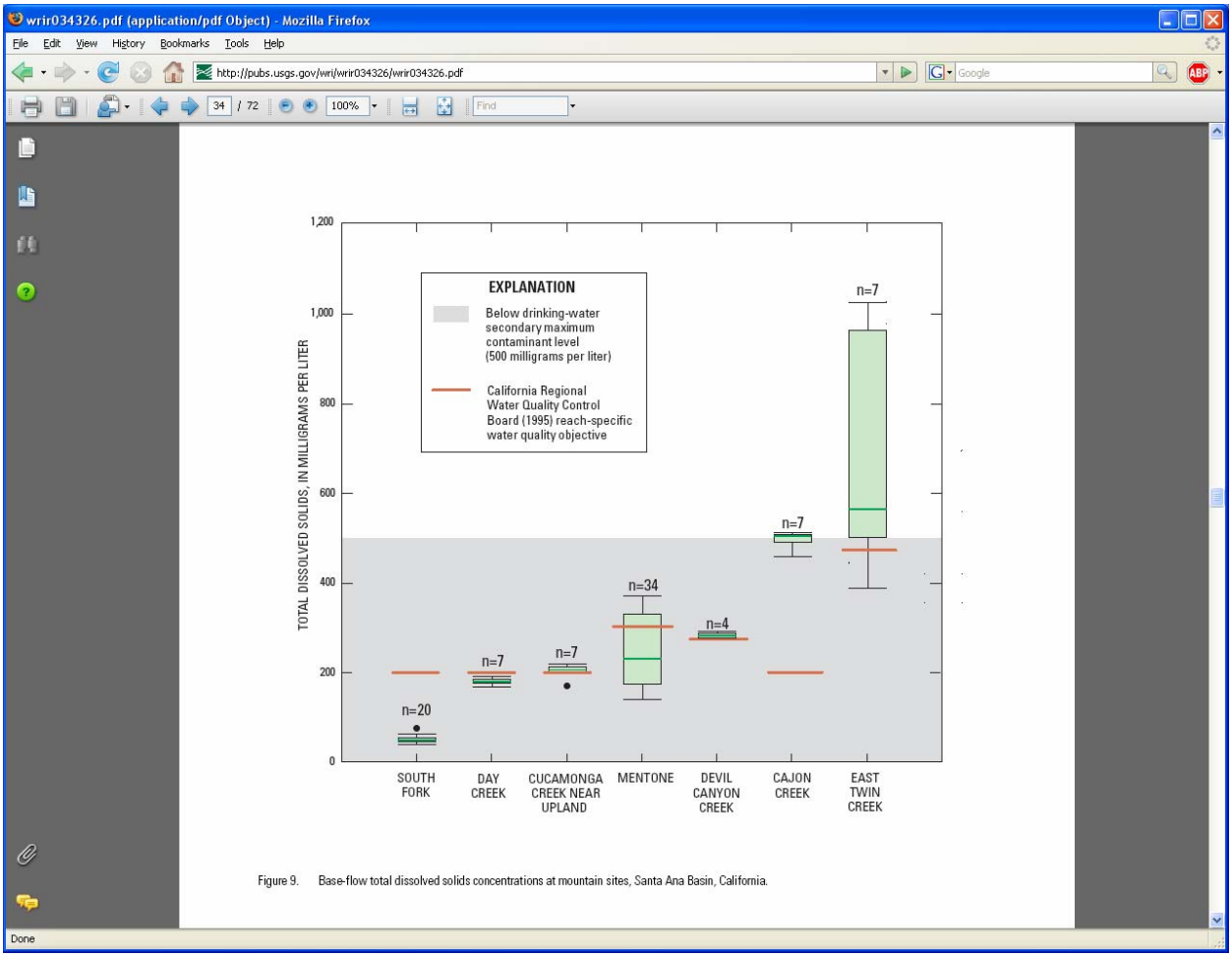
1. Strategy: The program asks and answers clear questions, with specific audiences in mind
   **Score: 10**
2. Monitoring objecives: Objectives are defined at a range of scales, from nationwide to basin-level, all related to the basic purpose of tracking patterns and trends in water quality
   **Score: 10**
3. Monitoring design: Designs are clearly defined and nested within nationally and regionally standardized frameworks
   **Score: 10**
4. Indicators: Indicators are well developed and standardized nationally and regionally
   **Score: 10**
5. Quality assurance: QA is a centrally important feature of all USGS programs, with formal QA procedures established and documented by the National Water Quality Laboratory. Additional, study-specific QA issues are addressed in the methods section of each assessment report
   **Score: 10**
6. Data management: Data management procedures are well established, standardized nationwide, and clearly documented. Data are housed in readily accessible databases and can be searched and downloaded from a variety of perspectives, including by drop-down lists of locations and data types, or through map-based interactive interfaces. The program's website has clear instructions and tutorials for public access and to provide data downloads to a variety of formats, including GIS
   **Score: 10**
7. Data analysis and assessment: A variety of analysis and assessment approaches are used to address questions at the national, regional, and basin-specific levels. These approaches are subject to both internal and external peer review
   **Score: 10**

8. Reporting: Assessment reports are the primary vehicle for disseminating program results and are readily available on the program's website. These cover a wide range of topics related to water quality and the processes affecting it. However, there are no interactive features in these reports to enable users to focus on a specific area or directly obtain the underlying data through a link to the database
   **Score: 8**
9. Programmatic evaluation: The program does not undergo a formal external review, but its methods, designs, assessment approaches, and products are continually reviewed and commented on by peer reviewers, partners, and customers
   **Score: 10**
10. Program planning: Year-to-year and longer-range planning occurs at the national and regional levels within USGS. This planning includes staffing and infrastructure needs, but is subject to the uncertainties of the federal budget process
    **Score: 10**

**Sample webpages**:


http://ca.water.usgs.gov/gmaps/wq_map.html
science for a changing world
Search USGS
California Water Science Center Site Locations
Home
Newsroom
Projects
Publications
GAMA
NAWQA
GIS
Hazards
Webcams
Links
Contact
ABOUT CALIFORNIA WSC
Home Page
Office information
Employee Directory
Locations
Employment
Cooperators
Information requests
Links
Outreach
USGS Events
DATA CENTER
Water Data Maps
NWISWeb
Real-time data
Site Information
Streamflow
Ground water
Water quality
Precipitation
Historical data
Streamflow
Ground water
Water quality
Annual Data Reports
WaterWatch
Floods/High flows
DroughtWatch
Ground water
2006 Streamflow Summary
USGS IN YOUR STATE
USGS Water Science Centers are located in each state.
Water-quality Sites
Field water-quality measurements - Site locations and links to data from more than 20 thousand measurements of field and/or laboratory analyses of water samples, biological tissue, stream sediments, or other environmental samples. Additional data for water-quality sites.
Data are provisional and subject to revision.
Show Sites in County: –Select County–
Map it
Water-quality Sites in Los Angeles County
After selecting a county, the map below will illustrate locations of water-quality sites in California. Click on an individual site marker to view links and additional information about that site.
USGS Station ID: 11109550
Site Name: PIRU C AB FRENCHMANS FLAT CA
Latitude: 34.63082016
Longitude: -118.7484244
Start Date: 1965-10-02
End Date: 1974-03-14
No. of Samples: 20
View NWIS data
Map
Satellite
Hybrid
Terrain
Data Portals

**Sample assessment products**:



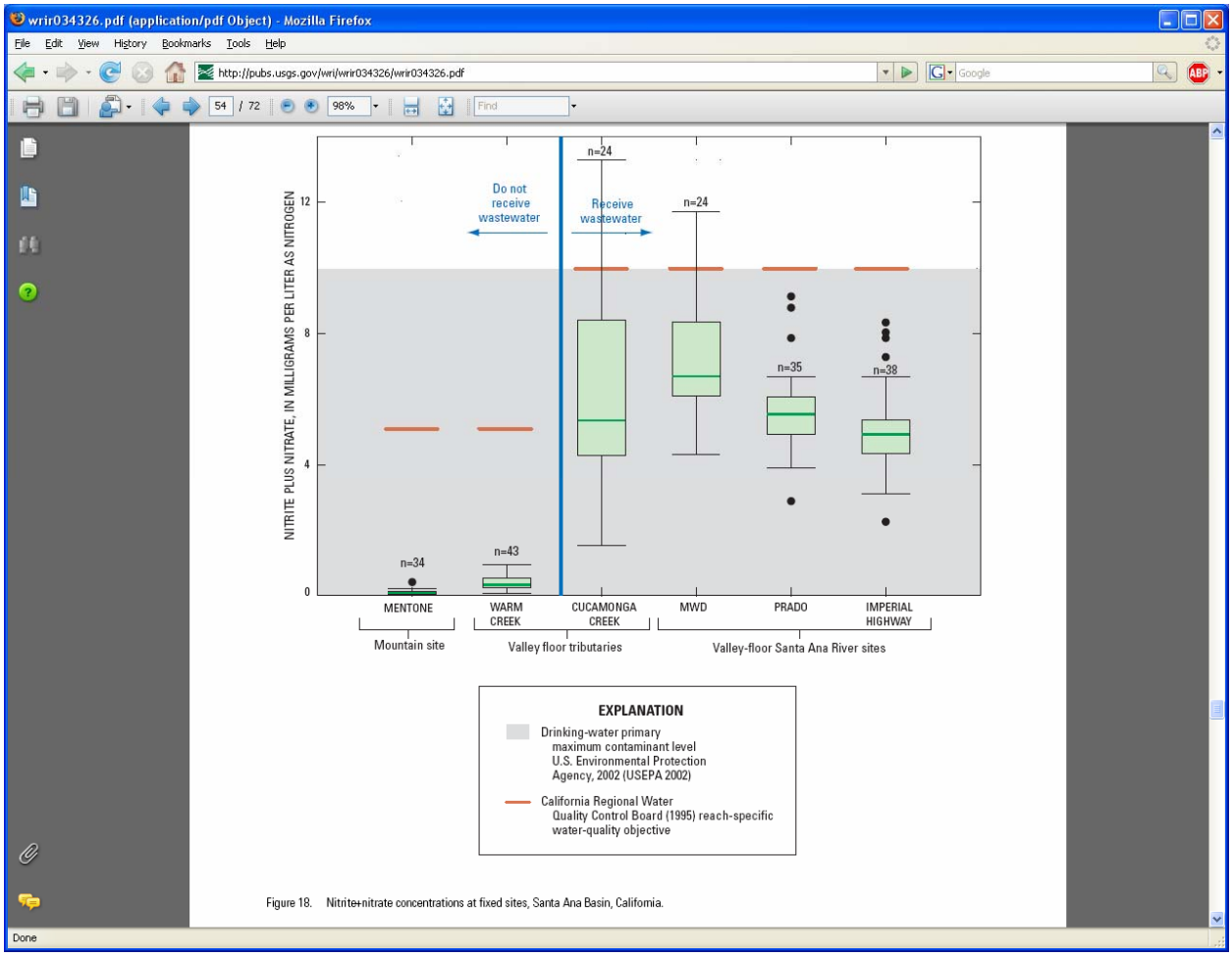



Figure 18. Nitrite+nitrate concentrations at fixed sites, Santa Ana Basin, California.

## Subtheme: Groundwater safety

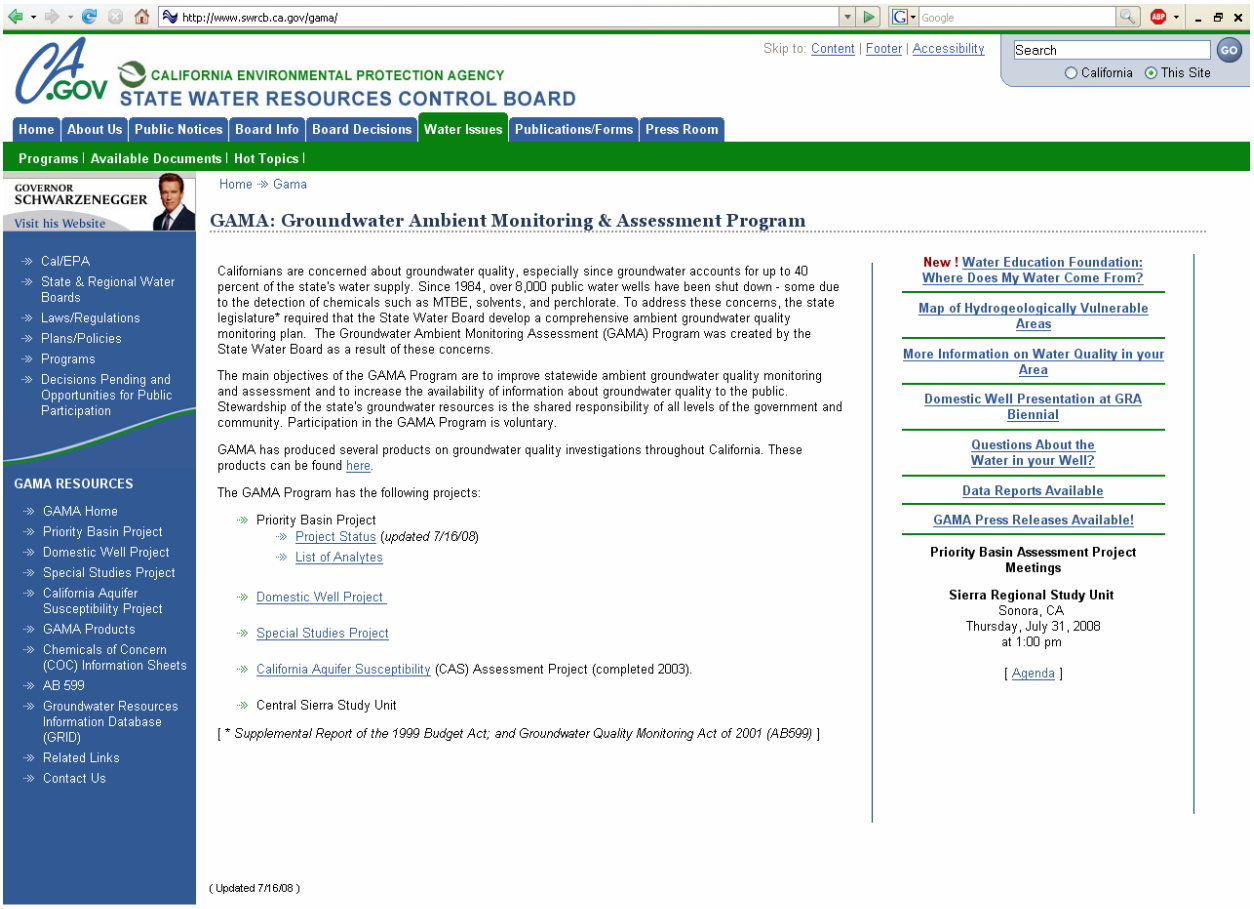
**Websites**: GAMA – http://www.waterboards.ca.gov/gama; GeoTracker – https://geotracker.waterboards.ca.gov/
**Sponsor**: GAMA – State Water Board, US Geological Survey; GeoTracker – State Water Board
**Contact**: GAMA – John Borkovich, State Water Board; GeoTracker – Val Connor, State Water Board
**Description**: GAMA is a cooperative program of the State Water Board and the US Geological Survey that addresses concerns about groundwater contamination and its impacts on public water wells and water supply. GAMA is a comprehensive ambient groundwater quality monitoring plan with the objectives of improving statewide ambient groundwater quality monitoring and assessment and increasing the availability of information about groundwater quality to the public. GeoTracker is a State Water Board database that centralizes locally-collected information about spills, groundwater contamination, and cleanup status.
**Evaluation of 10 elements**:

1. Strategy: Both programs ask and answer clear questions, with specific audiences in mind, but their strategies are not coordinated
   **Score: 8**
2. Monitoring objectives: GAMA's objectives are clearly stated on the program's website and in a number of descriptive and technical program document. More general objectives (e.g., better understand and identify risks to ground-water resources) are then supplemented with detailed monitoring objectives linked to specific monitoring designs. GeoTracker's objectives are to gather, organize, and provide access to information on cleanup sites in California. The programs' objectives are not coordinated
   **Score: 8**
3. Monitoring design: GAMA is based on an integrated statewide design based on a division of the state into a number of groundwater basins ranked by a systematic prioritization process. The design is described in technical documents available on the program's website. GeoTracker does not itself conduct any monitoring. Data are submitted by local agencies in compliance with State Water Board regulations that require the electronic submittal of information on all cleanup actions. The programs' designs are not coordinated
   **Score: 8**
4. Indicators: GAMA samples a standardized set of indicators sampled statewide. Indicators include a broader set of parameters, sampled at much lower detection limits, than required by DHS. Indicators and sampling methods are described in technical documents available on the program's website. GeoTracker clearly defines information types in the electronic submission procedure; these include primarily programmatic information such as cleanup status. The programs' indicators are not coordinated
   **Score: 8**
5. Quality assurance: QA is a centrally important feature of all USGS programs such as GAMA, with formal QA procedures established and documented by the National Water Quality Laboratory. Additional, study-specific QA issues are addressed in the methods section of each assessment report. GeoTracker includes no description of any QA screening of submitted data, nor of how data re generated and evaluated at the local level. It is thus not possible to judge the quality of data in the database
   **Score: 5 (10 for GAMA, 0 for GeoTracker)**
6. Data management: GAMA's data management procedures are well established, standardized statewide, and clearly documented. However, there are no query or download features to enable users to search, select, and download data. A planned link with the Geotracker website will provide these functions. GeoTracker's data management procedures are not described on the

website, but must be defined somewhere in order for the program to function. The system has an online tutorial that provides instructions for data access and download
**Score: 6**

7. Data analysis and assessment: GAMA uses a variety of analysis and assessment approaches are used to address questions at the national, regional, and basin-specific levels. These approaches are subject to both internal and external peer review. GeoTracker conducts no analysis or assessment
**Score: 10**
8. Reporting: GAMA uses assessment reports as the primary vehicle for disseminating program results and these are readily available on the program's website. Reports cover a wide range of topics related to program methods and monitoring and assessment results. However, there are no interactive features in these reports to enable users to focus on a specific area or directly obtain the underlying data through a link to the database. GeoTracker enables users to search the database by a variety of entry points, including county, groundwater basin, watershed, and address. Search results include maps, project status, and background information
**Score: 9**
9. Programmatic evaluation: No description of a periodic program evaluation process
**Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
**Score: 0**

**Sample webpages:**



http://www.swrcb.ca.gov/gama/

Skip to: Content | Footer | Accessibility

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CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD

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Programs | Available Documents | Hot Topics |

GOVERNOR SCHWARZENEGGER
Visit his Website

- Cal/EPA
- State & Regional Water Boards
- Laws/Regulations
- Plans/Policies
- Programs
- Decisions Pending and Opportunities for Public Participation

GAMA RESOURCES

- GAMA Home
- Priority Basin Project
- Domestic Well Project
- Special Studies Project
- California Aquifer Susceptibility Project
- GAMA Products
- Chemicals of Concern (COC) Information Sheets
- AB 599
- Groundwater Resources Information Database (GRID)
- Related Links
- Contact Us

Home » Gama

GAMA: Groundwater Ambient Monitoring & Assessment Program

Californians are concerned about groundwater quality, especially since groundwater accounts for up to 40 percent of the state's water supply. Since 1984, over 8,000 public water wells have been shut down - some due to the detection of chemicals such as MTBE, solvents, and perchlorate. To address these concerns, the state legislature* required that the State Water Board develop a comprehensive ambient groundwater quality monitoring plan. The Groundwater Ambient Monitoring Assessment (GAMA) Program was created by the State Water Board as a result of these concerns.

The main objectives of the GAMA Program are to improve statewide ambient groundwater quality monitoring and assessment and to increase the availability of information about groundwater quality to the public. Stewardship of the state's groundwater resources is the shared responsibility of all levels of the government and community. Participation in the GAMA Program is voluntary.

GAMA has produced several products on groundwater quality investigations throughout California. These products can be found here.

The GAMA Program has the following projects:

- Priority Basin Project
  - Project Status (*updated 7/16/08*)
  - List of Analytes
- Domestic Well Project
- Special Studies Project
- California Aquifer Susceptibility (CAS) Assessment Project (completed 2003).
- Central Sierra Study Unit

[ * *Supplemental Report of the 1999 Budget Act; and Groundwater Quality Monitoring Act of 2001 (AB599)* ]

New ! Water Education Foundation: Where Does My Water Come From?

Map of Hydrogeologically Vulnerable Areas

More Information on Water Quality in your Area

Domestic Well Presentation at GRA Biennial

Questions About the Water in your Well?

Data Reports Available

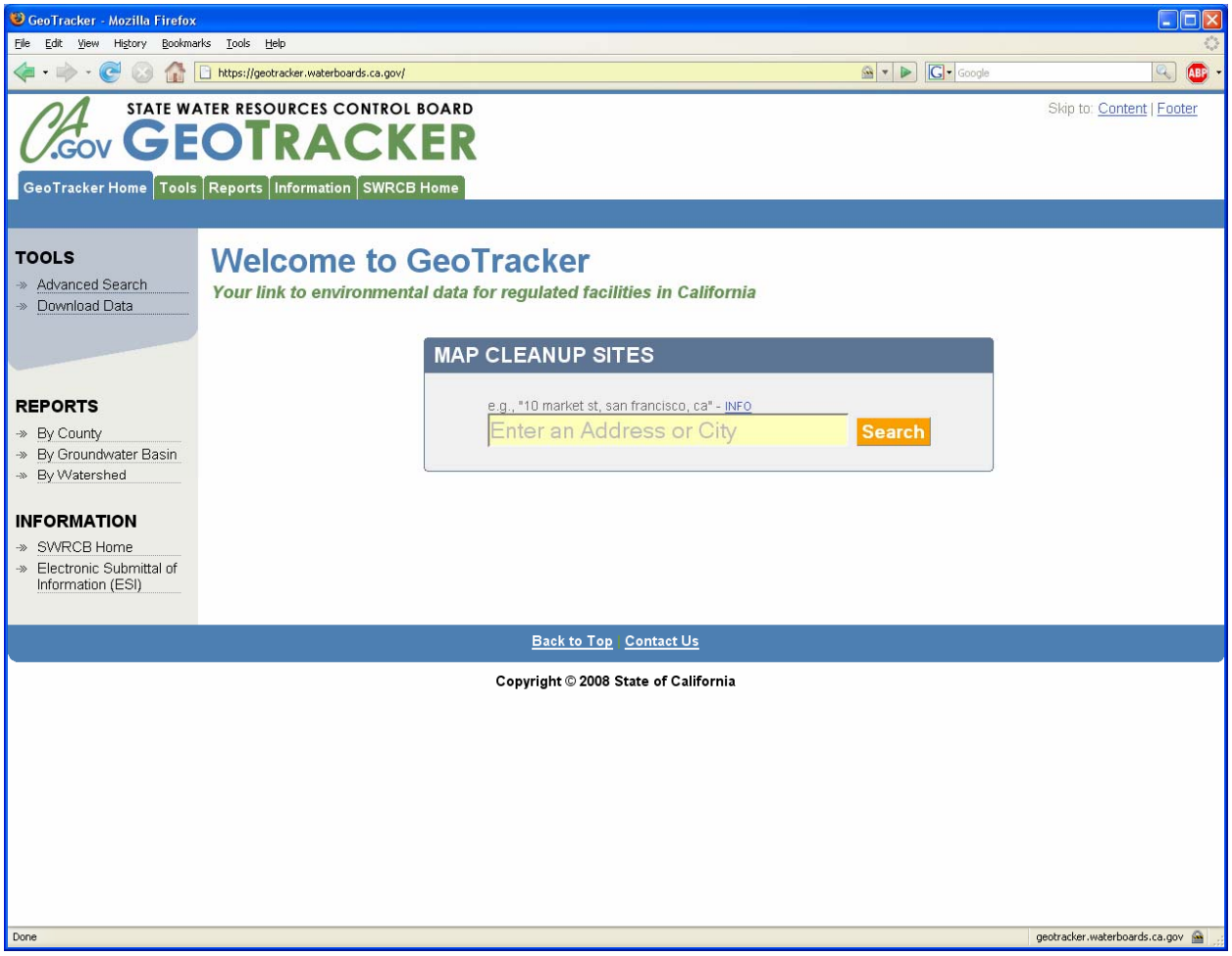
GAMA Press Releases Available!

**Priority Basin Assessment Project Meetings**

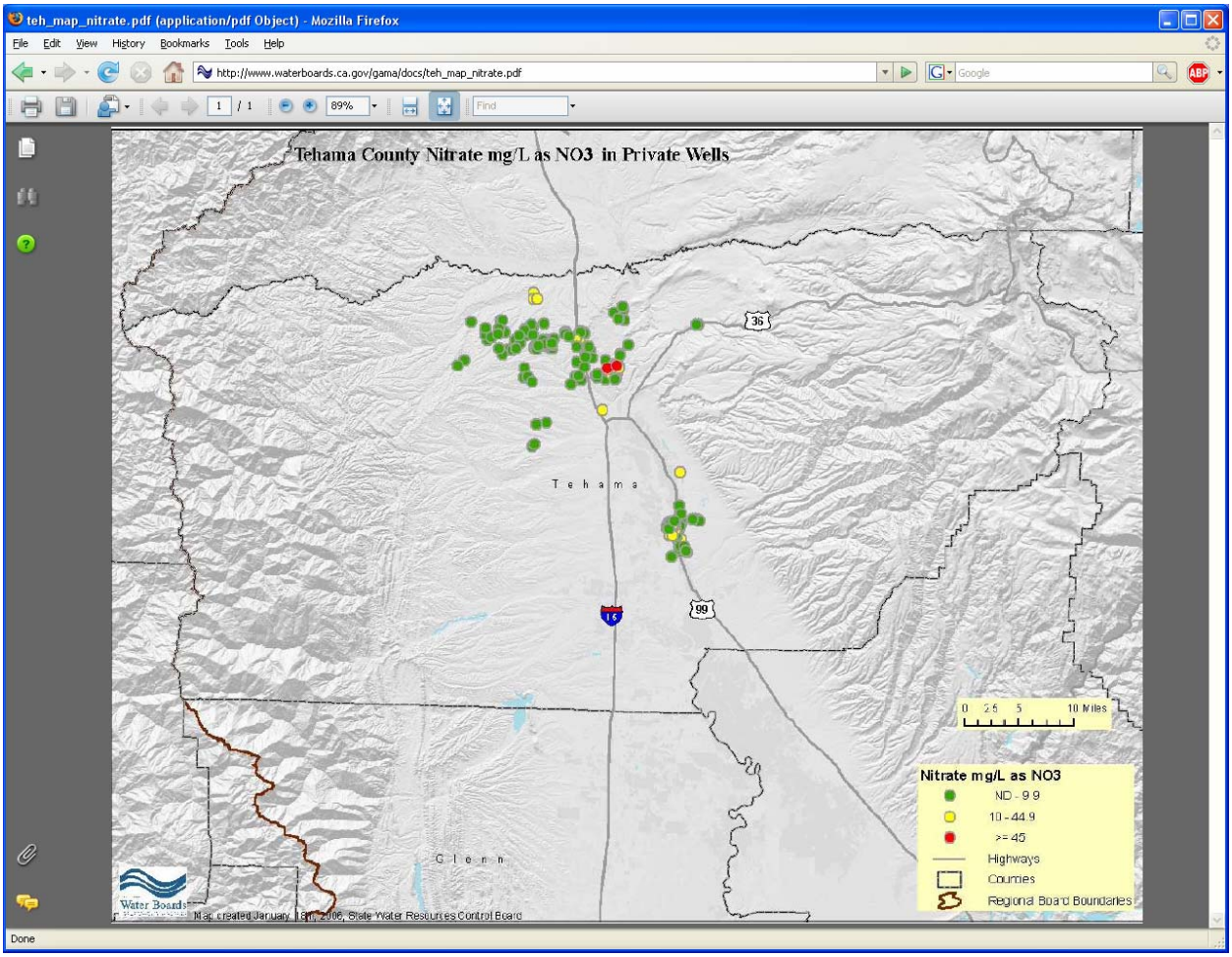
**Sierra Regional Study Unit**
Sonora, CA
Thursday, July 31, 2008
at 1:00 pm

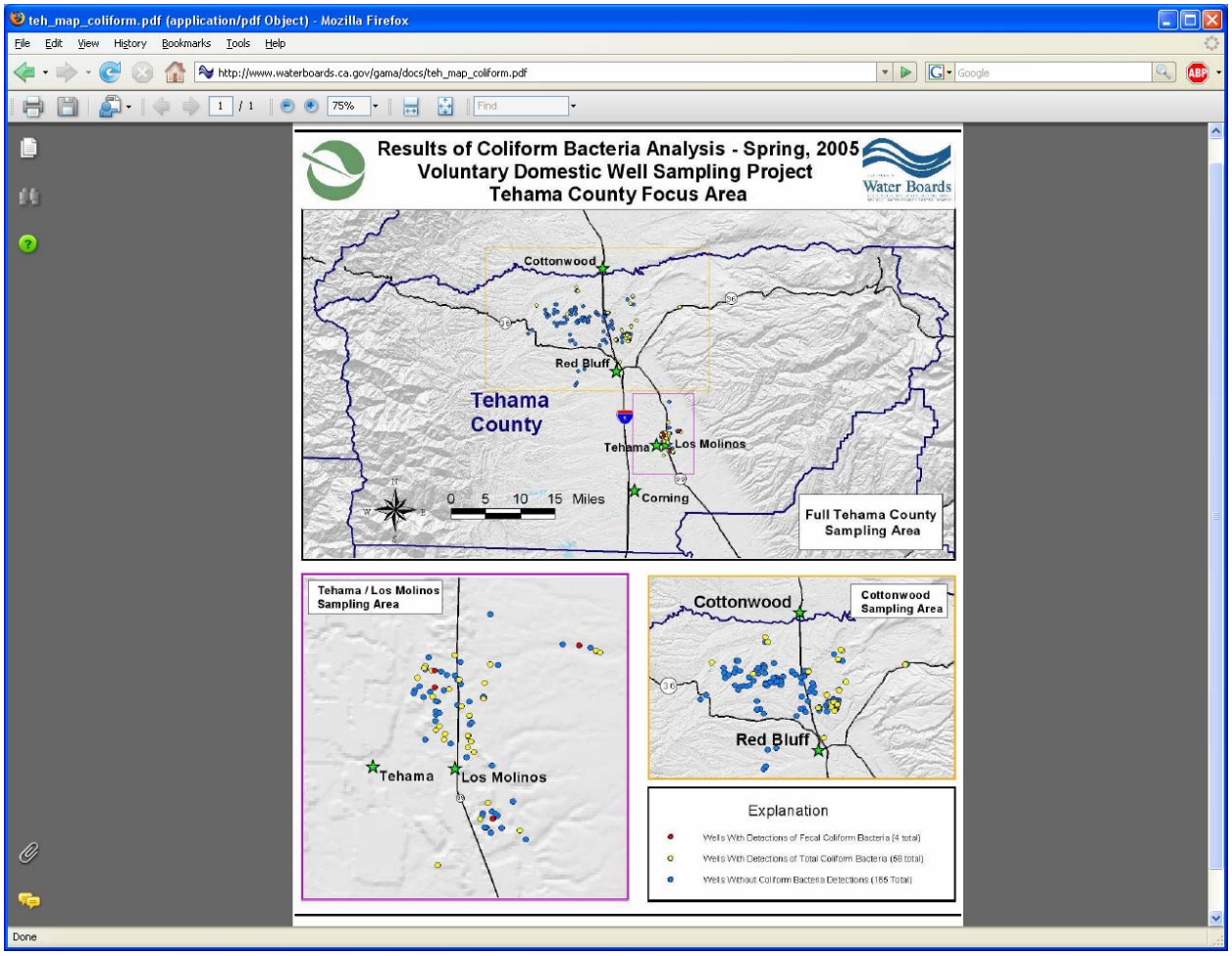
[ Agenda ]

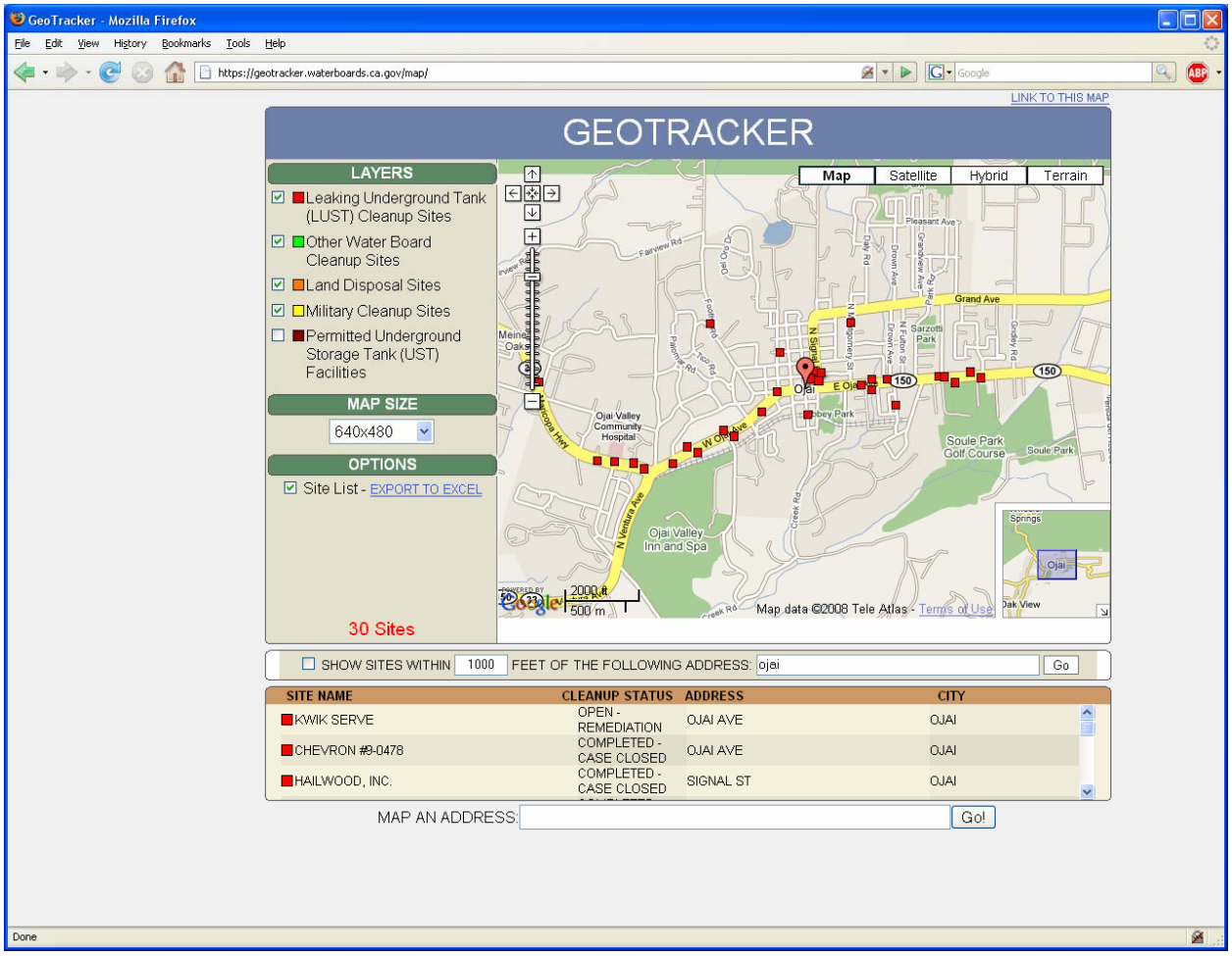
( Updated 7/16/08 )


GeoTracker - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://geotracker.waterboards.ca.gov/
STATE WATER RESOURCES CONTROL BOARD
GEOTRACKER
Skip to: Content | Footer
GeoTracker Home
Tools
Reports
Information
SWRCB Home
TOOLS
Advanced Search
Download Data
REPORTS
By County
By Groundwater Basin
By Watershed
INFORMATION
SWRCB Home
Electronic Submittal of Information (ESI)
Welcome to GeoTracker
Your link to environmental data for regulated facilities in California
MAP CLEANUP SITES
e.g., "10 market st, san francisco, ca" - INFO
Enter an Address or City
Search
Back to Top | Contact Us
Copyright © 2008 State of California
Done
geotracker.waterboards.ca.gov

**Sample assessment products**:




teh_map_coliform.pdf (application/pdf Object) - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.waterboards.ca.gov/gama/docs/teh_map_coliform.pdf
Done
Results of Coliform Bacteria Analysis - Spring, 2005
Voluntary Domestic Well Sampling Project
Tehama County Focus Area
Water Boards
Cottonwood
Red Bluff
Tehama County
Tehama
Los Molinos
Corning
0 5 10 15 Miles
Full Tehama County Sampling Area
Tehama / Los Molinos Sampling Area
Tehama
Los Molinos
Cottonwood
Cottonwood Sampling Area
Red Bluff
Explanation
Wells With Detections of Fecal Coliform Bacteria (4 total)
Wells With Detections of Total Coliform Bacteria (68 total)
Wells Without Coliform Bacteria Detections (185 Total)


GeoTracker - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://geotracker.waterboards.ca.gov/map/
LINK TO THIS MAP
GEOTRACKER
LAYERS
Leaking Underground Tank (LUST) Cleanup Sites
Other Water Board Cleanup Sites
Land Disposal Sites
Military Cleanup Sites
Permitted Underground Storage Tank (UST) Facilities
MAP SIZE
640x480
OPTIONS
Site List - EXPORT TO EXCEL
30 Sites
Map
Satellite
Hybrid
Terrain
Grand Ave
Ojai
E Ojai
Ojai Valley Community Hospital
Ojai Valley Inn and Spa
Soule Park Golf Course
Map data ©2008 Tele Atlas - Terms of Use
SHOW SITES WITHIN 1000 FEET OF THE FOLLOWING ADDRESS: ojai Go
SITE NAME
CLEANUP STATUS
ADDRESS
CITY
KWIK SERVE
OPEN - REMEDIATION
OJAI AVE
OJAI
CHEVRON #9-0478
COMPLETED - CASE CLOSED
OJAI AVE
OJAI
HAILWOOD, INC.
COMPLETED - CASE CLOSED
SIGNAL ST
OJAI
MAP AN ADDRESS: Go!
Done

## *Theme: Status of aquatic life*

The protection of aquatic life is a central part of the management and regulatory programs maintained by CalEPA and The Resources Agency. For example, the protection of aquatic life beneficial uses is mandated in NPDES discharge permits and the Department of Fish and Game monitors the status of many marine and freshwater fisheries stocks. Aquatic life is managed from both species-specific (e.g., Coho salmon) and a habitat (e.g., rocky reefs) perspectives.

### Subtheme: Wadeable streams

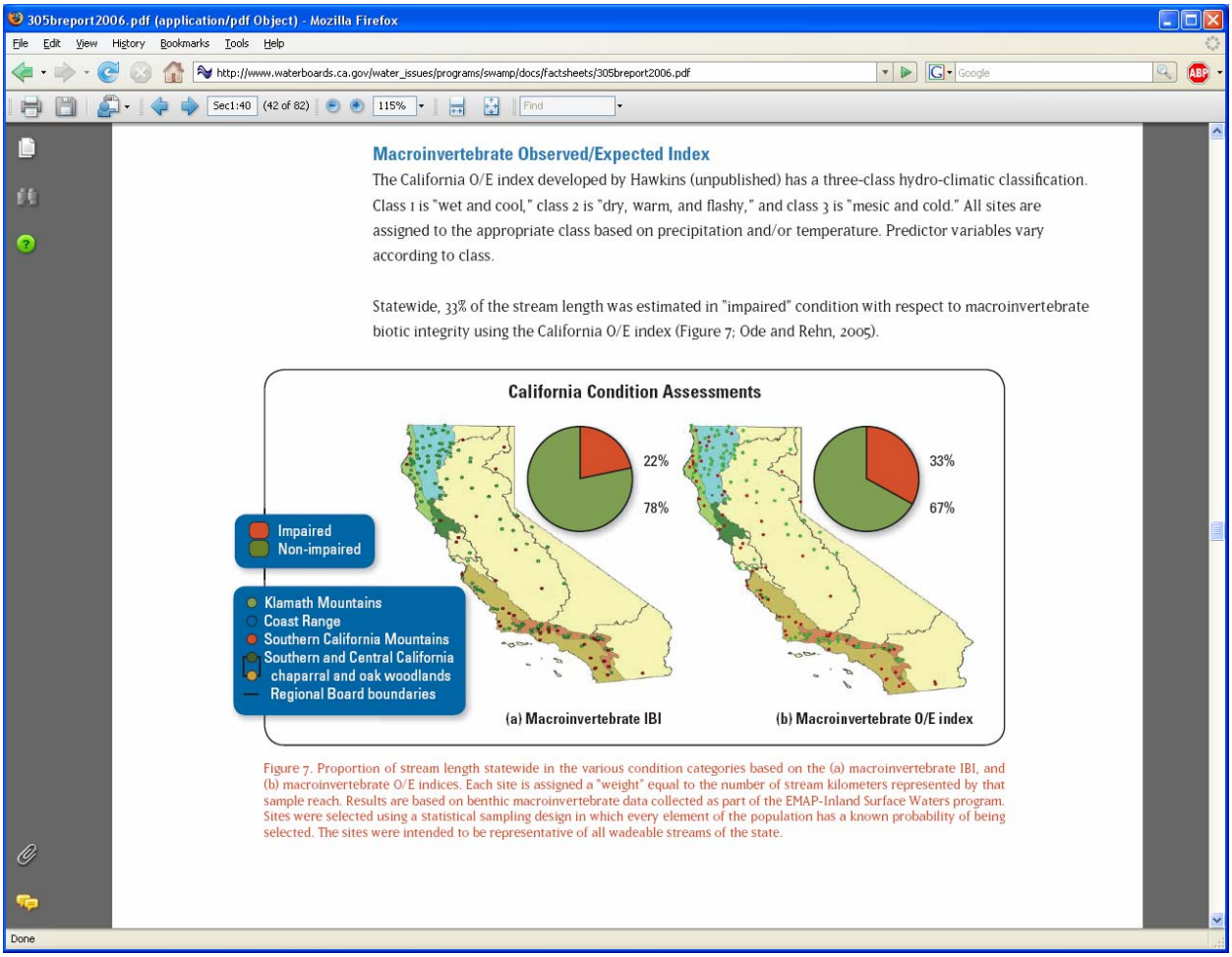
**Website**:
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reports/assess_socal2004.pdf
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/factsheets/305breport2006.pdf
**Sponsor**: State Water Board
**Contact**: Val Connor, State Water Board
**Description**: This program is intended to answer key questions about water quality and biological condition in wadeable streams statewide. A randomized design with standardized indicators provides the ability to assess overall water quality and ecological condition, estimate the proportion of wadeable streams falling into different categories of condition, and track changes in these measures over time. Monitoring results also help in prioritizing problem areas for further investigation. The program is implemented as a cooperative effort between the State Water Board and the Regional Water Boards.
**Evaluation of 10 elements**:

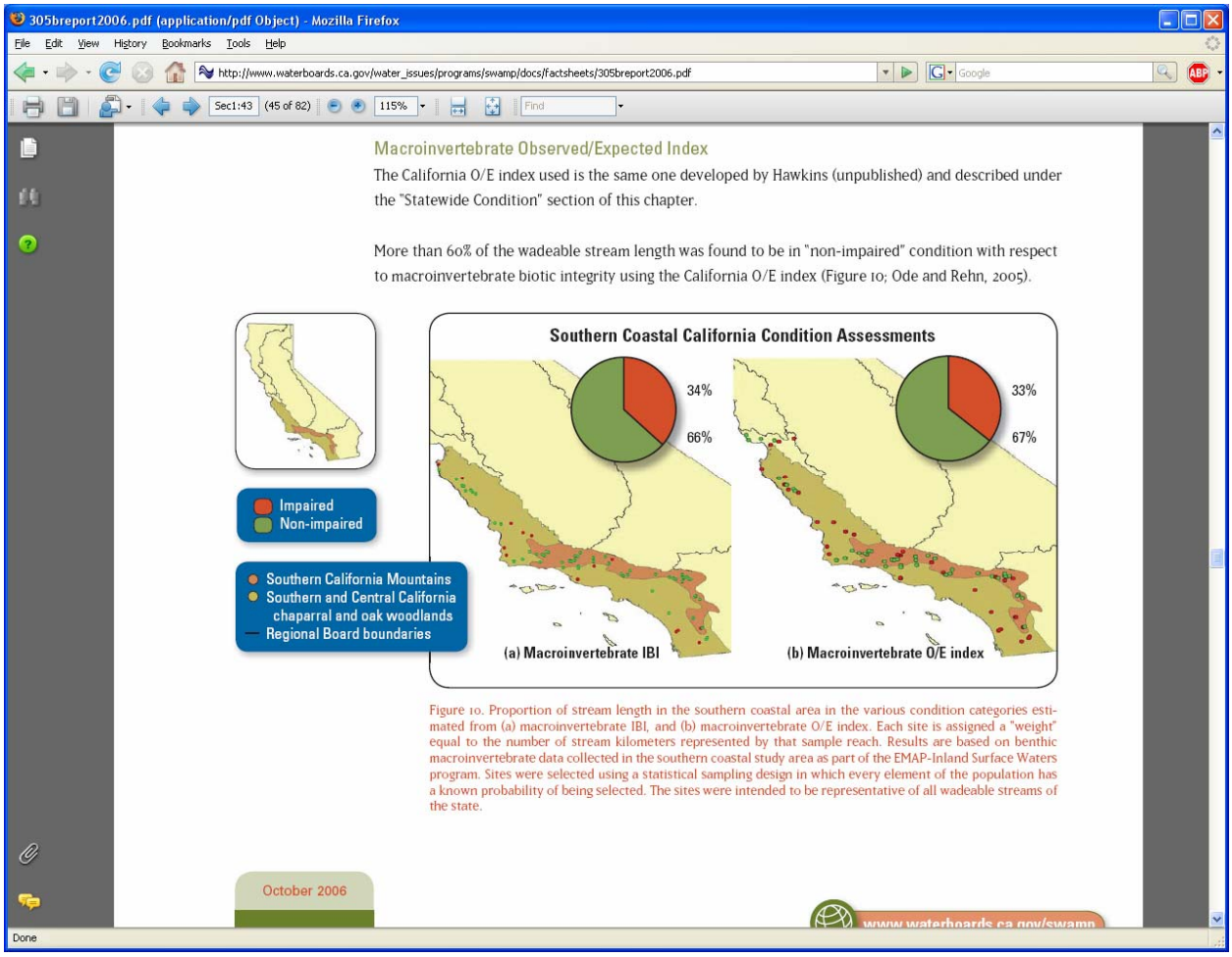
1. Strategy: The program asks and answers clear questions, with specific audiences in mind
   **Score: 10**
2. Monitoring objective: The monitoring objective is to assess the percentage of stream miles falling into different condition categories and to track how those percentages change over time
   **Score: 10**
3. Monitoring design: The monitoring design is specifically tailored to match the strategy and objective. It is well-described, standardized, and implemented consistently statewide
   **Score: 10**
4. Indicators: Indicators are centrally developed and standardized, with training available in field procedures. There is ongoing methods comparison research on bioassessment methods and to determine if CRAM (California Rapid Assessment Protocol) can provide equivalent results for less cost. Procedure manuals and indicator descriptions are available on the SWAMP website
   **Score: 10**
5. Quality assurance: QA is a central part of the program, with standardized methods and data required to meet SWAMP QA standards before entry into the SWAMP database
   **Score: 10**
6. Data management: Data management procedures are well established. Data are stored in the BDAT / CEDEN database in a standardized format and are available for search and download to any interested user
   **Score: 10**
7. Data anaysis and assessment: Analysis and assessment follows detailed and standardized protocols described in the assessment report in greater detail in a series of technical reports available on the SWAMP website. The assessment approach allows for examination of status and trends at the statewide, regional, watershed, and site-specific level
   **Score: 10**
8. Reporting: A statewide assessment report is available on the SWAMP website. However, there are no interactive features to enable users to focus on a specific area or directly obtain the underlying data through a link to the database
   **Score: 8**

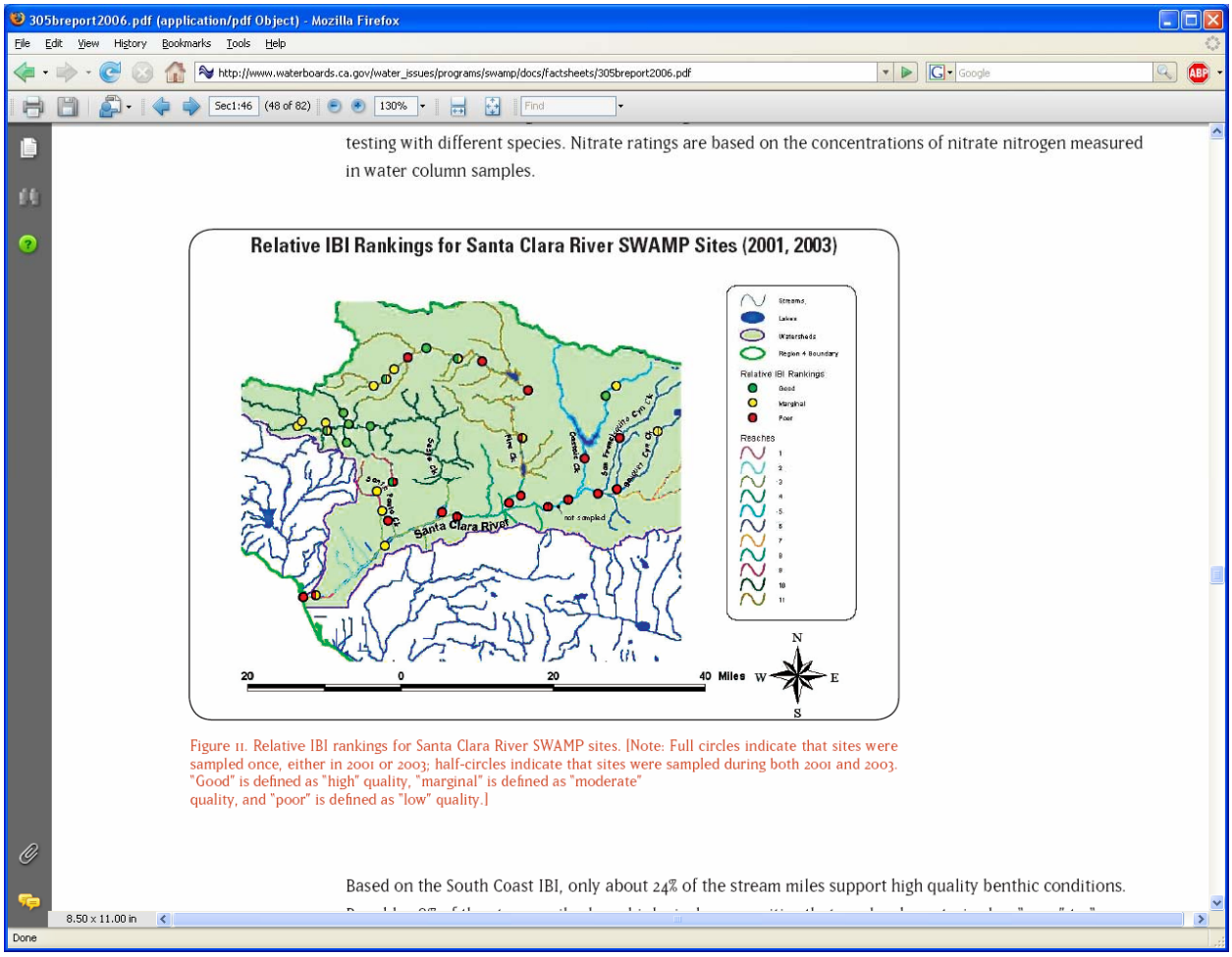
9. Programmatic evaluation: No description of a periodic program evaluation process, although the SWAMP as a whole recently underwent a thorough external evaluation
   **Score: 3**
10. Program planning: No information on assessment of or planning for future program needs, although SWAMP is currently developing a longer-range business plan
    **Score: 3**

**Sample webpages**: NA

**Sample assessment products**:




305breport2006.pdf (application/pdf Object) - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/factsheets/305breport2006.pdf
Sec1:43 (45 of 82) 115%
Find
Macroinvertebrate Observed/Expected Index
The California O/E index used is the same one developed by Hawkins (unpublished) and described under the "Statewide Condition" section of this chapter.
More than 60% of the wadeable stream length was found to be in "non-impaired" condition with respect to macroinvertebrate biotic integrity using the California O/E index (Figure 10; Ode and Rehn, 2005).
Southern Coastal California Condition Assessments
34%
66%
33%
67%
Impaired
Non-impaired
Southern California Mountains
Southern and Central California chaparral and oak woodlands
Regional Board boundaries
(a) Macroinvertebrate IBI
(b) Macroinvertebrate O/E index
Figure 10. Proportion of stream length in the southern coastal area in the various condition categories estimated from (a) macroinvertebrate IBI, and (b) macroinvertebrate O/E index. Each site is assigned a "weight" equal to the number of stream kilometers represented by that sample reach. Results are based on benthic macroinvertebrate data collected in the southern coastal study area as part of the EMAP-Inland Surface Waters program. Sites were selected using a statistical sampling design in which every element of the population has a known probability of being selected. The sites were intended to be representative of all wadeable streams of the state.
October 2006
www.waterboards.ca.gov/swamp
Done


305breport2006.pdf (application/pdf Object) - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/factsheets/305breport2006.pdf
Sec1:46 (48 of 82) 130%
Find
testing with different species. Nitrate ratings are based on the concentrations of nitrate nitrogen measured in water column samples.
Relative IBI Rankings for Santa Clara River SWAMP Sites (2001, 2003)
Streams
Lakes
Watersheds
Region 4 Boundary
Relative IBI Rankings
Good
Marginal
Poor
Reaches
Santa Clara River
not sampled
20 0 20 40 Miles
N
W
E
S
Figure 11. Relative IBI rankings for Santa Clara River SWAMP sites. [Note: Full circles indicate that sites were sampled once, either in 2001 or 2003; half-circles indicate that sites were sampled during both 2001 and 2003. "Good" is defined as "high" quality, "marginal" is defined as "moderate" quality, and "poor" is defined as "low" quality.]
Based on the South Coast IBI, only about 24% of the stream miles support high quality benthic conditions.
8.50 x 11.00 in
Done

## Subtheme: Streams – fisheries

**Website:** www.calfish.org/portals/2/Home/tabid/70/Default.aspx
**Sponsor:** The Resources Agency, Department of Fish and Game, Department of Water Resources, Coastal Conservancy, Caltrans, Pacific States Marine Fisheries Commission, NOAA Fisheries
**Contact:** NA
**Description:** This coordinated, state and federal interagency effort is intended to create, maintain, and enhance high quality, consistent data that are directly applicable to policy, planning, management, research, and recovery of anadromous fish and related aquatic resources in California, and to provide data and information services in a timely manner in formats that meet the needs of users. Its primary intent is to centralize access to fisheries and habitat monitoring and assessment data in California. This will make make it much easier to develop and maintain statewide data standards and promote further development of related data programs.
**Evaluation of 10 elements:**

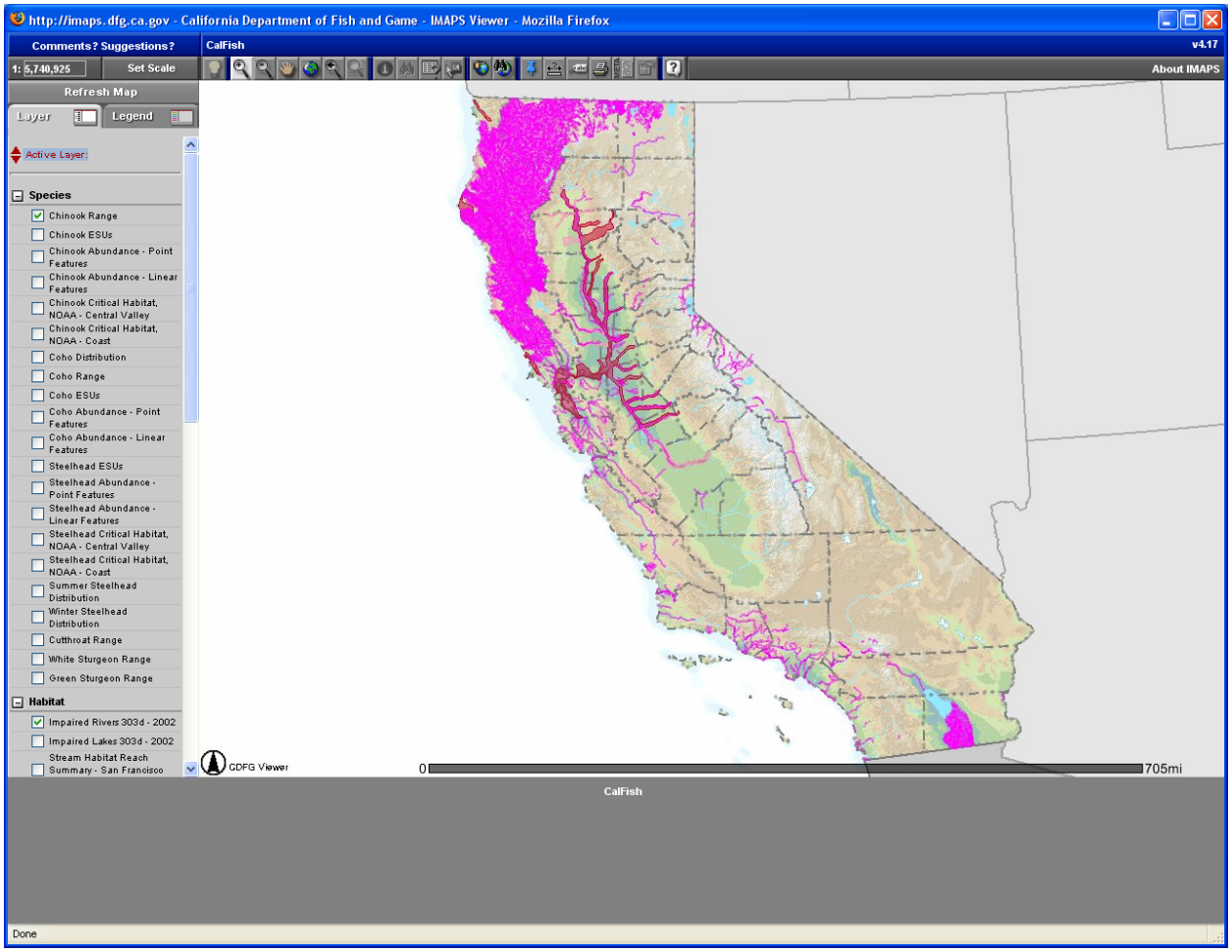
1. Strategy: The portal's overall strategy is broad but clearly stated
   **Score: 10**
2. Monitoring objectives: Monitoring objectives are defined by each of CalFish's cooperating agencies and vary depending on each agency's mission and the goals of specific programs. Monitoring objectives are available through links to agency programs provided on the website
   **Score: 7**
3. Monitoring design: As for monitoring objectives, monitoring designs are defined by CalFish's cooperating agencies and vary depending on individual program goals. Designs for many programs are available through links provided on the website
   **Score: 7**
4. Indicators: Monitoring indicators focus on measures of abundance and distribution and the cooperating agencies work to standardize these across programs. However, there is no information about standardization efforts directly available on the website
   **Score: 6**
5. Quality assurance: Quality assurance procedures are established and implemented by each cooperating agency. There is no information about QA directly available on the website
   **Score: 5**
6. Data management: Data management procedures are established and implemented by CalFish's cooperating agencies. In addition, there is a broader effort among CalFish's participants to standardize formats to improve access to and integration of data from multiple sources. The website provides links to published data collection and documentation standards and encourages their broader use. Users are able to view data via two basic methods: querying the database tables directly or querying the data geographically. The geographical queries are made possible with an interactive on-line mapping system. This system also provides access to a broad array of framework data (political boundaries, hydrography, quad maps, and many more) that make the spatial data even easier to analyze and understand. Because the tabular and geographical databases are linked, users can move easily between the two systems
   **Score: 7**
7. Data analysis and assessment: Given the wide range of issues related to anadromous fisheries, there is no single statewide assessment approach adopted by all agencies. Instead, data analysis and assessment is conducted by CalFish's cooperating agencies to meet their specific needs. However, the website provides descriptions of and links to assessment tools that may be of use to broader audiences, such as a method, developed by the Department of Fish and Game Information Services Branch for deriving salmonid distribution from existing observation data and creating GIS layers identifying this distribution. As another example, the interactive mapping

tool enables users to map a wide variety of abundance and distribution data against various habitat, water quality, and management parameters
**Score: 7**

8. Reporting: CalFish produces no reports of its own, though a variety of assessment reports are available from each of the cooperating agencies. CalFish does allow users to search the integrated database and create custom reports on population trends and counts, distributions, migration barriers, and fish genetics, as well as view information on individual monitoring programs, hatcheries, and habitat restoration projects
   **Score: 7**
9. Programmatic evaluation: No description of a periodic program evaluation process
   **Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

**Sample webpages:**

**Sample assessment products:** Chinook range mapped with impaired rivers from 2002 303(d) listing



## Subtheme: Coastal waters – reefs

**Website**: CDFG CRANE – http://www.dfg.ca.gov/marine/fir/sss.asp#crane; Reef Check – http://www.reefcheck.org/rcca/rcca_home.php
**Sponsor**: Department of Fish and Game; Reef Check
**Contact**: CRANE – Dan Pondella, Occidental College; Reef Check – Fiona Nagle, California Program Manager; William Golden, California Database Manager
**Description**: CDFG's Cooperative Research and Assessment of Nearshore Ecosystems (CRANE) is a collaborative effort between the California Department of Fish and Game (CDFG), various universities, private organizations, and government programs to gather and report data for fishery management and performance of marine protected areas. In 2004, funding was available for a wide-scale survey and report of fish and invertebrate populations in shallow, rocky habitats accessible to divers (Monterey to San Diego, including the Channel Islands). Reef Check California aims to support the CRANE program by establishing a network of volunteers trained to carry out surveys of nearshore reefs providing data on the status of key indicator species.
**Evaluation of 10 elements**:

1. Strategy: The programs ask and answer clear questions, with specific audiences in mind. However, there is no direct link to management actions
   **Score: 7**
2. Monitoring objectives: Specific monitoring objectives are stated on the Reef Check website (but not the CRANE website) and are to assess the relative abundance and size distribution of target species and how these parameters are changing over time. This will permit the evaluation of population and community attributes at sites inside and outside of existing and proposed Marine Protected Areas and will provide insight into how different sites respond to newly imposed management measures
   **Score: 10**
3. Monitoring design: The monitoring design is standardized statewide and is described in CRANE's 2006 summary report and in detail on the Reef Check website. Both programs have scientific advisory teams who provide input and feedback to ensure the scientific quality of the programs' data
   **Score: 10**
4. Indicators: Indicators are standardized statewide and are described in CRANE's 2006 summary report and on the Reef Check website
   **Score: 10**
5. Quality assurance: Basic QA procedures is described very briefly in CRANE's 2006 report. A quality assurance plan, with detailed procedures, is posted on Reef Check's website. These procedures are included in the 4 – 5 day volunteer training program, which includes both classroom and field training in the sampling and data management protocols
   **Score: 6**
6. Data management: The basic data flow is described in CRANE's 2006 report. Reef Check's data management procedures are well established and clearly defined, and include standardized data entry forms. The program has a designated full-time database manager. Summarized data (e.g., mean, standard error) are available as tables in a PDF document. However, there are no tools for searching or downloading raw data from either website or exporting them to other formats
   **Score: 7**
7. Data analysis and assessment: Data analysis methods are described in CRANE's 2006 summary report and Reef Check's 2006 – 97 report, and consisted of the preparation of summary descriptive statistics, correlation analyses, and multivariate pattern analysis. There are no assessment frameworks or thresholds for evaluating and comparing condition

**Score: 6**

8. Reporting: Data summary reports and the 2006 analysis and assessment report are available on the CRANE website. Reef Check also produced a two-year report assessing data collected in 2006 and 2007. Analyses included basic descriptions of abundance and distribution, as well as spatial pattern analyses. Users do not have the ability to define and run reports using their own criteria
   **Score: 6**
9. Programmatic evaluation: No description of a periodic program evaluation process
   **Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

**Sample webpages**:

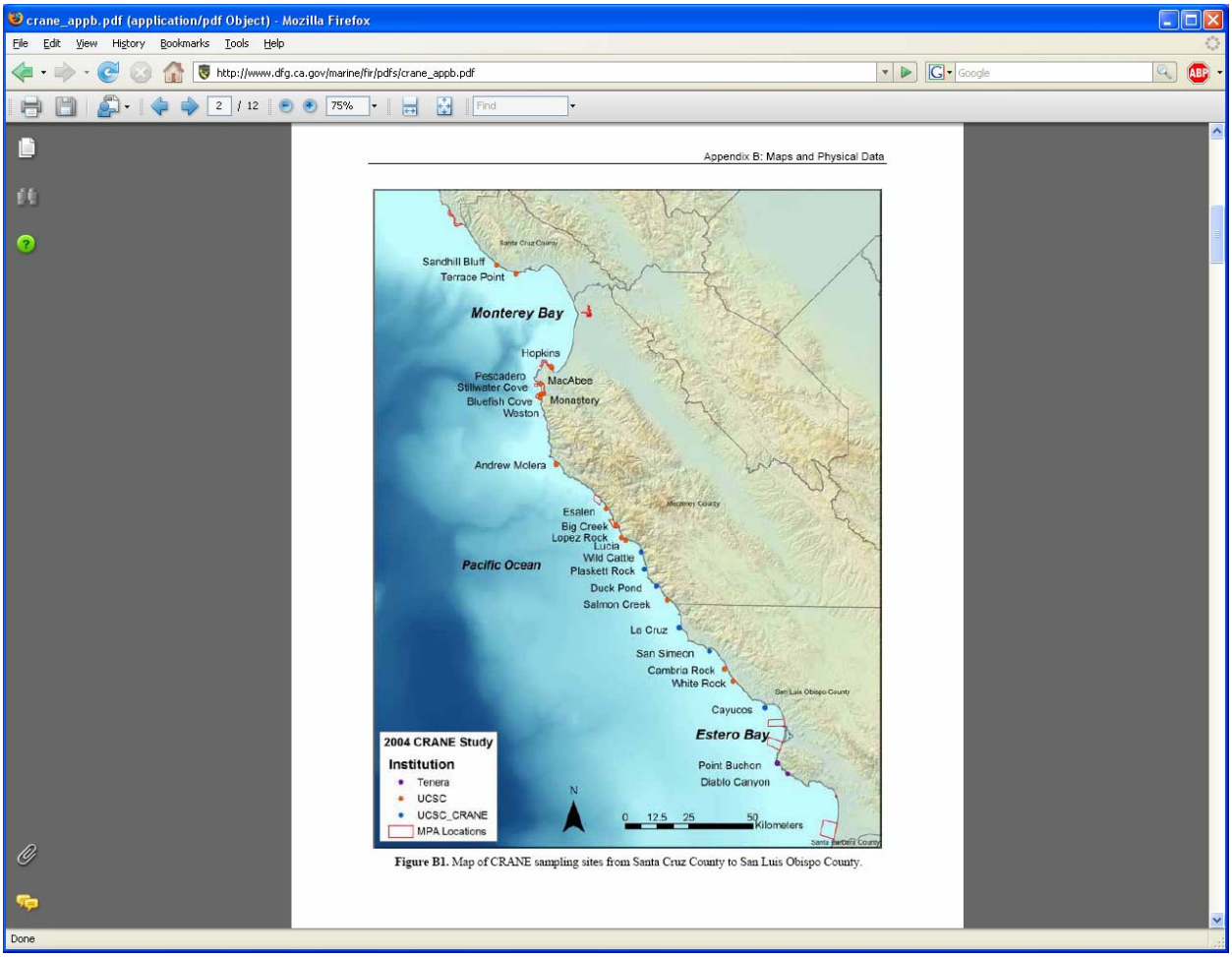
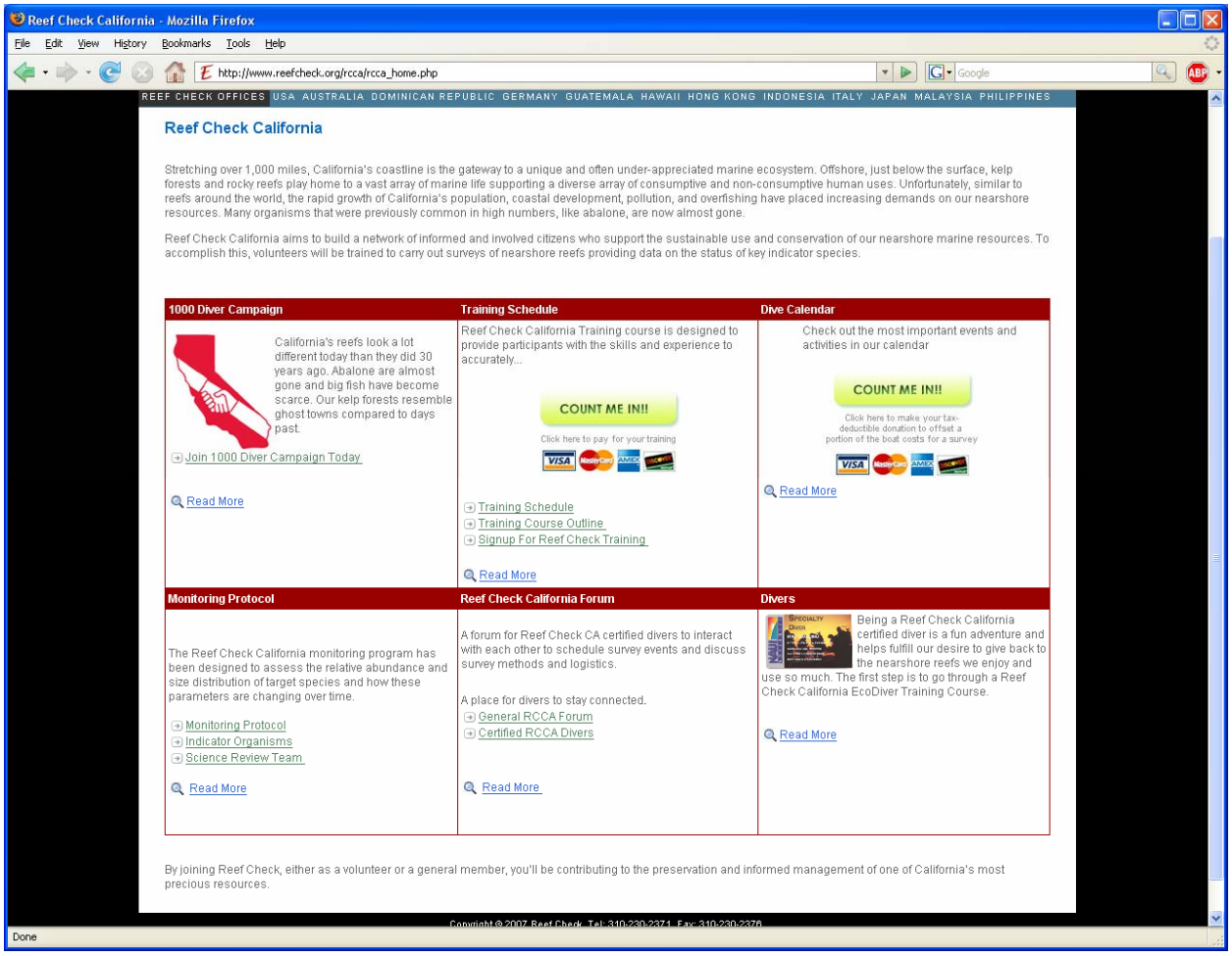
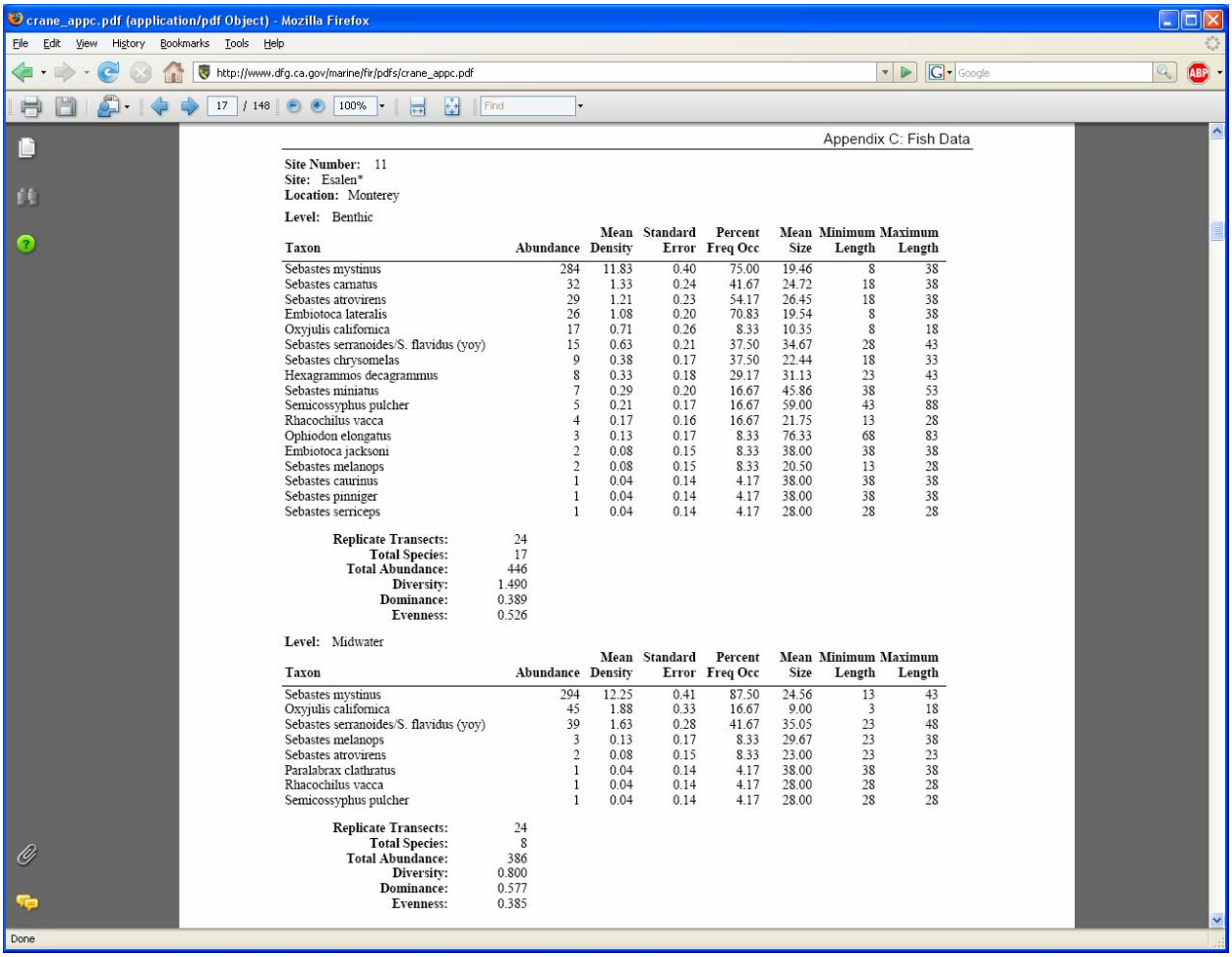


**Figure B1.** Map of CRANE sampling sites from Santa Cruz County to San Luis Obispo County.


Reef Check California - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.reefcheck.org/rcca/rcca_home.php
REEF CHECK OFFICES USA AUSTRALIA DOMINICAN REPUBLIC GERMANY GUATEMALA HAWAII HONG KONG INDONESIA ITALY JAPAN MALAYSIA PHILIPPINES
Reef Check California
Stretching over 1,000 miles, California's coastline is the gateway to a unique and often under-appreciated marine ecosystem. Offshore, just below the surface, kelp forests and rocky reefs play home to a vast array of marine life supporting a diverse array of consumptive and non-consumptive human uses. Unfortunately, similar to reefs around the world, the rapid growth of California's population, coastal development, pollution, and overfishing have placed increasing demands on our nearshore resources. Many organisms that were previously common in high numbers, like abalone, are now almost gone.
Reef Check California aims to build a network of informed and involved citizens who support the sustainable use and conservation of our nearshore marine resources. To accomplish this, volunteers will be trained to carry out surveys of nearshore reefs providing data on the status of key indicator species.
1000 Diver Campaign
California's reefs look a lot different today than they did 30 years ago. Abalone are almost gone and big fish have become scarce. Our kelp forests resemble ghost towns compared to days past.
Join 1000 Diver Campaign Today
Read More
Training Schedule
Reef Check California Training course is designed to provide participants with the skills and experience to accurately...
COUNT ME IN!!
Click here to pay for your training
Training Schedule
Training Course Outline
Signup For Reef Check Training
Read More
Dive Calendar
Check out the most important events and activities in our calendar
COUNT ME IN!!
Click here to make your tax-deductible donation to offset a portion of the boat costs for a survey
Read More
Monitoring Protocol
The Reef Check California monitoring program has been designed to assess the relative abundance and size distribution of target species and how these parameters are changing over time.
Monitoring Protocol
Indicator Organisms
Science Review Team
Read More
Reef Check California Forum
A forum for Reef Check CA certified divers to interact with each other to schedule survey events and discuss survey methods and logistics.
A place for divers to stay connected.
General RCCA Forum
Certified RCCA Divers
Read More
Divers
Being a Reef Check California certified diver is a fun adventure and helps fulfill our desire to give back to the nearshore reefs we enjoy and use so much. The first step is to go through a Reef Check California EcoDiver Training Course.
Read More
By joining Reef Check, either as a volunteer or a general member, you'll be contributing to the preservation and informed management of one of California's most precious resources.
Done

**Sample assessment products**:






**Site Number:** 11
**Site:** Esalen*
**Location:** Monterey

**Level:** Benthic

| Taxon | Abundance | Mean Density | Standard Error | Percent Freq Occ | Mean Size | Minimum Length | Maximum Length |
|---|---|---|---|---|---|---|---|
| Sebastes mystinus | 284 | 11.83 | 0.40 | 75.00 | 19.46 | 8 | 38 |
| Sebastes carnatus | 32 | 1.33 | 0.24 | 41.67 | 24.72 | 18 | 38 |
| Sebastes atrovirens | 29 | 1.21 | 0.23 | 54.17 | 26.45 | 18 | 38 |
| Embiotoca lateralis | 26 | 1.08 | 0.20 | 70.83 | 19.54 | 8 | 38 |
| Oxyjulis californica | 17 | 0.71 | 0.26 | 8.33 | 10.35 | 8 | 18 |
| Sebastes serranoides/S. flavidus (yoy) | 15 | 0.63 | 0.21 | 37.50 | 34.67 | 28 | 43 |
| Sebastes chrysomelas | 9 | 0.38 | 0.17 | 37.50 | 22.44 | 18 | 33 |
| Hexagrammos decagrammus | 8 | 0.33 | 0.18 | 29.17 | 31.13 | 23 | 43 |
| Sebastes miniatus | 7 | 0.29 | 0.20 | 16.67 | 45.86 | 38 | 53 |
| Semicossyphus pulcher | 5 | 0.21 | 0.17 | 16.67 | 59.00 | 43 | 88 |
| Rhacochilus vacca | 4 | 0.17 | 0.16 | 16.67 | 21.75 | 13 | 28 |
| Ophiodon elongatus | 3 | 0.13 | 0.17 | 8.33 | 76.33 | 68 | 83 |
| Embiotoca jacksoni | 2 | 0.08 | 0.15 | 8.33 | 38.00 | 38 | 38 |
| Sebastes melanops | 2 | 0.08 | 0.15 | 8.33 | 20.50 | 13 | 28 |
| Sebastes caurinus | 1 | 0.04 | 0.14 | 4.17 | 38.00 | 38 | 38 |
| Sebastes pinniger | 1 | 0.04 | 0.14 | 4.17 | 38.00 | 38 | 38 |
| Sebastes serriceps | 1 | 0.04 | 0.14 | 4.17 | 28.00 | 28 | 28 |

| | |
|---|---|
| **Replicate Transects:** | 24 |
| **Total Species:** | 17 |
| **Total Abundance:** | 446 |
| **Diversity:** | 1.490 |
| **Dominance:** | 0.389 |
| **Evenness:** | 0.526 |

**Level:** Midwater

| Taxon | Abundance | Mean Density | Standard Error | Percent Freq Occ | Mean Size | Minimum Length | Maximum Length |
|---|---|---|---|---|---|---|---|
| Sebastes mystinus | 294 | 12.25 | 0.41 | 87.50 | 24.56 | 13 | 43 |
| Oxyjulis californica | 45 | 1.88 | 0.33 | 16.67 | 9.00 | 3 | 18 |
| Sebastes serranoides/S. flavidus (yoy) | 39 | 1.63 | 0.28 | 41.67 | 35.05 | 23 | 48 |
| Sebastes melanops | 3 | 0.13 | 0.17 | 8.33 | 29.67 | 23 | 38 |
| Sebastes atrovirens | 2 | 0.08 | 0.15 | 8.33 | 23.00 | 23 | 23 |
| Paralabrax clathratus | 1 | 0.04 | 0.14 | 4.17 | 38.00 | 38 | 38 |
| Rhacochilus vacca | 1 | 0.04 | 0.14 | 4.17 | 28.00 | 28 | 28 |
| Semicossyphus pulcher | 1 | 0.04 | 0.14 | 4.17 | 28.00 | 28 | 28 |

| | |
|---|---|
| **Replicate Transects:** | 24 |
| **Total Species:** | 8 |
| **Total Abundance:** | 386 |
| **Diversity:** | 0.800 |
| **Dominance:** | 0.577 |
| **Evenness:** | 0.385 |

RCCA_2yr_Report.pdf (application/pdf Object) - Mozilla Firefox

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http://www.reefcheck.org/PDFs/rcca2yr/RCCA_2yr_Report.pdf

Reef Check California 2-Year Report - ... | RCCA_2yr_Report.pdf (applicatio...

19 / 36 129%

### *Invertebrates*

MDS was also used to evaluate the similarity of RCCA sites based on invertebrate populations. Similar to the trend displayed by fish populations, RCCA sites sort out very well by geographic region based on RCCA indicator invertebrate populations (Figure 4.7). Bat stars are most common at CenCal sites and the San Miguel Nor-Island sites (two points in middle of Figure 4.7), while rock crabs, sun/sunflower stars and red abalone drive the groupings of the NorCal sites. Invertebrate assemblages are more variable in SoCal and So-Islands sites, although all sites in these regions have relatively large urchin populations, a trait shared with Santa Barbara sites and the Nor-Islands sites on Santa Rosa.

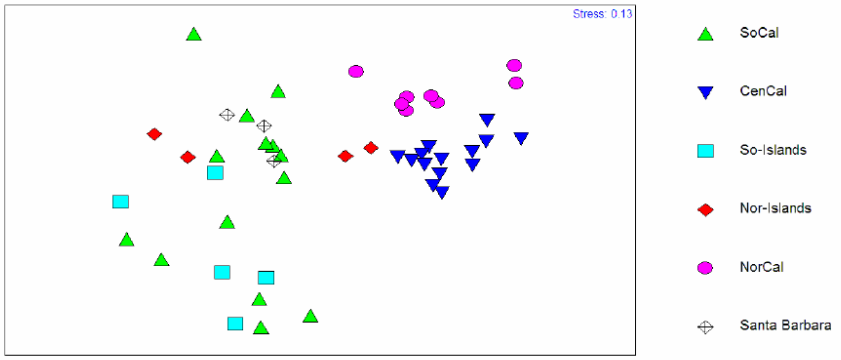



**Figure 4.7**. MDS plot of RCCA sites, coded by geographic region, based on observed invertebrate densities.

Done

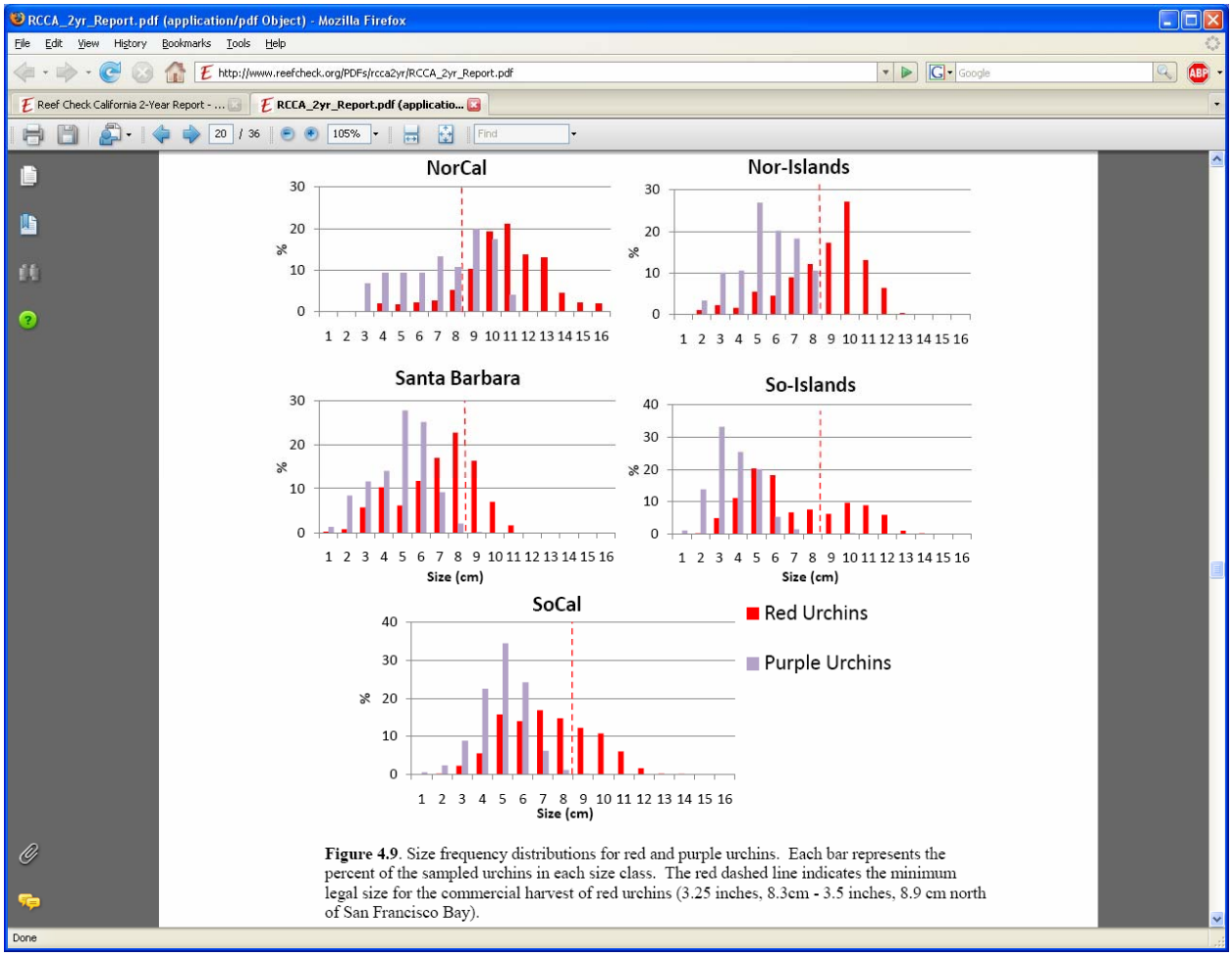



**Figure 4.9**. Size frequency distributions for red and purple urchins. Each bar represents the percent of the sampled urchins in each size class. The red dashed line indicates the minimum legal size for the commercial harvest of red urchins (3.25 inches, 8.3cm - 3.5 inches, 8.9 cm north of San Francisco Bay).

## Subtheme: Coastal waters – aquatic life contamination

**Website:** NA
**Sponsor:** State Water Board
**Contact:** Dominic Gregorio, State Water Board
**Description:** The California Mussel Watch Program, which has just begun sampling, is based on NOAA's historical Status and Trends Program and is being conducted in coordination with NOAA. The program's goal is to continue the earlier time series of broad measures of coastal contamination.
**Evaluation of 10 element:**

1. Strategy: The program asks and answers a clear question, with specific audiences in mind
   **Score: 10**
2. Monitoring objectives: Monitoring objectives have been clearly stated by the National Status and Trends Program program and are to track larger-scale patterns and longer-term trends in contamination of aquatic life in the coastal zone
   **Score: 10**
3. Monitoring design: The monitoring design was established by the National Status and Trends Program and has been updated with new sites selected in coordination with the MARINe intertidal monitoring program. The monitoring design is described in work plans for the northern and southern California components of the program, but is not available online
   **Score: 10**
4. Indicators: Indicators are well defined and standardized both nationally and statewide, and sampling methods are defined in standard operating procedures that are part of the workplans
   **Score: 10**
5. Quality assurance: QA methods are well defined and standardized both nationally and statewide
   **Score: 10**
6. Data management: The California program has only recently been restarted and data management procedures have not yet been established
   **Score: 0**
7. Data analysis and assessment: Data analysis methods are standardized nationwide and consist primarily of descriptive summaries of patterns and trends. There are no assessment thresholds used to categorize condition. The State Water Board and NOAA are still in discussions regarding who will conduct data analysis
   **Score: 5**
8. Reporting: The newly reconstituted program has not yet produced reports or developed a formal reporting strategy
   **Score: 0**
9. Programmatic evaluation: No description of a periodic program evaluation process
   **Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

**Sample website:** NA

**Sample assessment products:**

## Subtheme: Bays and estuaries – sediment quality

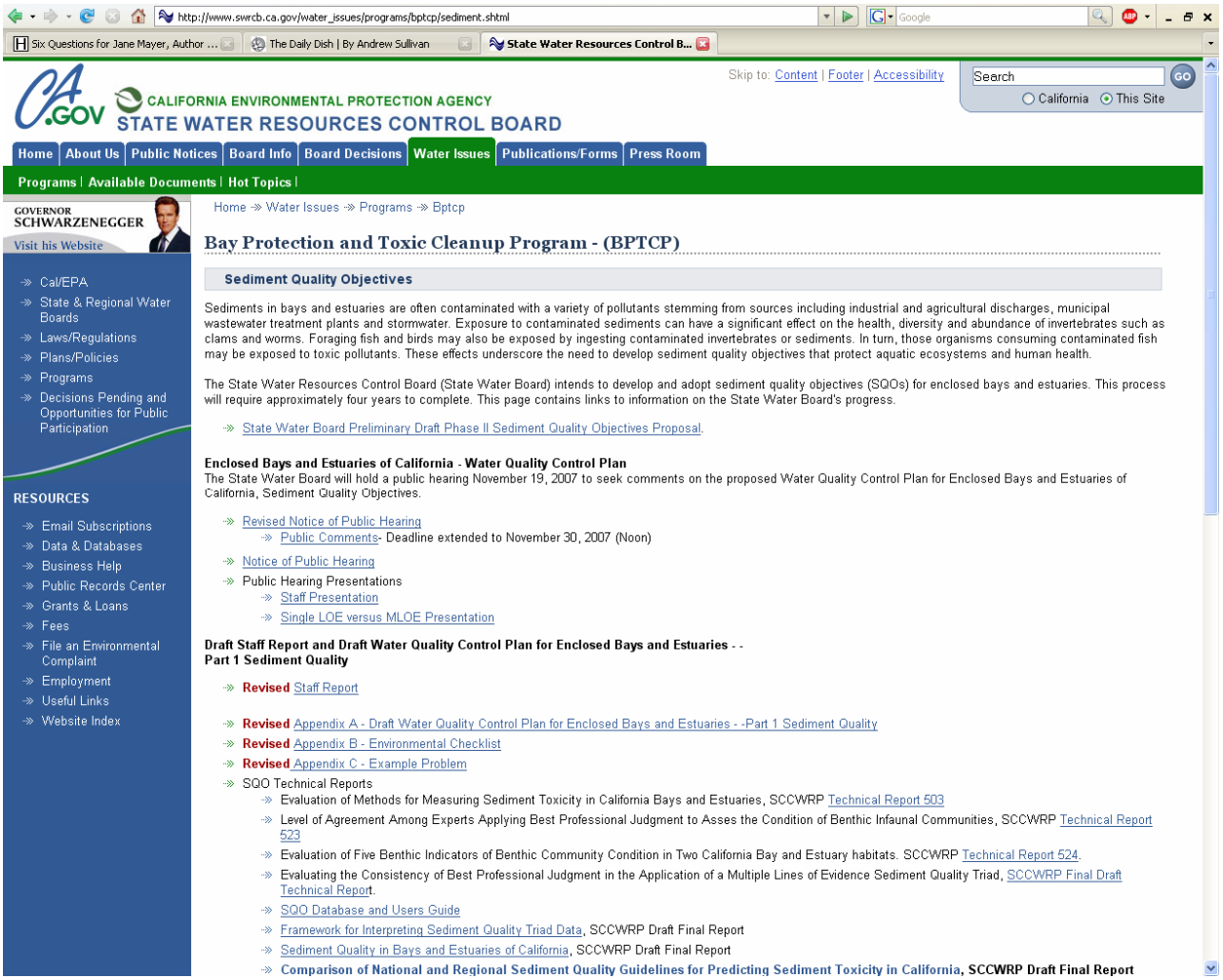
**Website**:
http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/reports/sedimentqual_baysestuaries.pdf
http://www.swrcb.ca.gov/water_issues/programs/bptcp/sediment.shtml
**Sponsor**: State Water Board
**Contact**: Steve Bay, SCCWRP
**Description**: This is a multiyear program to develop and implement objectives for enclosed bays and estuaries that protect aquatic ecosystems and human health from the direct (e.g., toxicity) and indirect (e.g., health impacts from eating contaminated seafood) effects of sediment contamination. The program has focused primarily on the development of an impact assessment framework and associated thresholds, monitoring methods, and standardized assessment tools. The program conducted a statewide assessment of sediment quality, using available data, to demonstrate the applicability of the approach and obtain an initial estimate of the percentage of the area of bays and estuaries falling into different categories of impact.
**Evaluation of 10 elements**:

1. Strategy: The program asks and answers a clear question, with specific audiences in mind
   **Score: 10**
2. Monitoring objectives: The monitoring objective is to assess whether new sediment quality objectives are being met
   **Score: 10**
3. Monitoring design: There was only a small amount of additional monitoring done specifically for this assessment; the assessment was based primarily on available data collected for other purposes. However, the data requirements of the SQO are prompting changes to existing monitoring designs so that all three lines of evidence are collected simultaneously. Spatial and temporal aspects of monitoring designs are only loosely defined by the policy and are left to the discretion of local agencies
   **Score: 5**
4. Indicators: Indicators are standardized and well developed and described in summary form in the statewide assessment report and in greater technical detail in a series of reports available on the State Water Board's SQO website
   **Score: 10**
5. Quality assurance: Data used in the assessment were rigorously checked and validated; however, there are no QA guidelines as part of the SQO policy or guidance materials
   **Score: 5**
6. Data management: A statewide database was established for the 2008 assessment and is currently housed at SCCWRP. The database allows users to download data; however, it will not be integrated with SCCWRP's other internet-based data search tools because it includes data from other organizations. Procedures have not been established for ongoing capture of new monitoring data, maintenance of the database, or inclusion of the database in the BDAT/CEDEN system
   **Score: 3**
7. Data analysis and assessment: Analysis and assessment follow detailed and standardized protocols described in summary in the statewide assessment report and in greater technical detail in a series of technical reports available on the State Water Board's SQO website. The assessment approach allows for examination of status and trends at the statewide and regional levels, and of condition at the local and site-specific levels
   **Score: 10**
8. Reporting: A statewide assessment report is available on the SQO and SWAMP websites. However, there are no interactive features to enable users to focus on a specific area or directly

obtain the underlying data through a link to the database. Plans for future reporting have not been developed
**Score: 4**

9. Programmatic evaluation: No description of a periodic program evaluation process
**Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
**Score: 0**

## Sample webpages



http://www.swrcb.ca.gov/water_issues/programs/bptcp/sediment.shtml

Six Questions for Jane Mayer, Author ... | The Daily Dish | By Andrew Sullivan | State Water Resources Control B...

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# Bay Protection and Toxic Cleanup Program - (BPTCP)

## Sediment Quality Objectives

Sediments in bays and estuaries are often contaminated with a variety of pollutants stemming from sources including industrial and agricultural discharges, municipal wastewater treatment plants and stormwater. Exposure to contaminated sediments can have a significant effect on the health, diversity and abundance of invertebrates such as clams and worms. Foraging fish and birds may also be exposed by ingesting contaminated invertebrates or sediments. In turn, those organisms consuming contaminated fish may be exposed to toxic pollutants. These effects underscore the need to develop sediment quality objectives that protect aquatic ecosystems and human health.

The State Water Resources Control Board (State Water Board) intends to develop and adopt sediment quality objectives (SQOs) for enclosed bays and estuaries. This process will require approximately four years to complete. This page contains links to information on the State Water Board's progress.

- State Water Board Preliminary Draft Phase II Sediment Quality Objectives Proposal.

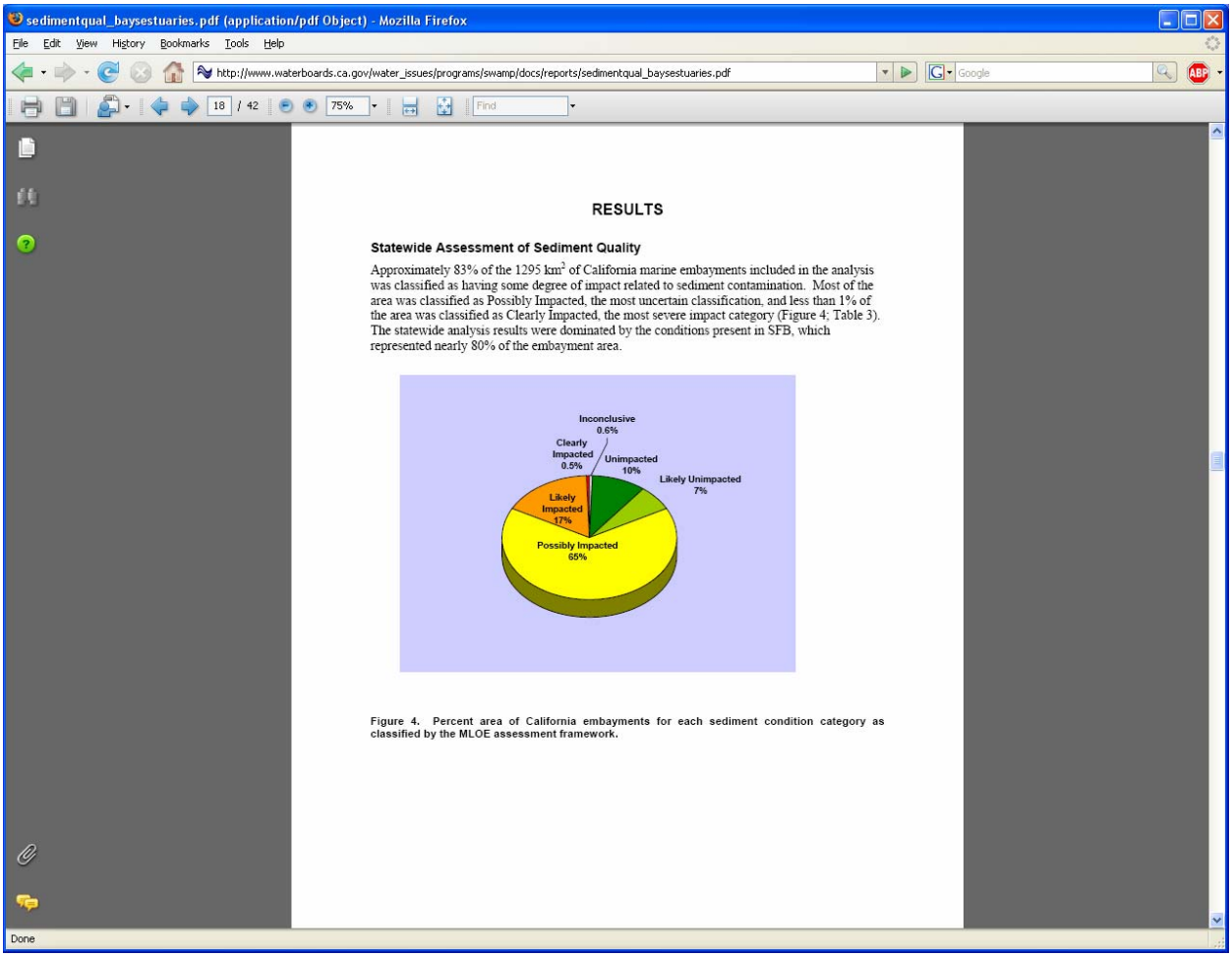
**Enclosed Bays and Estuaries of California - Water Quality Control Plan**
The State Water Board will hold a public hearing November 19, 2007 to seek comments on the proposed Water Quality Control Plan for Enclosed Bays and Estuaries of California, Sediment Quality Objectives.

- Revised Notice of Public Hearing
  - Public Comments- Deadline extended to November 30, 2007 (Noon)
- Notice of Public Hearing
- Public Hearing Presentations
  - Staff Presentation
  - Single LOE versus MLOE Presentation

**Draft Staff Report and Draft Water Quality Control Plan for Enclosed Bays and Estuaries - - Part 1 Sediment Quality**

- **Revised** Staff Report
- **Revised** Appendix A - Draft Water Quality Control Plan for Enclosed Bays and Estuaries - -Part 1 Sediment Quality
- **Revised** Appendix B - Environmental Checklist
- **Revised** Appendix C - Example Problem
- SQO Technical Reports
  - Evaluation of Methods for Measuring Sediment Toxicity in California Bays and Estuaries, SCCWRP Technical Report 503
  - Level of Agreement Among Experts Applying Best Professional Judgment to Asses the Condition of Benthic Infaunal Communities, SCCWRP Technical Report 523
  - Evaluation of Five Benthic Indicators of Benthic Community Condition in Two California Bay and Estuary habitats. SCCWRP Technical Report 524.
  - Evaluating the Consistency of Best Professional Judgment in the Application of a Multiple Lines of Evidence Sediment Quality Triad, SCCWRP Final Draft Technical Report.
  - SQO Database and Users Guide
  - Framework for Interpreting Sediment Quality Triad Data, SCCWRP Draft Final Report
  - Sediment Quality in Bays and Estuaries of California, SCCWRP Draft Final Report
  - **Comparison of National and Regional Sediment Quality Guidelines for Predicting Sediment Toxicity in California, SCCWRP Draft Final Report**

**Sample assessment products**:



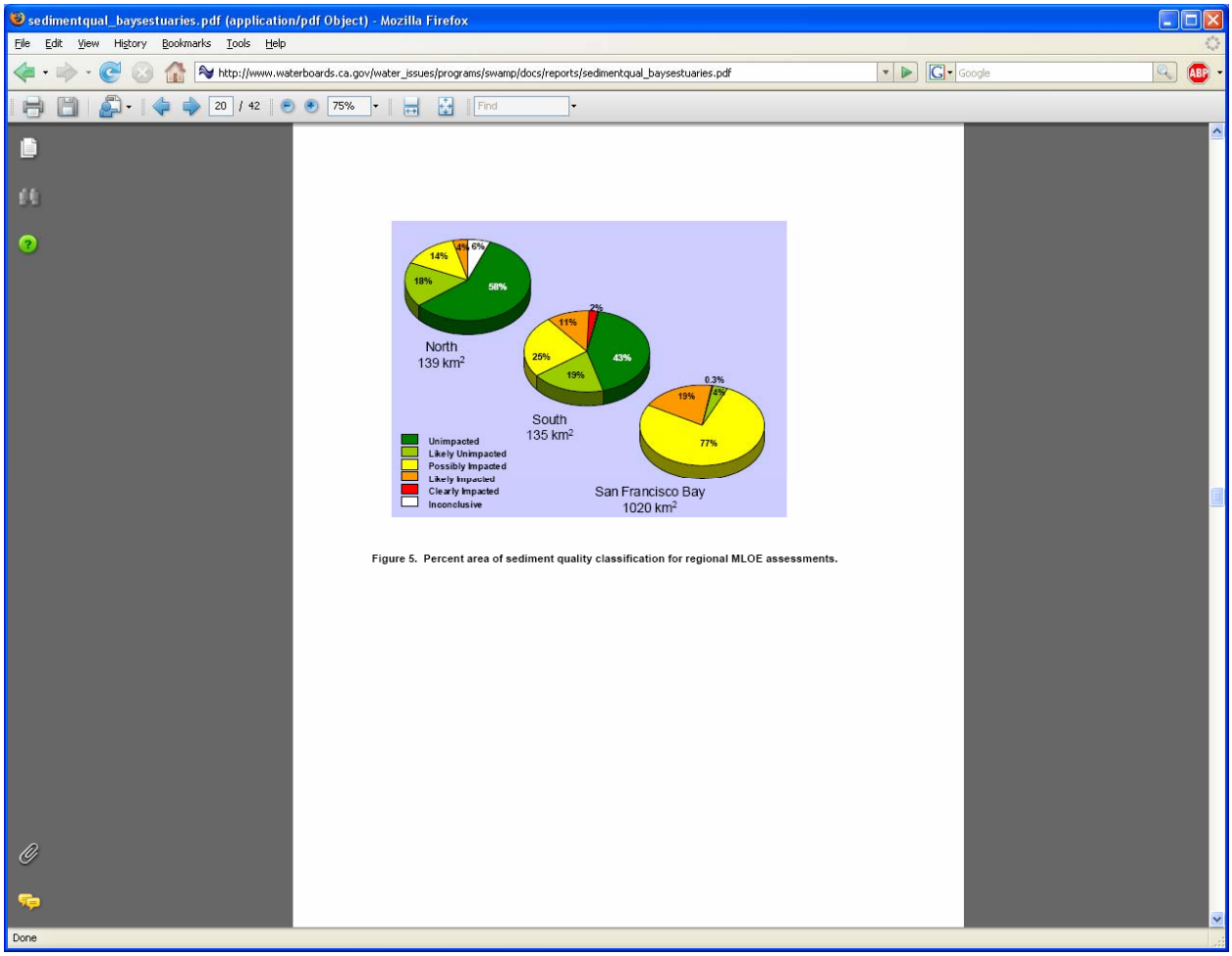



**Figure 5. Percent area of sediment quality classification for regional MLOE assessments.**

## Subtheme: Bays and estuaries – San Francisco Bay

**Website**: http://www.sfei.org/rmp/
**Sponsor**: San Francisco Estuary Institute (SFEI)
**Contact**: Mike Connor, SFEI
**Description**: The Regional Monitoring Program for San Francisco Bay (RMP) is funded by a consortium of dischargers in the region and managed by a Steering Committee including consortium members and the Regional Water Board. The program's core focus is on
**Evaluation of 10 elements**:

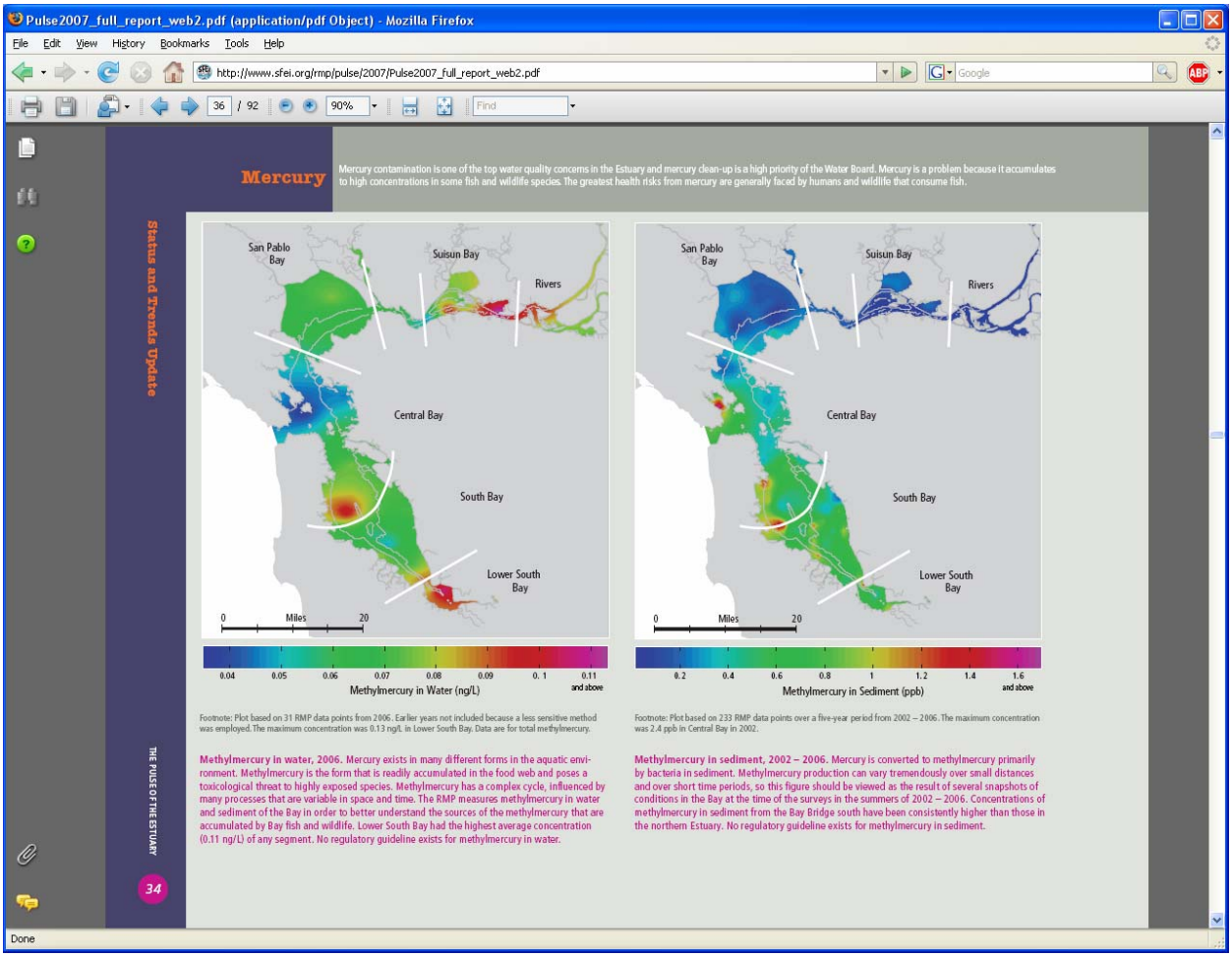
1. Strategy: The program asks and answers clear questions, with a range of audiences in mind
   **Score: 10**
2. Monitoring objectives: Monitoring objectives are reviewed and approved by Technical Review and Steering Committees and are explicitly stated on the program website. There are five higher-level objectives (e.g., Describe the distribution and trends of pollutant concentrations in the Estuary; Describe sources, pathways, and loading of pollutants entering the Estuary) which are then expanded by a series of detailed questions (e.g., For each pollutant of concern, what forms are released from each pathway and what are the magnitude and temporal variation of concentrations and loadings?)
   **Score: 10**
3. Monitoring design: The RMP includes two sorts of monitoring designs, a stable status and trends design based on EPA's EMAP design that includes a rotating cycle of randomized stations, and targeted pilot and special studies designed to resolve shorter-term questions. Designs are well described on the program's website
   **Score: 10**
4. Indicators: Indicators are standardized and well developed and described in summary form in the statewide assessment report and in greater technical detail in a series of reports available on SFEI's website
   **Score: 10**
5. Quality assurance: The program has a QA officer and a detailed QAPP, which is regularly reviewed and updated. Quality control procedures and reports are available on the program's website
   **Score: 10**
6. Data management: Data management procedures are well defined and managed by SFEI's database manager. Data for all program components (e.g., fish tissue, water) are readily available for search, viewing, and download from SFEI's website
   **Score: 10**
7. Data analysis and assessment: A variety of analysis and assessment approaches are used to address the program's specific objectives. These approaches are reviewed and updated by the program's Technical Advisory and Steering Committees. However, there are no specific assessment thresholds for categorizing condition
   **Score: 8**
8. Reporting: The program produces two annual reports, one containing the complete results of all status and trends monitoring and the Pulse of the Estuary which summarizes findings for a more general audience. The website also provides links to numerous additional publications based on the program's monitoring data. However, there are no interactive features in these reports to enable users to focus on a specific area or directly obtain the underlying data through a link to the database
   **Score: 8**
9. Programmatic evaluation: The program undergoes periodic (every five years) external reviews of all aspects of its design, implementation, and management. Recommendations resulting from

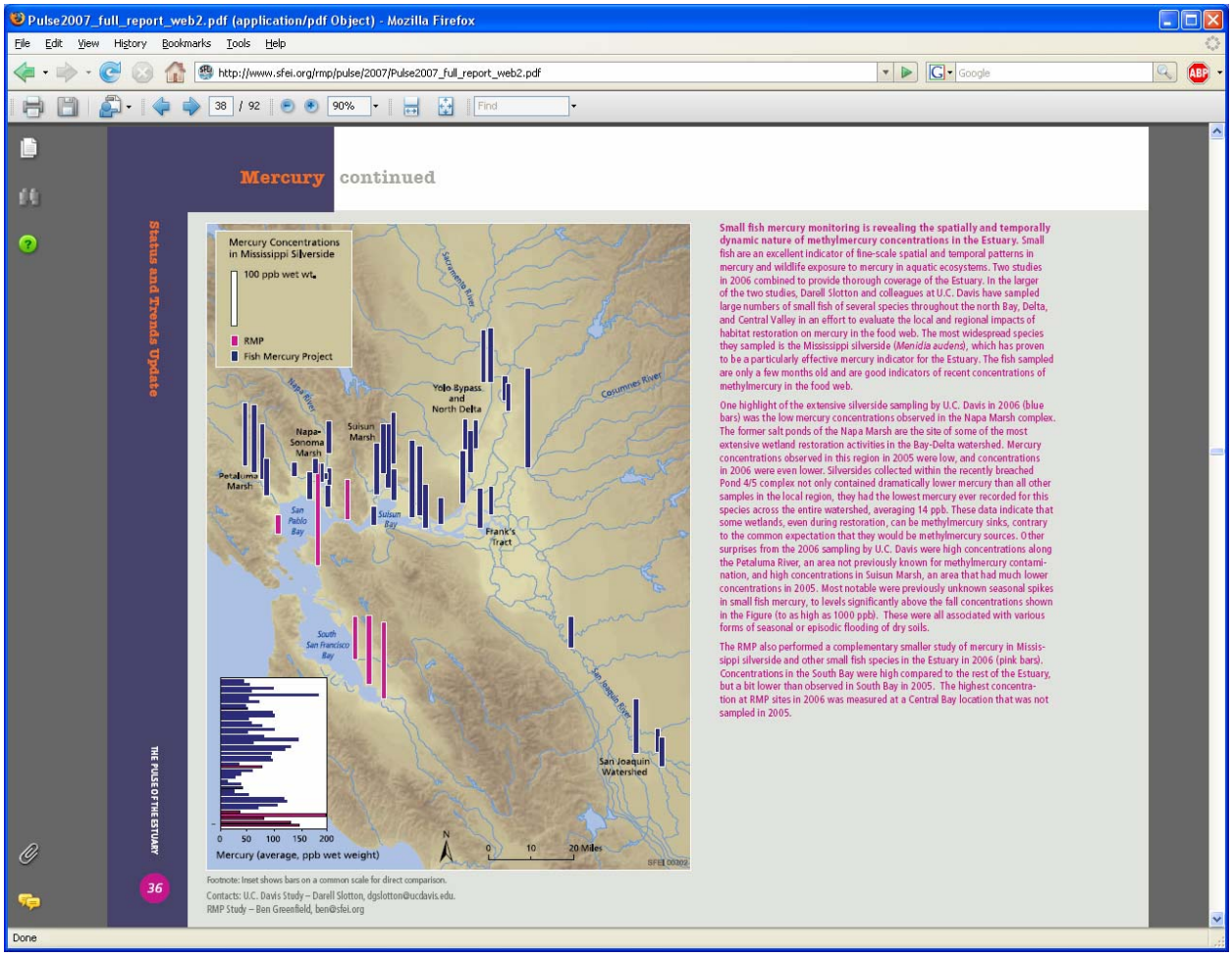
these reviews are addressed by the program's standing committees as well as ad hoc workgroups established to consider specific topics
**Score: 10**

10. Program planning: SFEI prepares annual budgets and program plans for the RMP which are reviewed by the Steering Committee. In addition, SFEI conducts longer-term planning, under the guidance of its board of directors, which includes consideration of the staffing and infrastructure needs of all programs, including the RMP
**Score: 10**

**Sample webpages**:

**Sample assessment products**:




Pulse2007_full_report_web2.pdf (application/pdf Object) - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.sfei.org/rmp/pulse/2007/Pulse2007_full_report_web2.pdf
Mercury continued
Status and Trends Update
THE PULSE OF THE ESTUARY
36
Mercury Concentrations in Mississippi Silverside
100 ppb wet wt.
RMP
Fish Mercury Project
Sacramento River
Napa River
Yolo Bypass and North Delta
Cosumnes River
Napa-Sonoma Marsh
Suisun Marsh
Petaluma Marsh
San Pablo Bay
Suisun Bay
Frank's Tract
South San Francisco Bay
San Joaquin River
San Joaquin Watershed
0 50 100 150 200
Mercury (average, ppb wet weight)
N
0 10 20 Miles
SFEI 00302
Footnote: Inset shows bars on a common scale for direct comparison.
Contacts: U.C. Davis Study – Darell Slotton, dgslotton@ucdavis.edu.
RMP Study – Ben Greenfield, ben@sfei.org
Small fish mercury monitoring is revealing the spatially and temporally dynamic nature of methylmercury concentrations in the Estuary. Small fish are an excellent indicator of fine-scale spatial and temporal patterns in mercury and wildlife exposure to mercury in aquatic ecosystems. Two studies in 2006 combined to provide thorough coverage of the Estuary. In the larger of the two studies, Darell Slotton and colleagues at U.C. Davis have sampled large numbers of small fish of several species throughout the north Bay, Delta, and Central Valley in an effort to evaluate the local and regional impacts of habitat restoration on mercury in the food web. The most widespread species they sampled is the Mississippi silverside (Menidia audens), which has proven to be a particularly effective mercury indicator for the Estuary. The fish sampled are only a few months old and are good indicators of recent concentrations of methylmercury in the food web.
One highlight of the extensive silverside sampling by U.C. Davis in 2006 (blue bars) was the low mercury concentrations observed in the Napa Marsh complex. The former salt ponds of the Napa Marsh are the site of some of the most extensive wetland restoration activities in the Bay-Delta watershed. Mercury concentrations observed in this region in 2005 were low, and concentrations in 2006 were even lower. Silversides collected within the recently breached Pond 4/5 complex not only contained dramatically lower mercury than all other samples in the local region, they had the lowest mercury ever recorded for this species across the entire watershed, averaging 14 ppb. These data indicate that some wetlands, even during restoration, can be methylmercury sinks, contrary to the common expectation that they would be methylmercury sources. Other surprises from the 2006 sampling by U.C. Davis were high concentrations along the Petaluma River, an area not previously known for methylmercury contamination, and high concentrations in Suisun Marsh, an area that had much lower concentrations in 2005. Most notable were previously unknown seasonal spikes in small fish mercury, to levels significantly above the fall concentrations shown in the Figure (to as high as 1000 ppb). These were all associated with various forms of seasonal or episodic flooding of dry soils.
The RMP also performed a complementary smaller study of mercury in Mississippi silverside and other small fish species in the Estuary in 2006 (pink bars). Concentrations in the South Bay were high compared to the rest of the Estuary, but a bit lower than observed in South Bay in 2005. The highest concentration at RMP sites in 2006 was measured at a Central Bay location that was not sampled in 2005.
Done

## Subtheme: Wetlands

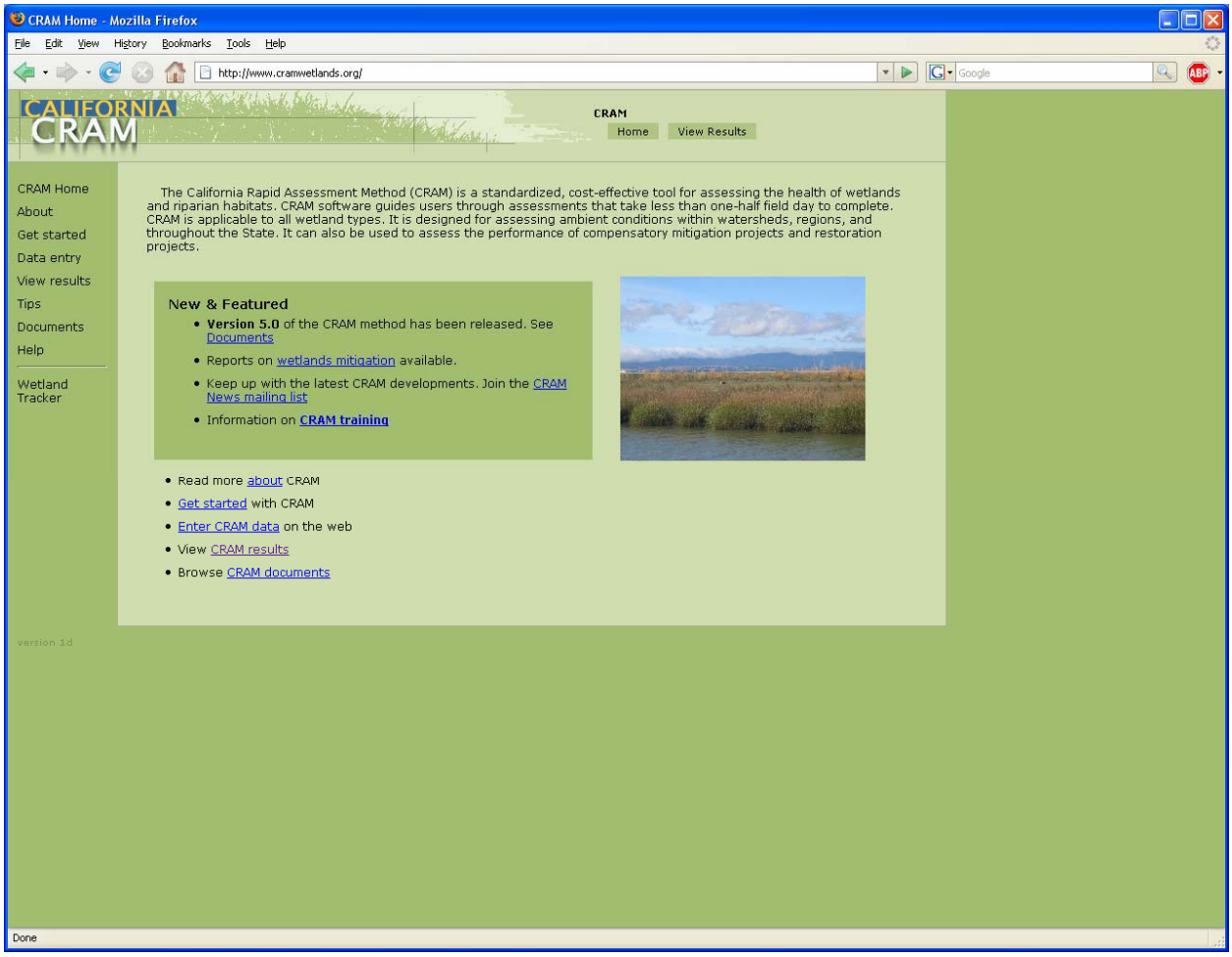
**Website**: CRAM – http://www.cramwetlands.org/; Wetland Tracker - http://www.wetlandtracker.org/
**Sponsor**: State Water Board; California Wetlands Information System – Resources Agency
**Contact**: CRAM and Wetland Tracker – Josh Collins, SFEI
**Description**: The California Rapid Assessment Method (CRAM) is a standardized, cost-effective tool for assessing the health of wetlands and riparian habitats. CRAM software guides users through assessment procedures that are applicable to all wetland types. It is designed for assessing ambient conditions within watersheds, regions, and throughout the State. It can also be used to assess the performance of compensatory mitigation projects and restoration projects. The CRAM portal provides a mechanism for independent monitoring programs to apply the method and enter their data into a centralized system. CRAM data and results are also accessible through the State Water Board's Wetland Tracker, which is intended to eventually become the portal for entry into all wetlands monitoring and assessment data for the state.
**Evaluation of 10 elements**:

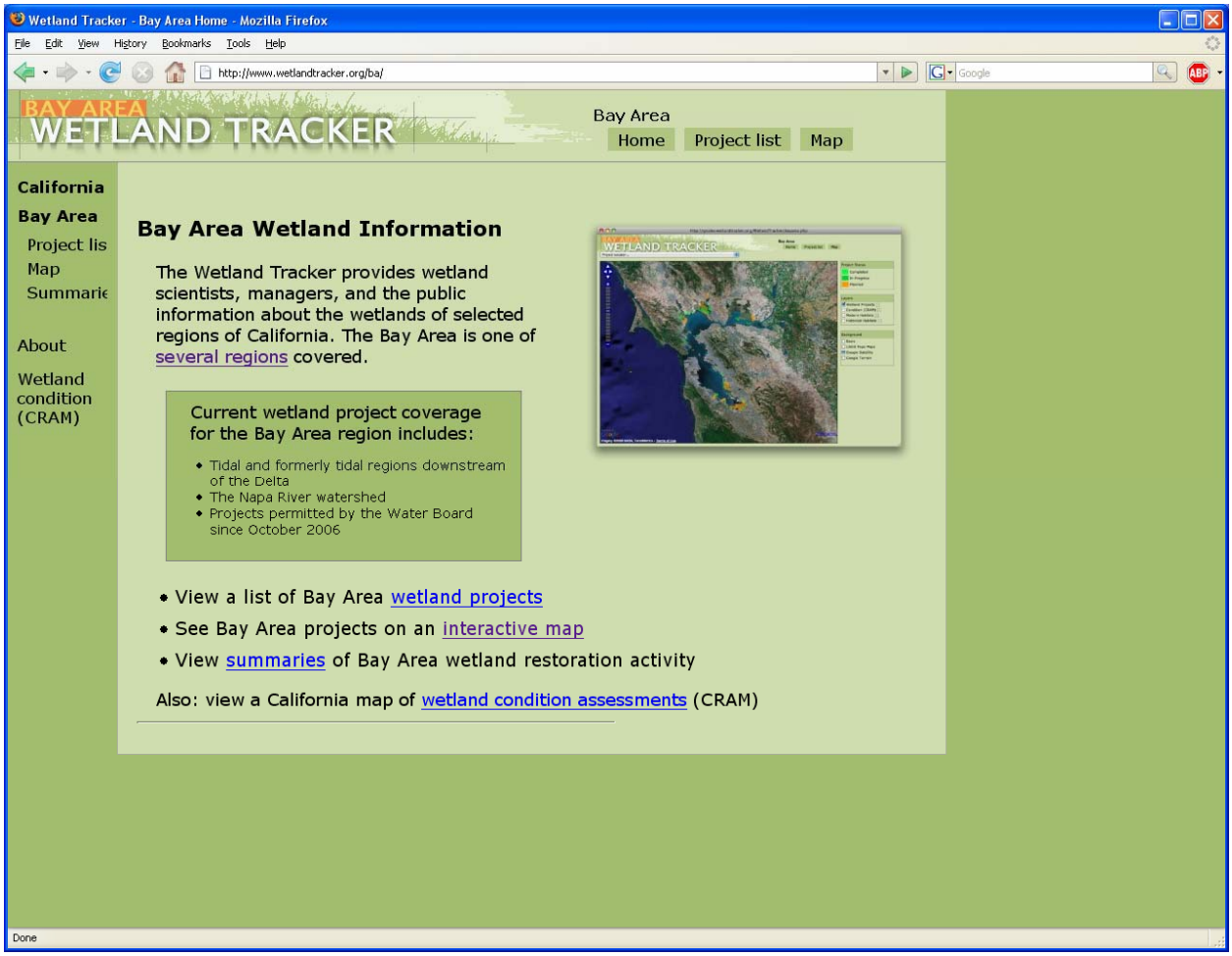
1. Strategy: The program asks and answers a clear question, with specific audiences in mind
   **Score: 10**
2. Monitoring objective: The monitoring objective is to provide rapid, scientifically defensible, standardized, cost-effective assessments of the status and trends in the condition of wetlands and related policies, programs and projects throughout California
   **Score: 10**
3. Monitoring design: There is a three-level monitoring design, recommend by the Wetlands Recovery Project. However, this is not universally applied and individual monitoring programs with somewhat different designs can all enter their data into the CRAM database
   **Score: 7**
4. Indicators: Indicators and monitoring methods are well developed and standardized, though they are in the last phase of field testing and final revision. The schedule for training sessions is posted on the CRAM website, as are detailed methods manuals and user guides
   **Score: 10**
5. Quality assurance: There is no systematic QA applied to data submitted to the site. Funds exist (104b3 and CIAP) to develop regional "audit teams" of trained CRAM experts for coastal regions that will provide third-party review of selected CRAM results by re-CRAMming the sites
   **Score: 5**
6. Data management: Data management procedures are well established and data are housed in a database maintained by SFEI. The CRAM methodology is being field tested and finalized and the CRAM database is being updated regularly to reflect these adjustments and will not be integrated with BDAT / CEDEN until it has stabilized. The database has preprogrammed routines for remote data entry by participants. At this time, there are no tools for search, selecting, and downloading data, although this functionality is included in the CIAP project that begins this fall. The funded task includes downloading by site, combination of sites, wetland type, watershed (Cal Water 2), congressional district, Water Board, and statewide
   **Score: 7**
7. Data analysis and assessment: CRAM is level 2 of a three-level assessment strategy for wetlands that begins at the landscape level and ends at the detailed site level. Assessment thresholds are well developed and standardized statewide. Software to apply the CRAM metrics and user manuals are available for download from the program's website. The CRAM database will eventually be merged with the Wetland Tracker database to allow users to visualize extent and condition assessments simultaneously. For each wetland type, at each of several scales, Wetland Tracker will generate a "report" of the size-frequency of all wetland polygons, the size-frequency

of the wetland polygons for projects, the CRAM condition frequency (by attribute and site score) for all sites, and for project sites
**Score: 8**

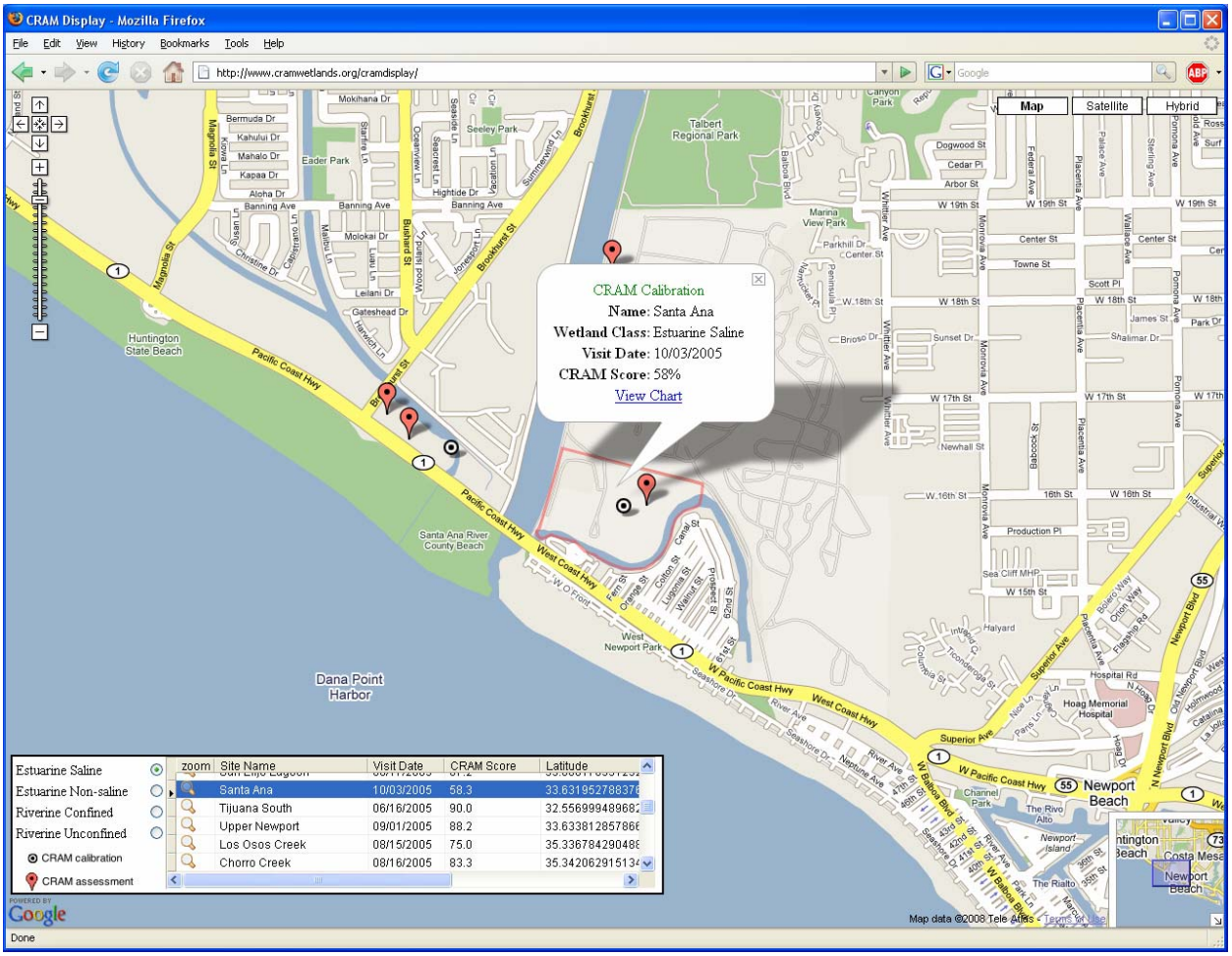
8. Reporting: The website has a Google Maps interface that displays all wetlands in the system. Clicking on specific sites brings up summary information for that wetland and a chart of CRAM scores. Wetlands can also be selected from a drop-down list of available sites. Wetlands can also be viewed regionally via the interactive mapping function of Wetland Tracker (www.wetlandtracker.org), although not all wetland scores are visible at every scale. However, no reports summarizing and synthesizing results have been prepared. Access to these and other information about wetlands will be centralized through a main wetlands portal, perhaps CERES, that has not yet been decided
   **Score: 7**
9. Programmatic evaluation: No description of a periodic program evaluation process
   **Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

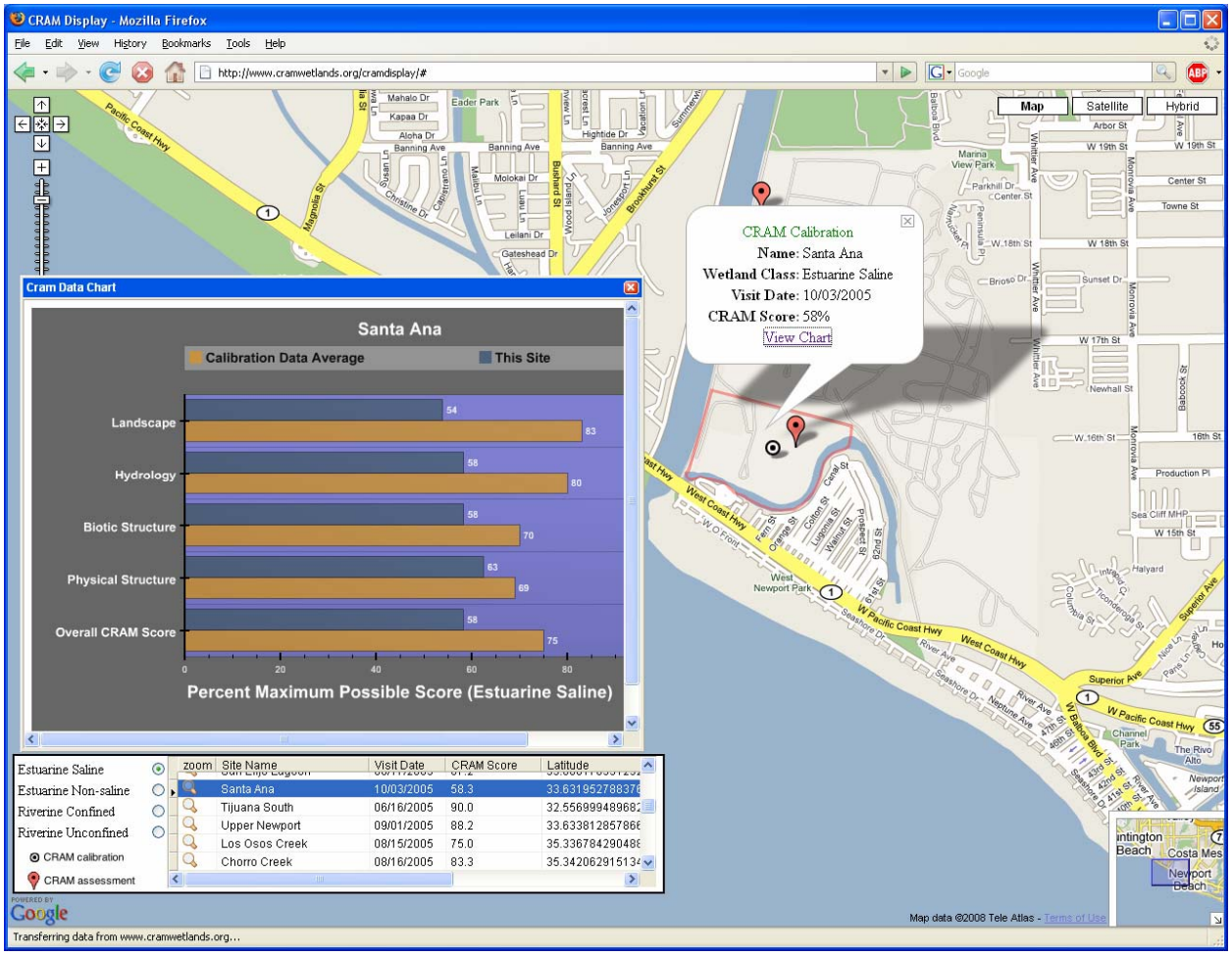
**Sample webpages**:

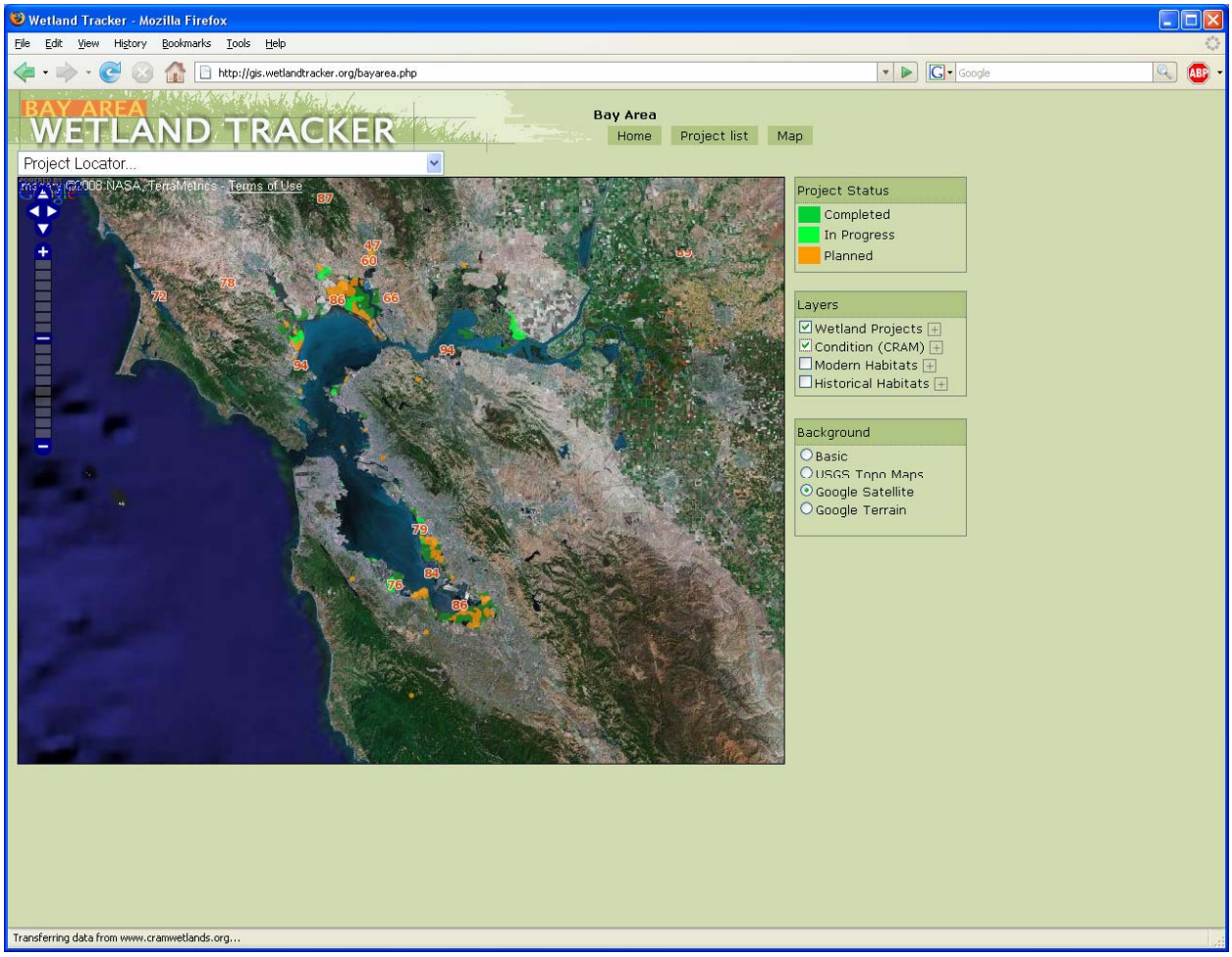



Wetland Tracker - Bay Area Home - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.wetlandtracker.org/ba/
BAY AREA
WETLAND TRACKER
Bay Area
Home
Project list
Map
California
Bay Area
Project lis
Map
Summarie
About
Wetland condition (CRAM)
Bay Area Wetland Information
The Wetland Tracker provides wetland scientists, managers, and the public information about the wetlands of selected regions of California. The Bay Area is one of several regions covered.
Current wetland project coverage for the Bay Area region includes:
Tidal and formerly tidal regions downstream of the Delta
The Napa River watershed
Projects permitted by the Water Board since October 2006
View a list of Bay Area wetland projects
See Bay Area projects on an interactive map
View summaries of Bay Area wetland restoration activity
Also: view a California map of wetland condition assessments (CRAM)
Done

**Sample assessment products**:




CRAM Display - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.cramwetlands.org/cramdisplay/#
Map
Satellite
Hybrid
CRAM Calibration
Name: Santa Ana
Wetland Class: Estuarine Saline
Visit Date: 10/03/2005
CRAM Score: 58%
View Chart
Cram Data Chart
Santa Ana
Calibration Data Average
This Site
Landscape
Hydrology
Biotic Structure
Physical Structure
Overall CRAM Score
54
83
58
80
58
70
63
69
58
75
0
20
40
60
80
Percent Maximum Possible Score (Estuarine Saline)
Estuarine Saline
Estuarine Non-saline
Riverine Confined
Riverine Unconfined
CRAM calibration
CRAM assessment
zoom
Site Name
Visit Date
CRAM Score
Latitude
Santa Ana 10/03/2005 58.3
Tijuana South 06/16/2005 90.0
Upper Newport 09/01/2005 88.2
Los Osos Creek 08/15/2005 75.0
Chorro Creek 08/16/2005 83.3
Google
Map data ©2008 Tele Atlas - Terms of Use
Transferring data from www.cramwetlands.org...


Wetland Tracker - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://gis.wetlandtracker.org/bayarea.php
BAY AREA
WETLAND TRACKER
Bay Area
Home
Project list
Map
Project Locator...
Image © 2008 NASA, TerraMetrics - Terms of Use
Project Status
Completed
In Progress
Planned
Layers
Wetland Projects
Condition (CRAM)
Modern Habitats
Historical Habitats
Background
Basic
USGS Topo Maps
Google Satellite
Google Terrain
Transferring data from www.cramwetlands.org...

## Subtheme: Intertidal

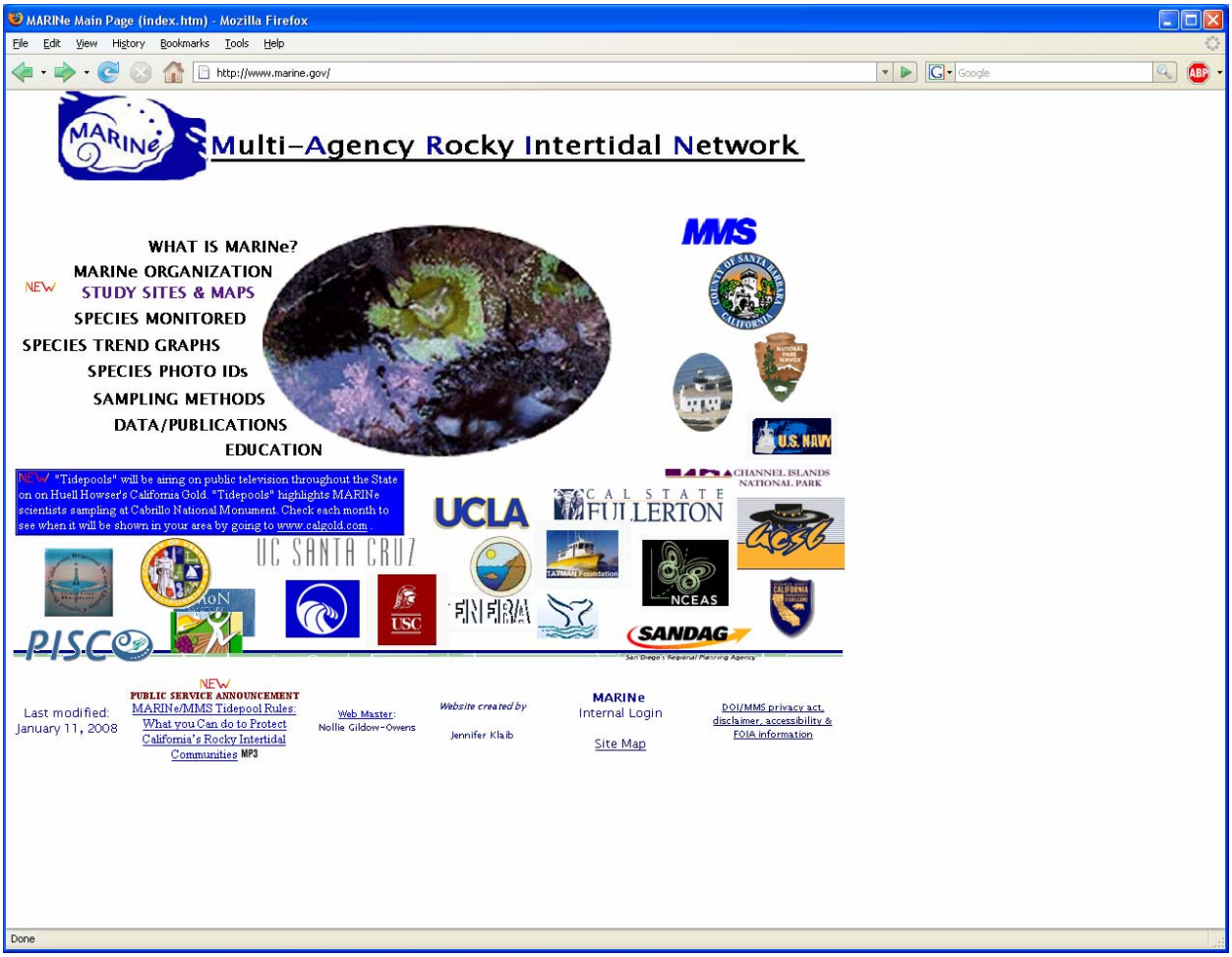
**Website**: http://www.marine.gov/
**Sponsor**: Cooperative interagency group
**Contact**: Pete Raimondi, UC Santa Cruz
**Description**: The MARINe partnership of local, State, and Federal agencies, universities and private organizations monitors rocky intertidal sites along the coast of California, including the islands, on a long-term basis. It represents the largest program of its kind on the west coast. Many of the sites have been monitored consistently for 15-20 years. A standardized set of Core Protocols are used to monitor rocky intertidal habitat each fall and spring at 89 MARINe sites. These data are funded by multiple partners and are entered into a common database for analysis. Sites are spaced every 10 to 15 miles along the coast on the mainland and offshore islands. Continuous monitoring provides resource managers with early warnings of abnormal conditions, such as the discovery of the withering foot syndrome which has affected black abalone across the coast.
**Evaluation of 10 elements**:

1. Strategy: MARINe asks and answers clearly defined set of questions about status and long-term trends, as defined by an interagency Steering Committee
   **Score: 10**
2. Monitoring objectives: Specific monitoring objectives are not defined on the program's website, but can be inferred from the program's overall goals and the analysis approaches
   **Score: 5**
3. Monitoring design: The monitoring and sampling protocols are established by an interagency Science Panel. These are standardized statewide and described in detail on the program's website and in publications and reports accessible from the website. The monitoring design and sampling protocols are targeted directly at the program's goals to describe status and long-term trends
   **Score: 10**
4. Indicators: Indicators are standardized statewide, with allowances for differences in species distributions, and are described on the program's website and in reports and publications available from the website
   **Score: 10**
5. Quality assurance: QA is conducted by each program partner; however, QA methods are not described on the program's website
   **Score: 3**
6. Data management: Data management protocols are established by a Database Panel, but are not described on the program's website or in any reports listed on the website. Data are transferred to a central database, which is currently being organized with standardized formats. Data are not available remotely but must be requested from the MARINe program
   **Score: 4**
7. Data analysis and assessment: The program is working with state agencies in their evaluation of discharges into Areas of Special Biological Significance, and with monitoring of marine protected areas. Indices of intertidal community health being generated by MARINe will allow condition to be categorized and federal and state agencies to assess measures to reduce impacts to this critical shoreline habitat. The website enables users to generate simple time plots of the abundance of individual species at specific sites
   **Score: 7**
8. Reporting: MARINe partners have produced a large number of reports and publication based on the program's monitoring data, and these are listed on the program's website
   **Score: 10**
9. Programmatic evaluation: No description of a periodic program evaluation process

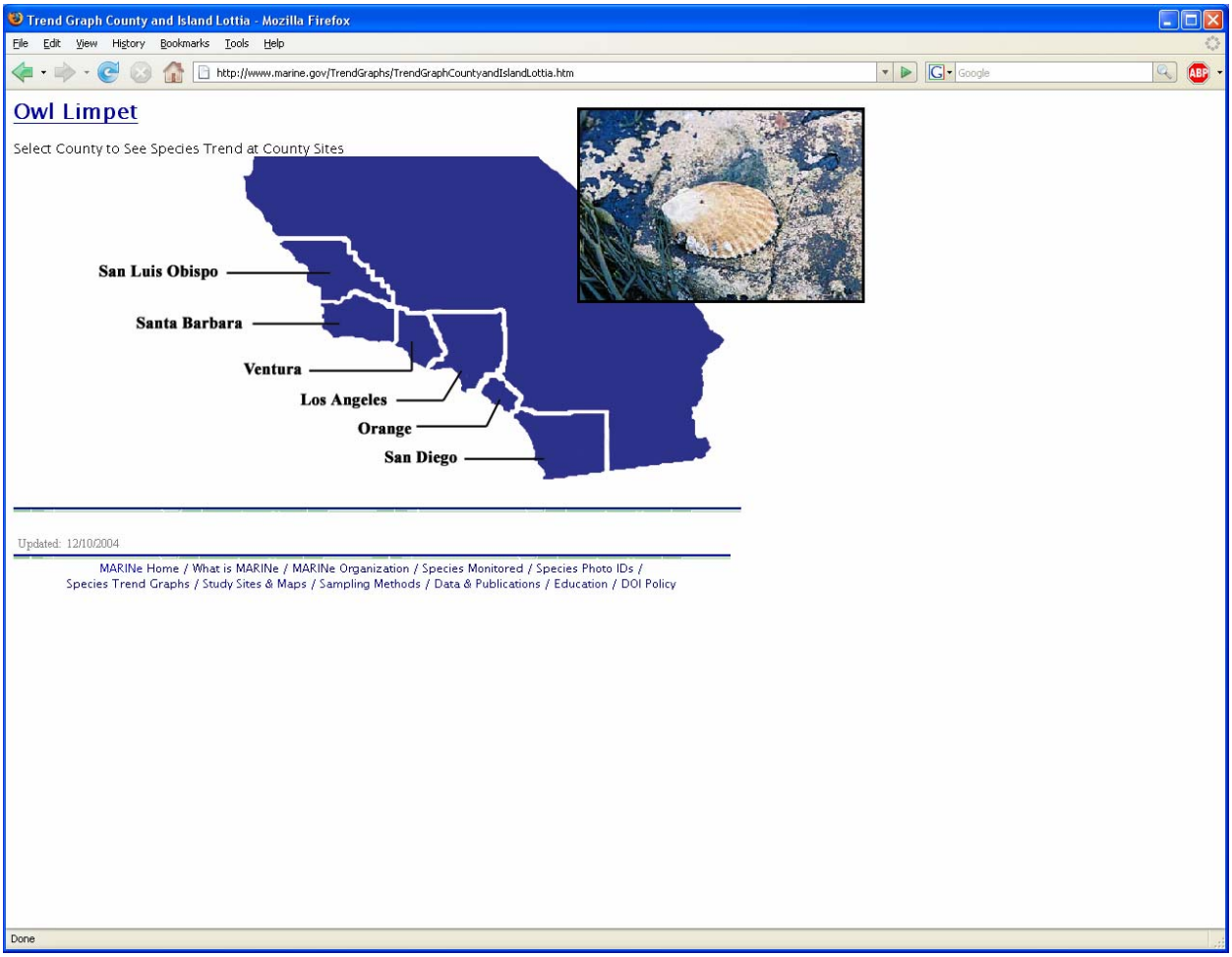
**Score: 0**

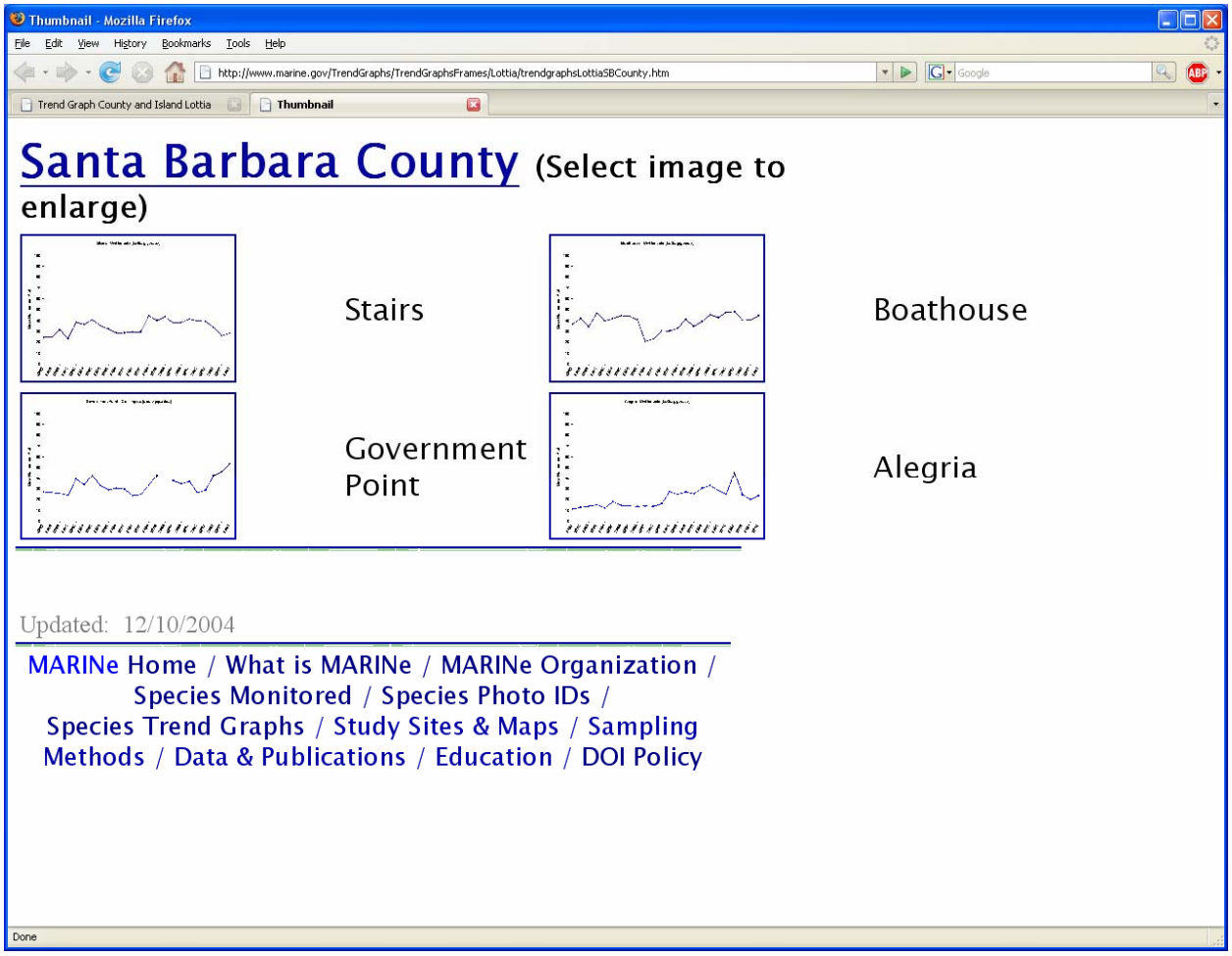
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

**Sample webpages**:



**Sample assessment products**:




Thumbnail - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.marine.gov/TrendGraphs/TrendGraphsFrames/Lottia/trendgraphsLottiaSBCounty.htm
Trend Graph County and Island Lottia
Thumbnail
Santa Barbara County (Select image to enlarge)
Stairs
Boathouse
Government Point
Alegria
Updated: 12/10/2004
MARINe Home / What is MARINe / MARINe Organization / Species Monitored / Species Photo IDs / Species Trend Graphs / Study Sites & Maps / Sampling Methods / Data & Publications / Education / DOI Policy
Done

## *Inventories*

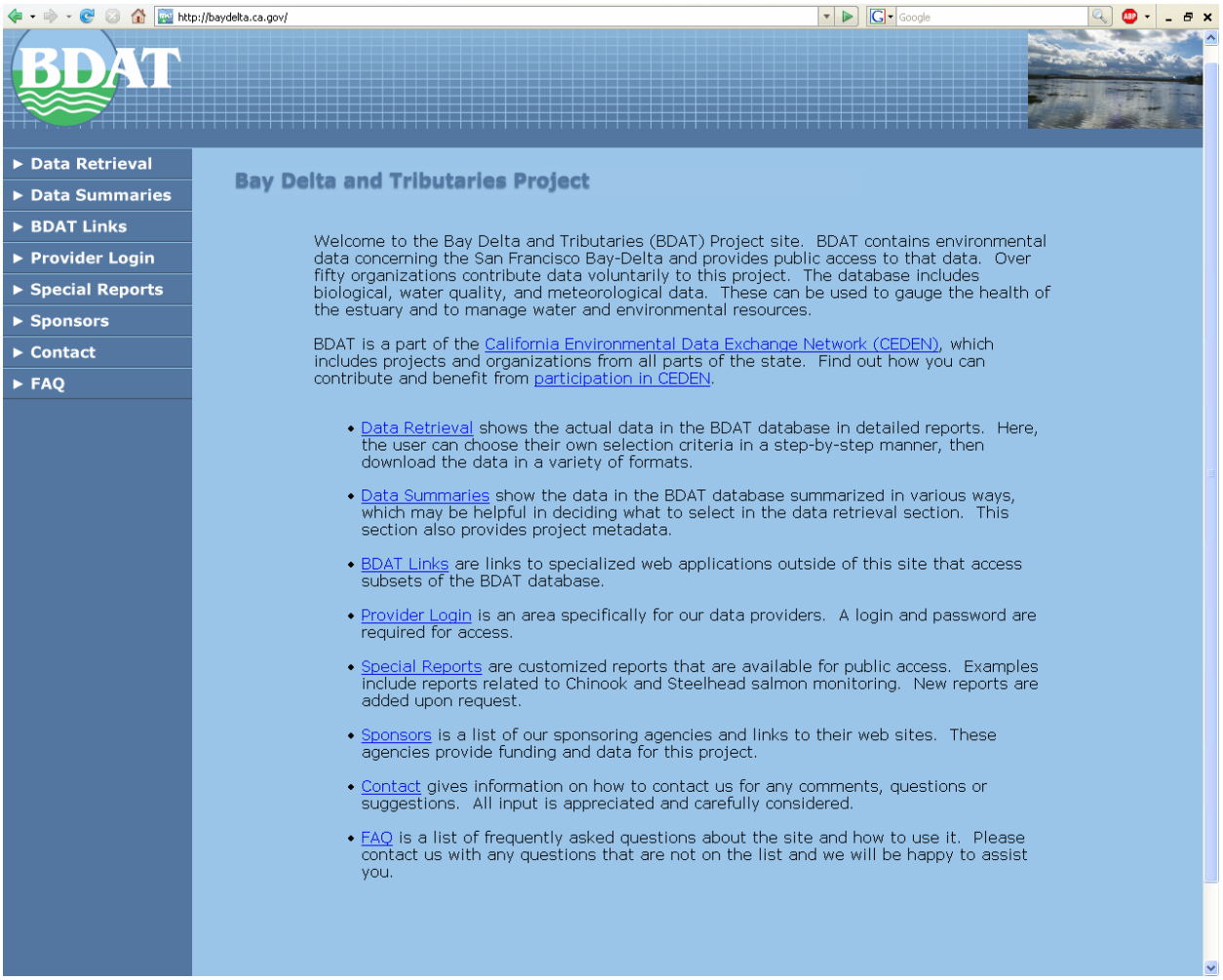
In addition to the portals described above, which are specific to a theme or subtheme, broader inventory websites provide access to a wide range of progammatic, mapping, monitoring, and assessment data, much of which is essential to interpreting the more targeted monitoring data collected to evaluate each subtheme. The Resources Agency maintains many such inventories, a few of which are described below. An important issue for future planning is to define the links both among the inventories themselves and between the inventories and the issue-specific portals.

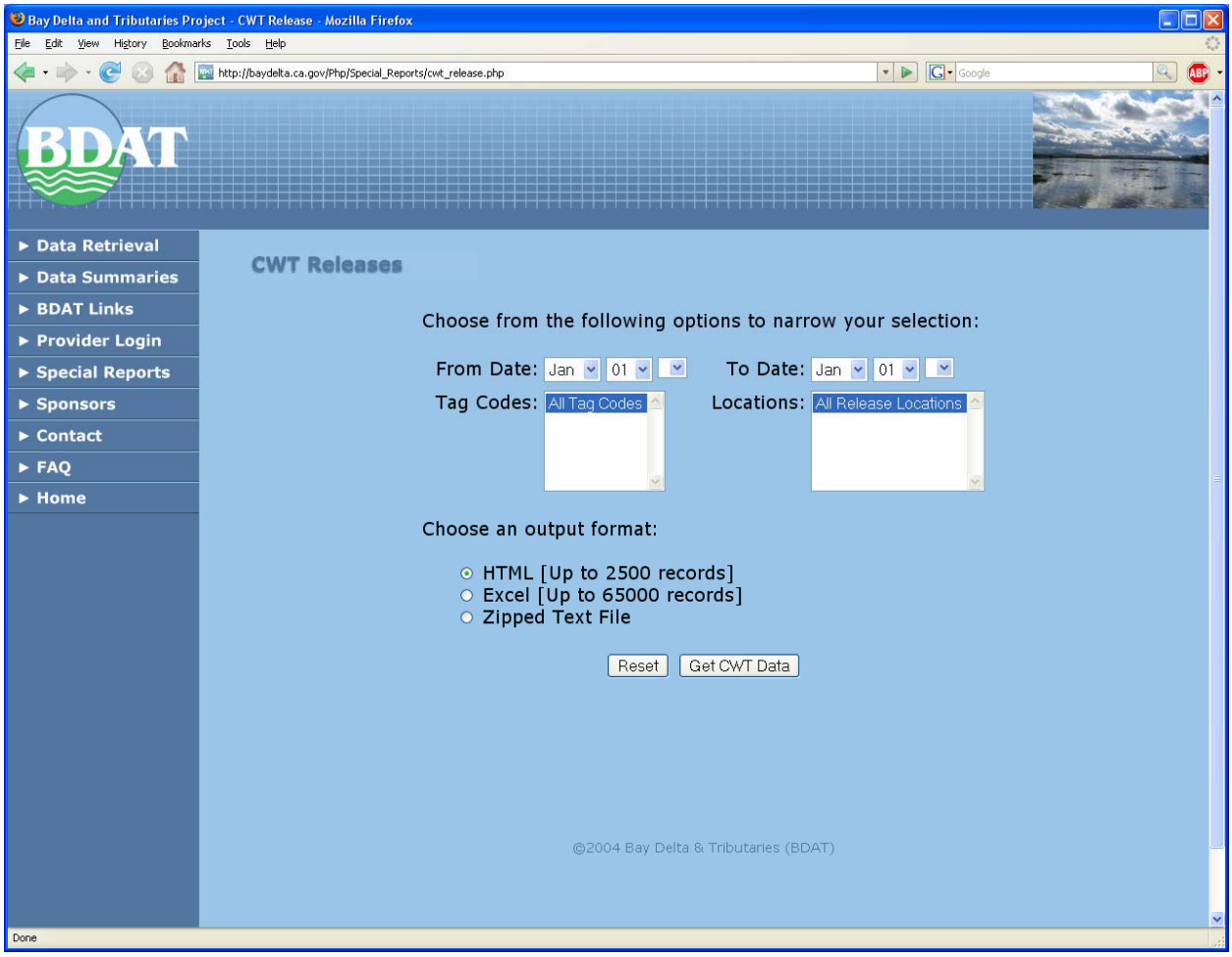
### Bay Delta and Tributaries Project (BDAT)

**Website**: http://baydelta.ca.gov/
**Sponsor**: Resources Agency
**Contact**: Karl Jacobs, State Water Board
**Description**: BDAT contains environmental data concerning the San Francisco Bay-Delta and provides public access to that data. Over fifty organizations contribute data voluntarily to this project. The database includes biological, water quality, and meteorological data. These can be used to gauge the health of the estuary and to manage water and environmental resources. BDAT is a part of the California Environmental Data Exchange Network (CEDEN), which includes projects and organizations from all parts of the state.
**Evaluation of 10 elements**:

1. Strategy: This is not a monitoring program; its strategy is to improve access to scientific data about the San Francisco Bay-Delta by providing a single access point to biological and hydrologoical data on the Bay-Delta
   **Score: 10**
2. Monitoring objectives: NA
3. Monitoring design: NA
4. Indicators: The program includes a wide range of data types (e.g., fish, benthos, water quality); specific indicators are defined by the individual contributing partners' programs. These are not defined or described on the BDAT website
   **Score: 5**
5. Quality assurance: BDAT obtains data directly from other sources and conducts no additional QA procedures to ensure their accuracy. Some data sources have sophisticated QA procedures, while data from other sources may be less well validated. BDAT provides no information about the QA procedures applied by contributors
   **Score: 0**
6. Data management: The database structure is well developed and is based on linking to other data sources each of which has their own data management procedures. Data can be searched for and retrieved from a variety of perspectives, including category (e.g., atmospheric, benthic, fisheries, plankton), project, location, or species, and the system includes a customized time series graphing tool
   **Score: 10**
7. Data analysis and assessment: NA
8. Reporting: NA
9. Programmatic evaluation: No description of a periodic program evaluation process
   **Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

**Sample webpages**:






**Sample assessment products**: NA

## California Data Exchange Center (CDEC)

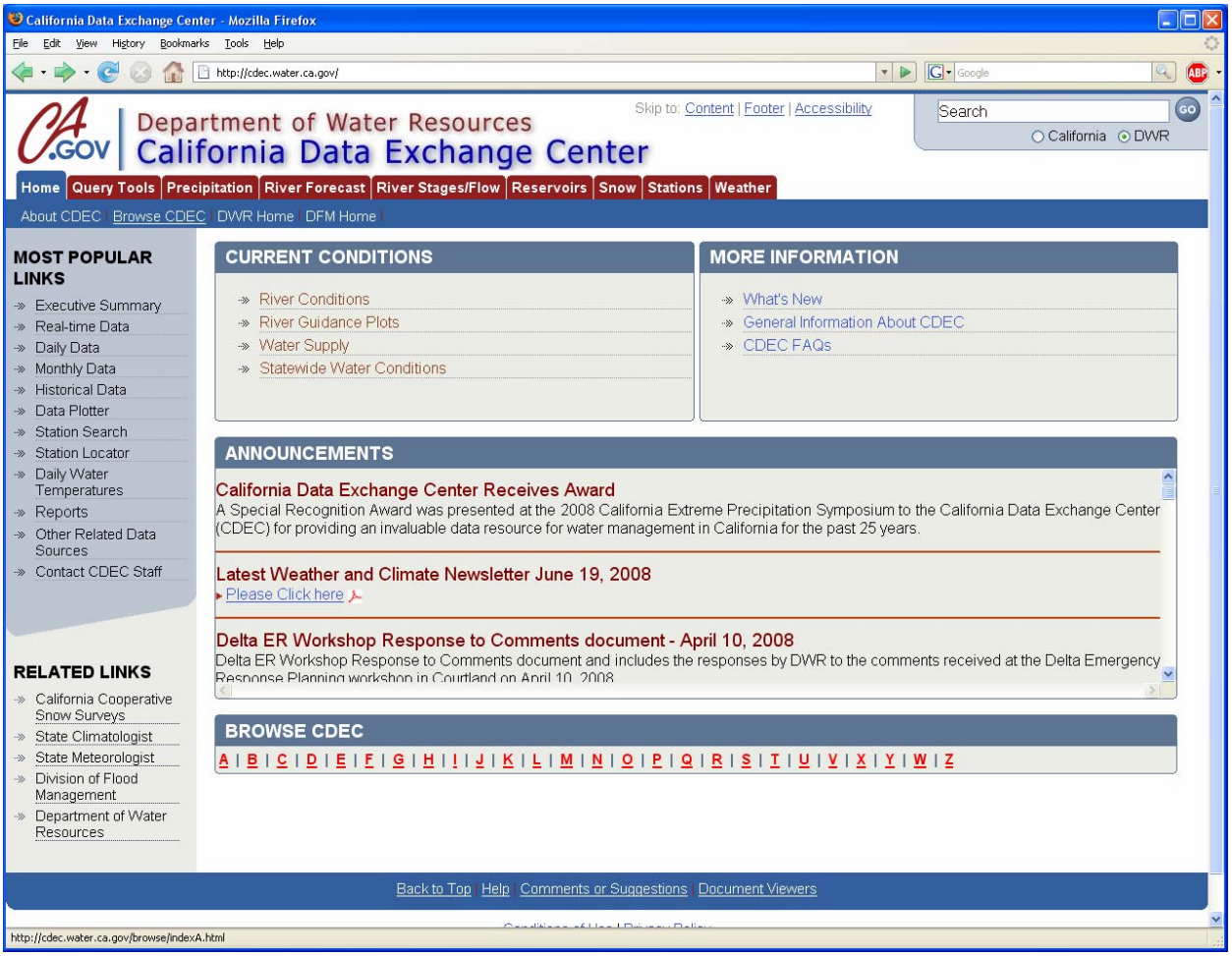
**Website**: http://cdec.water.ca.gov/
**Sponsor**: Resources Agency
**Contact**: Karl Jacobs, State Water Board
**Description**: The California Data Exchange Center (CDEC) installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gages for the Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting. CDEC provides a centralized location to store and process real-time hydrologic information gathered by various cooperators throughout the State. CDEC then disseminates this information to the cooperators, public and private agencies, and news media.
**Evaluation of 10 elements**:

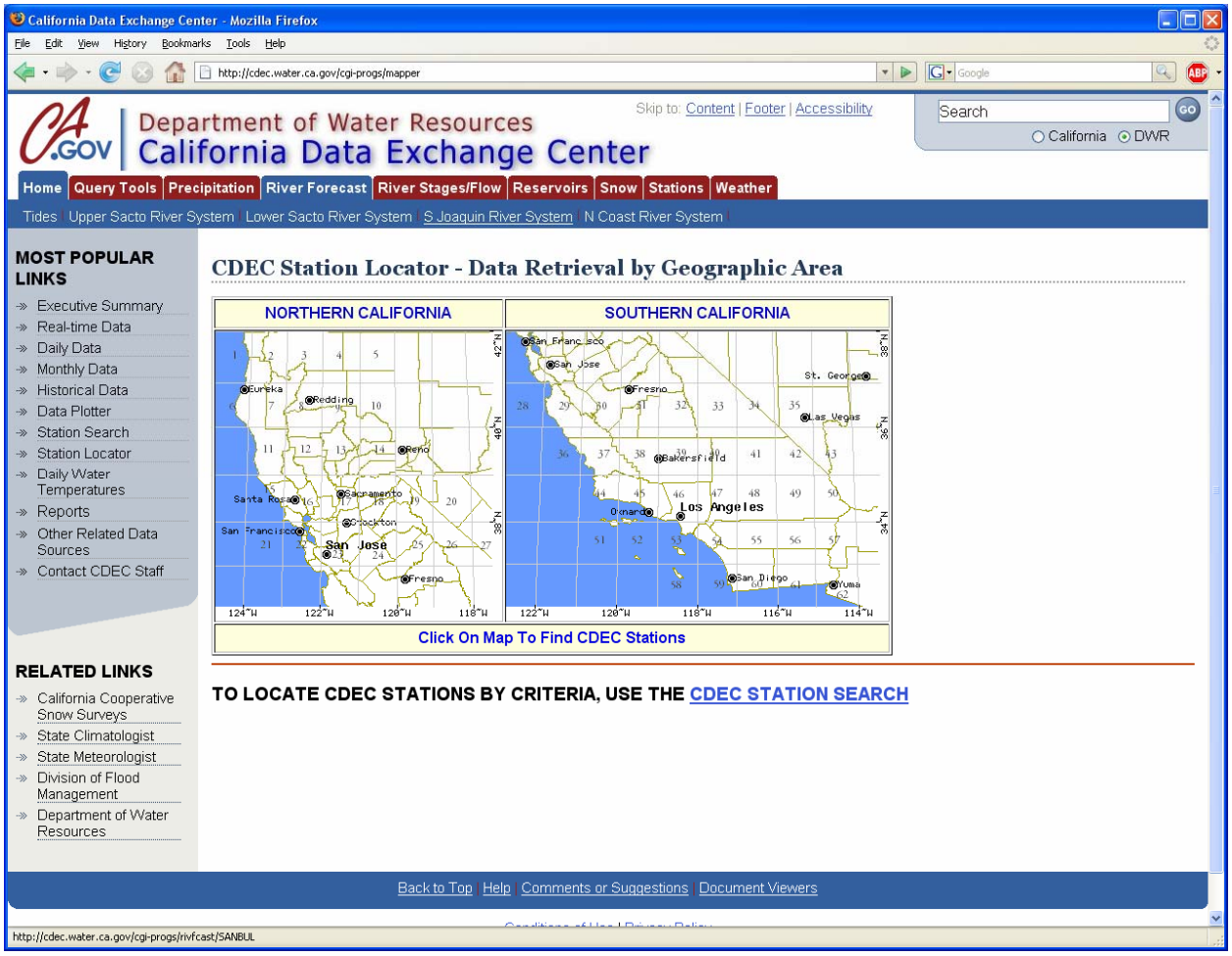
1. Strategy: The program meets well-defined information needs of specific audiences
   **Score: 10**
2. Monitoring objectives: The program's monitoring objectives are to provide real-time hydrologic information
   **Score: 10**
3. Monitoring design: There is no standardized monitoring design applied statewide. CDEC obtains and organizes data provided by a wide range of cooperative partners, each with its own monitoring design
   **Score: 3**
4. Indicators: The basic set of hydrologic indicators is well defined and methods are standardized to some degree across the major participating agencies
   **Score: 5**
5. Quality assurance: CDEC's emphasis on the provision of real-time data for specific decision-making needs precludes the application of rigorous quality checks of the data. The time required for such QA would make the data substantially less useful to the program's customers. The level of QA is appropriate to the needs of the users and, after much discussion, the program decided that correcting inaccuracies in the data and releasing revised datasets would not be worth the effort. The program's website notes that data are preliminary in nature. However, the level of quality assurance applied to the data is not documented on the program's website
   **Score: 2**
6. Data management: Data management procedures are well defined and systematically applied. CDEC operates a data exchange program with various federal and state agencies and other public agencies. This data exchange program involves the automated transfer and receipt of data and information via network connections. Automated query routines permit searches by station, parameter, and a variety of other entry points
   **Score: 10**
7. Data analysis and assessment: There is little analysis or assessment, since CDEC's primary purpose is to ensure the ready availability of real-time hydrologic data. However, an automated data plotting tool enables users to prepare graphs of query results. The program's website has clear instructions and is suited for both public access and to provide data downloads for analysts and researchers
   **Score: 5**
8. Reporting: CDEC's website provides access to a large number of reports, the majority of which are data reports on various aspects of hydrologic condition. There are no provisions for interactive reports except as noted under #7
   **Score: 8**
9. Progammatic evaluation: No description of a periodic program evaluation process

**Score: 0**

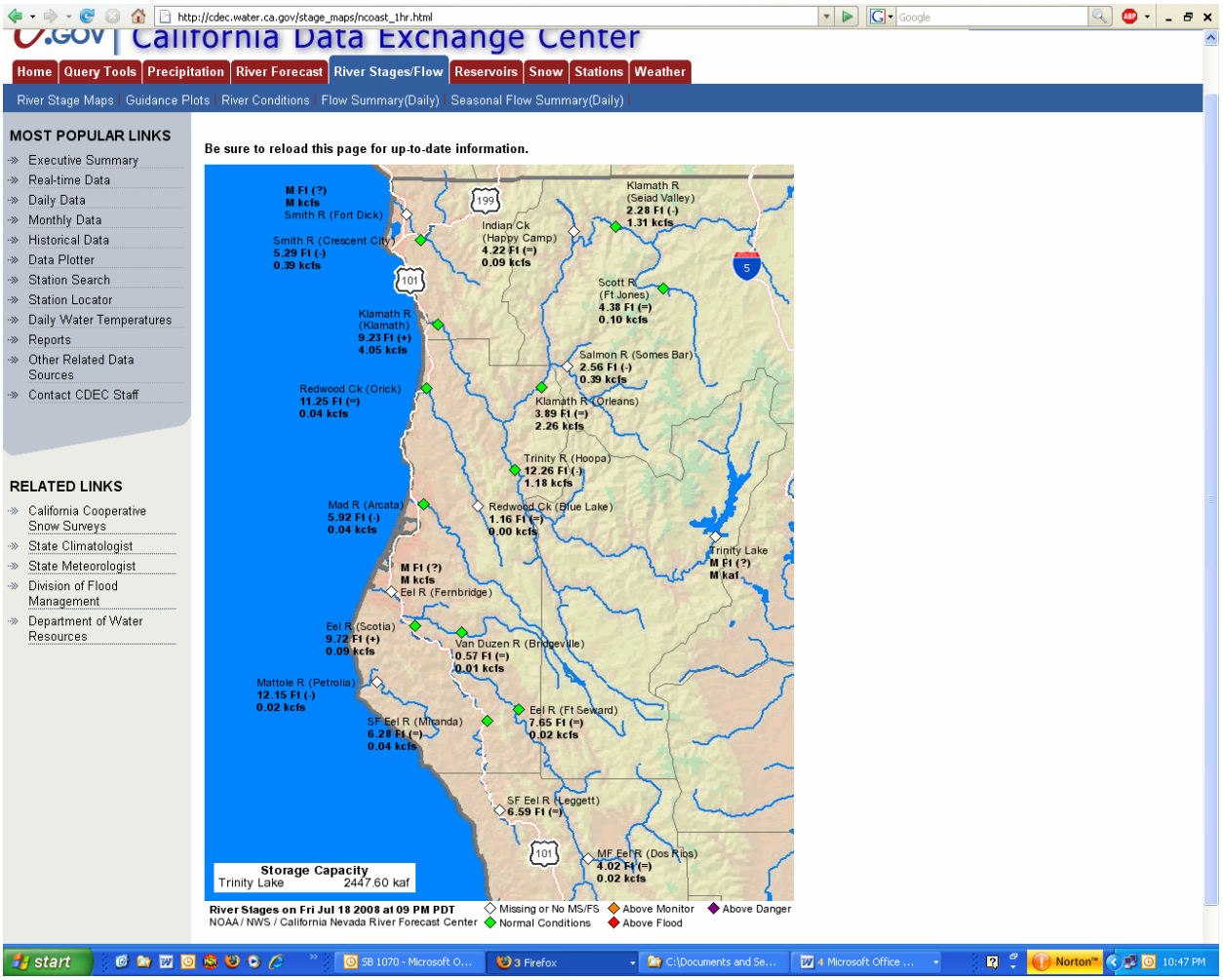
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

**Sample webpages**:




California Data Exchange Center - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://cdec.water.ca.gov/cgi-progs/mapper
Department of Water Resources
California Data Exchange Center
Skip to: Content | Footer | Accessibility
Search
California DWR
Home Query Tools Precipitation River Forecast River Stages/Flow Reservoirs Snow Stations Weather
Tides | Upper Sacto River System | Lower Sacto River System | S Joaquin River System | N Coast River System
MOST POPULAR LINKS
Executive Summary
Real-time Data
Daily Data
Monthly Data
Historical Data
Data Plotter
Station Search
Station Locator
Daily Water Temperatures
Reports
Other Related Data Sources
Contact CDEC Staff
RELATED LINKS
California Cooperative Snow Surveys
State Climatologist
State Meteorologist
Division of Flood Management
Department of Water Resources
CDEC Station Locator - Data Retrieval by Geographic Area
NORTHERN CALIFORNIA
SOUTHERN CALIFORNIA
Eureka
Redding
Reno
Sacramento
Santa Rosa
Stockton
San Francisco
San Jose
Fresno
San Francisco
San Jose
Fresno
St. George
Las Vegas
Bakersfield
Los Angeles
Oxnard
San Diego
Yuma
Click On Map To Find CDEC Stations
TO LOCATE CDEC STATIONS BY CRITERIA, USE THE CDEC STATION SEARCH
Back to Top | Help | Comments or Suggestions | Document Viewers
http://cdec.water.ca.gov/cgi-progs/rivfcast/SANBUL

**Sample assessment products**:

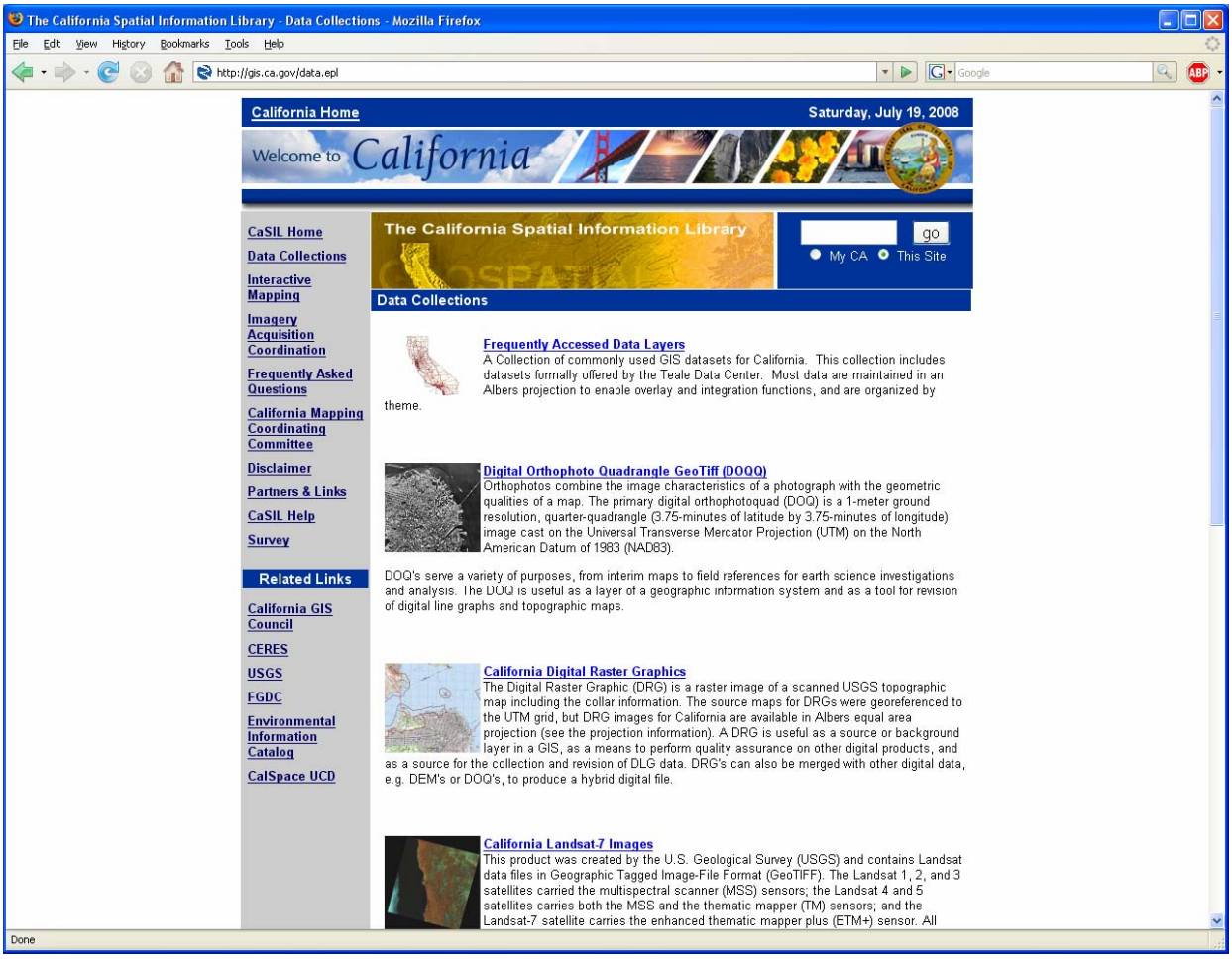


## California Spatial Information Library (CaSIL)

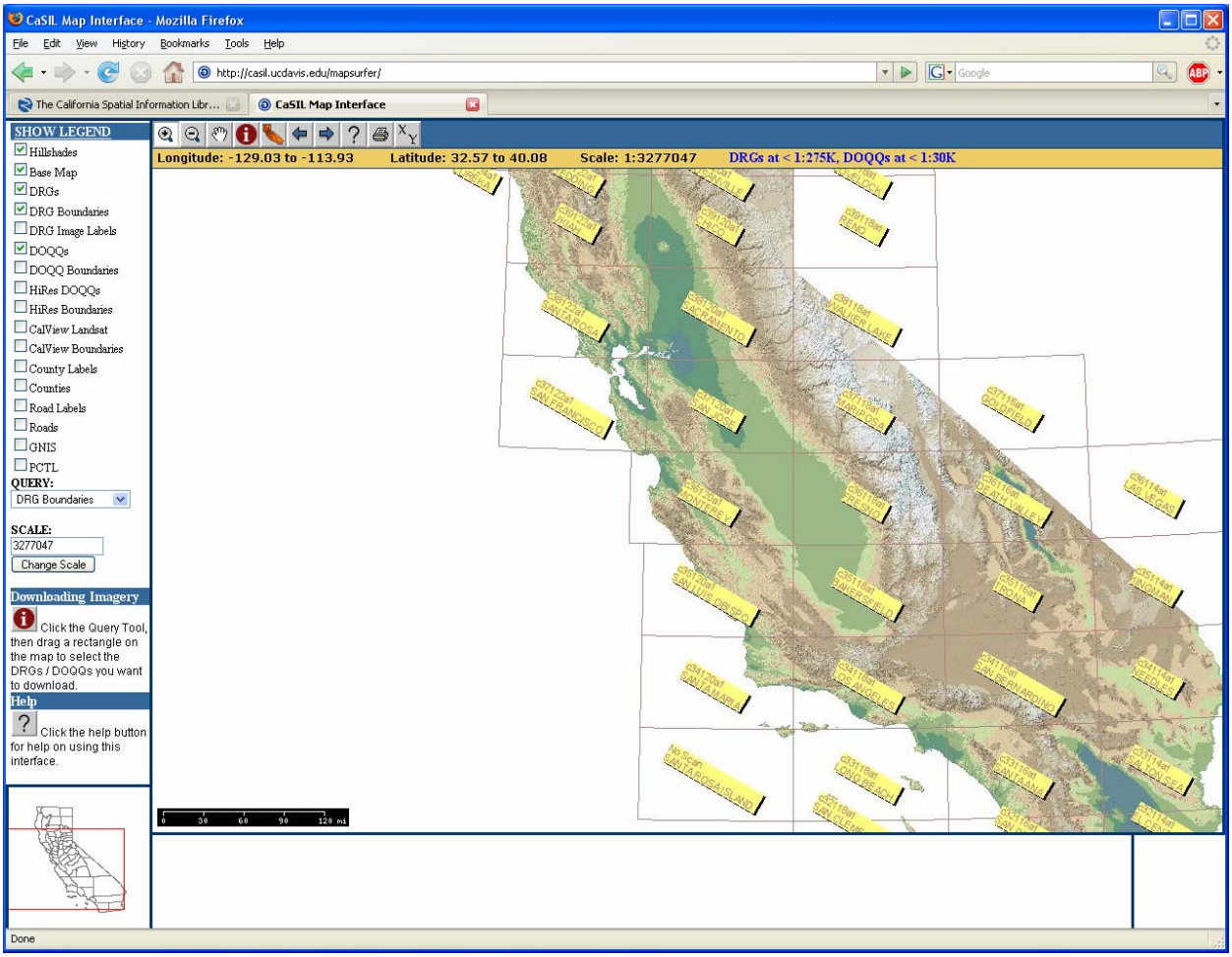
**Website**: http://gis.ca.gov/index.epl
**Sponsor**: Resources Agency
**Contact**: Sam Harader, Resources Agency
**Description**: CaSIL is the California Geographic Information Systems (GIS) web portal. Its ongoing development, managed by the California Mapping Coordinating Committee (CMCC), focuses on developing a series of GIS-related web pages to provide information on state government GIS activities, access to statewide GIS data, and links to the larger California GIS community.
**Evaluation of 10 elements**:

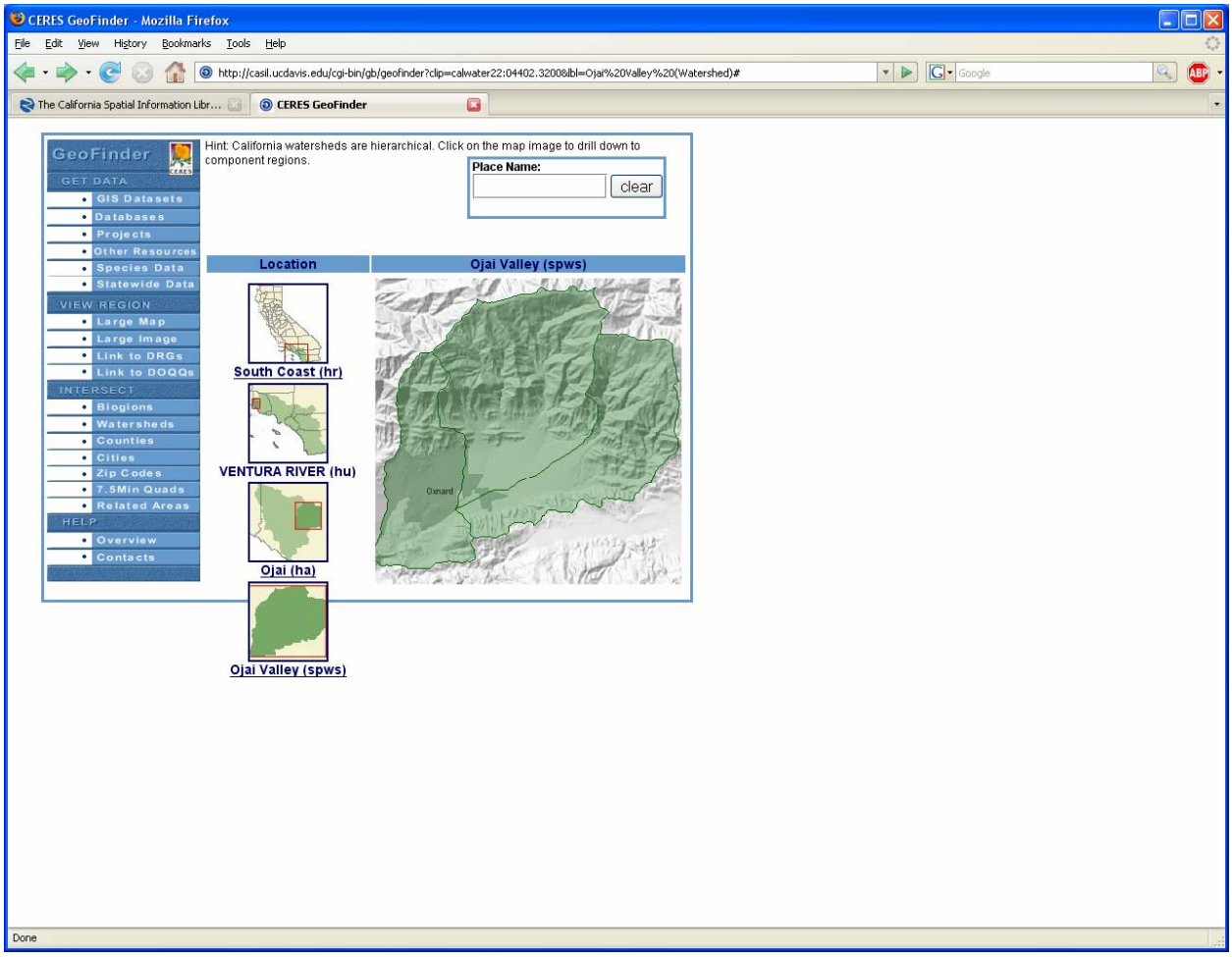
1. Strategy: This is not a monitoring program, but its data acquisition and integration strategy is clearly defined and targeted at providing easier access to particular kinds of maps and map-based data to a broad range of potential audiences
   **Score; 10**
2. Monitoring objectives: NA
3. Monitoring design: NA
4. Indicators: The program focuses on well-defined types of data and information developed by others. Indicators are defined by these other data sources and are not described in detail on the CaSIL website
   **Score: 5**
5. Quality assurance: CaSIL obtains data directly from other sources and conducts no additional QA procedures to ensure their accuracy. Some data sources, such as USGS, have sophisticated QA procedures, while data from other sources may be less well validated. CaSIL posts a disclaimer on its website notifying users that it does not guarantee the accuracy or reliability of any data accessed through the site. However, the level of quality assurance applied to the data is not documented on the program's website
   **Score: 0**
6. Data management: Data management procedures are well defined and carefully implemented. Data management is overseen by the California Mapping Coordinating Committee, in partnership with other partners such as the Federal Geographic Data Committee and the California Geographic Information Association. The goal of these relationships is to improve the ability to locate, access, share, and integrate map-based data from a variety of sources. CaSIL data holdings can be accessed by FTP or HTTP and treated as one large file system. The collections are organized by contributing agency. The system has an online users' guide that provides instructions for data access and download
   **Score: 10**
7. Data analysis and assessment: NA
8. Reporting: CaSIL provides a range of options for searching, investigating, combining, and acquiring a range of data types. For example, an interactive mapping tool enables users to drill down through a map of California using a variety of boundary and location definitions to obtain orthophoto quads, USGS map sheets, and species data from Fish and Game's Natural Diversity Database. The system includes links to the websites of other program partners who post data summary and assessment reports on their websites. However, CaSIL's goal is not to conduct independent data analyses or assessments
   **Score: 10**
9. Programmatic evaluation: No description of a periodic program evaluation process
   **Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

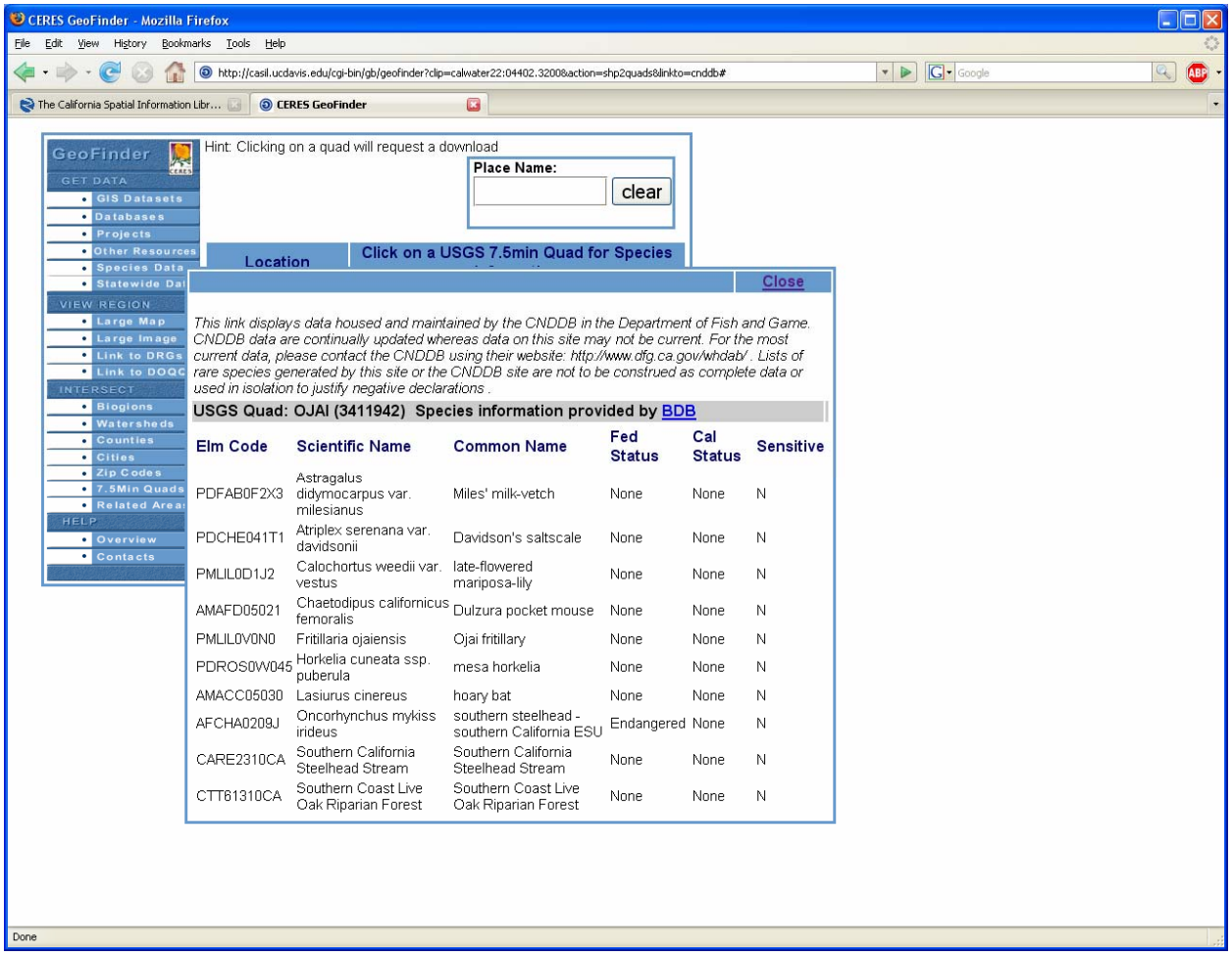
**Sample webpages**:



**Sample assessment products**:




CERES GeoFinder - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://casil.ucdavis.edu/cgi-bin/gb/geofinder?clip=calwater22:04402.3200&lbl=Ojai%20Valley%20(Watershed)#
The California Spatial Information Libr...
CERES GeoFinder
GeoFinder
GET DATA
GIS Datasets
Databases
Projects
Other Resources
Species Data
Statewide Data
VIEW REGION
Large Map
Large Image
Link to DRGs
Link to DOQQs
INTERSECT
Biogions
Watersheds
Counties
Cities
Zip Codes
7.5Min Quads
Related Areas
HELP
Overview
Contacts
Hint: California watersheds are hierarchical. Click on the map image to drill down to component regions.
Place Name:
clear
Location
Ojai Valley (spws)
South Coast (hr)
VENTURA RIVER (hu)
Ojai (ha)
Ojai Valley (spws)
Oxnard
Done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http://casil.ucdavis.edu/cgi-bin/gb/geofinder?clip=calwater22:04402.3200&action=shp2quads&linkto=cnddb#
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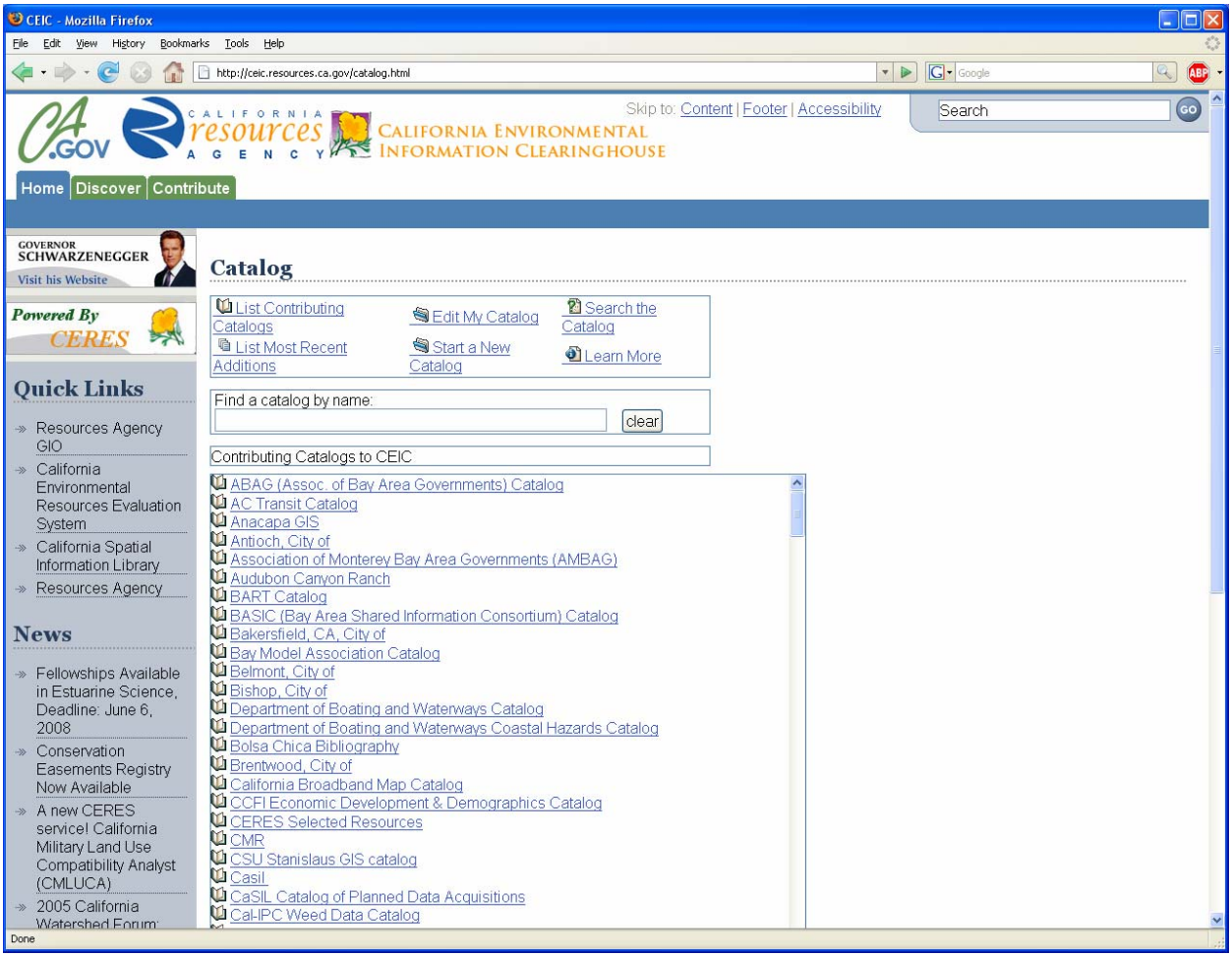
Watersheds
Counties
Cities
Zip Codes
7.5Min Quads
Related Area
HELP
Overview
Contacts
Hint: Clicking on a quad will request a download
Place Name:
clear
Location
Click on a USGS 7.5min Quad for Species
Close
This link displays data housed and maintained by the CNDDB in the Department of Fish and Game. CNDDB data are continually updated whereas data on this site may not be current. For the most current data, please contact the CNDDB using their website: http://www.dfg.ca.gov/whdab/ . Lists of rare species generated by this site or the CNDDB site are not to be construed as complete data or used in isolation to justify negative declarations .
USGS Quad: OJAI (3411942) Species information provided by BDB
Elm Code
Scientific Name
Common Name
Fed Status
Cal Status
Sensitive
PDFAB0F2X3 Astragalus didymocarpus var. milesianus Miles' milk-vetch None None N
PDCHE041T1 Atriplex serenana var. davidsonii Davidson's saltscale None None N
PMLIL0D1J2 Calochortus weedii var. vestus late-flowered mariposa-lily None None N
AMAFD05021 Chaetodipus californicus femoralis Dulzura pocket mouse None None N
PMLIL0V0N0 Fritillaria ojaiensis Ojai fritillary None None N
PDROS0W045 Horkelia cuneata ssp. puberula mesa horkelia None None N
AMACC05030 Lasiurus cinereus hoary bat None None N
AFCHA0209J Oncorhynchus mykiss irideus southern steelhead - southern California ESU Endangered None N
CARE2310CA Southern California Steelhead Stream Southern California Steelhead Stream None None N
CTT61310CA Southern Coast Live Oak Riparian Forest Southern Coast Live Oak Riparian Forest None None N
Done

## California Environmental Information Clearing House (CEIC)

**Website**: http://gis.ca.gov/catalog/
**Sponsor**: Resources Agency
**Contact**: Karl Jacobs, State Water Board
**Description**: The California Environmental Information Clearinghouse (CEIC) uses the CERES Catalog as an online directory for reporting and discovery of information resources for California. Participants include cities, counties, utilities, state and federal agencies, private businesses and academic institutions that have spatial and other types of data resources. The Catalog has been developed through a collaborative effort with the California Geographic Information Association, California Environmental Resources Evaluation System, and the Federal Geographic Data Committee.
**Evaluation of 10 elements**:

1. Strategy: This is not a monitoring program; its strategy is to provide the greatest possible access to a wide variety of environmental information
   **Score: 6**
2. Monitoring objectives: NA
3. Monitoring design: NA
4. Indicators: The program's scope includes virtually all types of environmental data and information; these datatypes are not defined further on the CEIC website
   **Score: 2**
5. Quality assurance: CEIC links directly to data and information on other websites and conducts no additional QA procedures to ensure their accuracy. Some data sources have sophisticated QA procedures, while others do not; CEIC provides no information about relative levels of QA
   **Score: 0**
6. Data management: The database structure is well developed and is based on providing the ability for partners to create new catalogs to make their data resources available through CEIC. CEIC provides a wide variety of entry points for searches, including map-based, keyword, agency name, and project name. Catalogs can also be browsed alphabetically. However, the system does not impose any structure of its own on information resources
   **Score: 6**
7. Data analysis and assessment: NA
8. Reporting: NA
9. Programmatic evaluation: No description of a periodic program evaluation process
   **Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

**Sample webpages**:



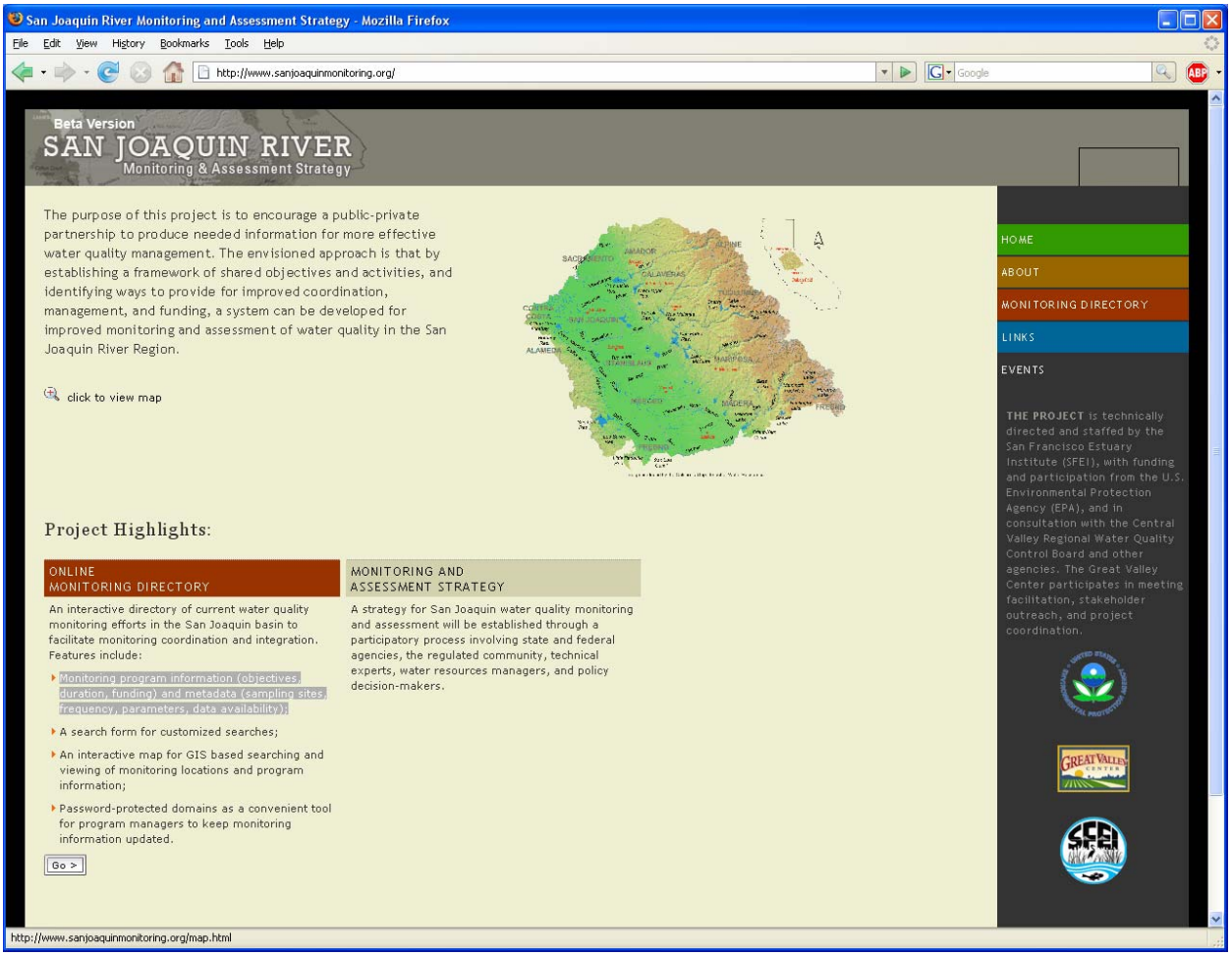

**Sample assessment products**: NA

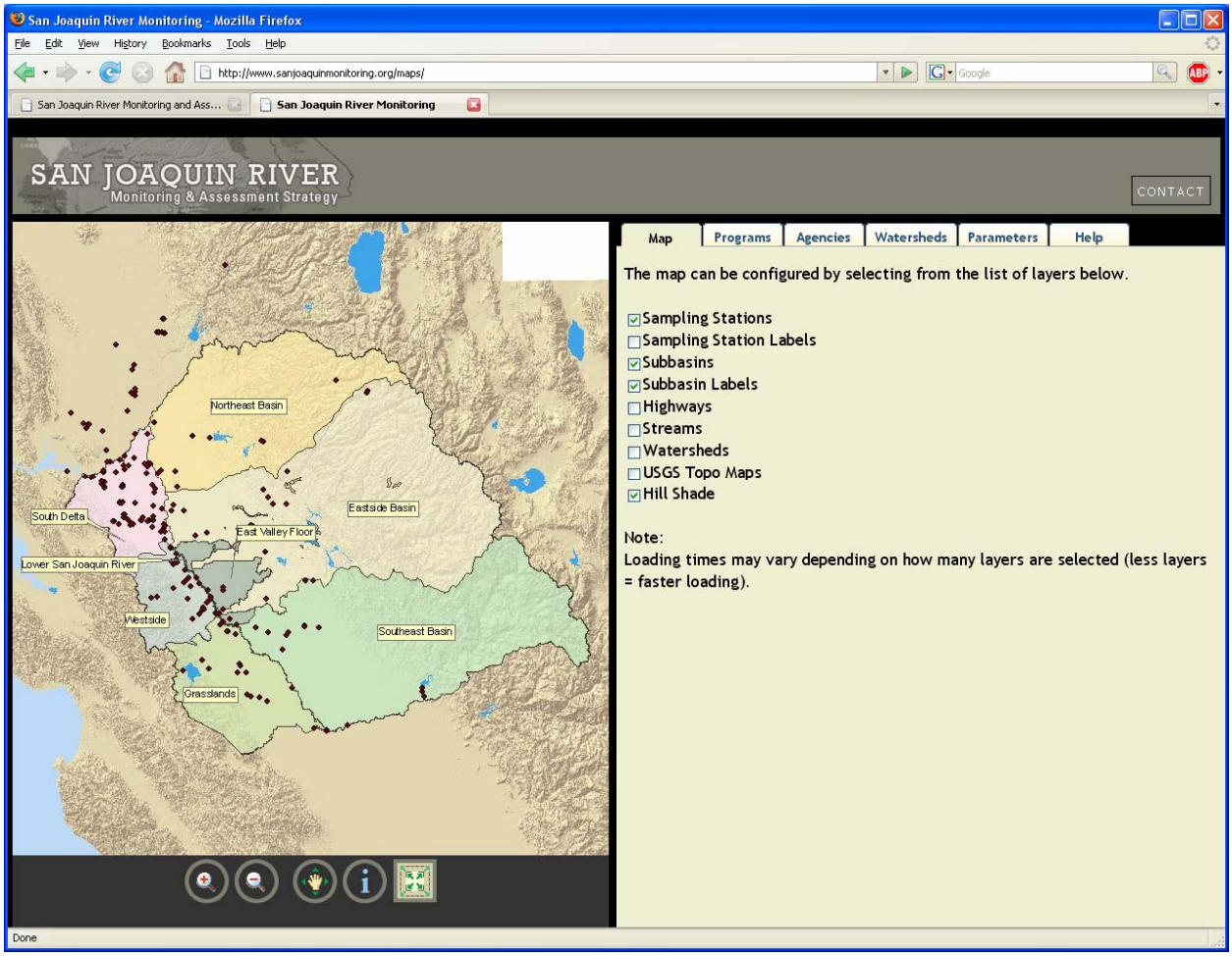
## San Joaquin River Monitoring & Assessment Strategy – Monitoring Directory

**Website**: http://www.sanjoaquinmonitoring.org/
**Sponsor**: San Francisco Estuary Institute
**Contact**: Thomas Jabusch, SFEI
**Description**: This website contains an interactive directory of current water quality monitoring efforts in the San Joaquin basin to facilitate monitoring coordination and integration.
**Evaluation of 10 elements**:

1. Strategy: The program's intent is to provide a single point of access for monitoring data within he San Joaquin River watershed
   **Score: 10**
2. Monitoring objectives: NA
3. Monitoring design: NA
4. Indicators: NA
5. Quality assurance: Descriptive information about individual monitoring programs (e.g., objectives, duration, sites, monitoring designs, data availability) is carefully reviewed before being entered into the database. However, there are no systematic procedures in place for routine review and updating of information in the directory
   **Score:6**
6. Data management: Data management procedures are well established and information is housed in a database at SFEI. There is no direct access to data from the Directory website; however, users can follow links to individual program websites, where reports, maps, and data downloads are possible, depending on the policies and capabilities of those individual program websites
   **Score: 7**
7. Data analysis and assessment: NA
8. Reporting: The database provides a variety of search routines, including customized queries and map-based interfaces
   **Score: 4**
9. Programmatic evaluation: No description of a periodic program evaluation process
   **Score: 0**
10. Program planning: No information on assessment of or planning for future program needs
    **Score: 0**

**Sample webpages**:






**Sample assessment products**: NA