California Water Quality Monitoring Council

Guidelines for Workgroups and the Development of *My Water Quality* Theme-Based Internet Portals

Background & Purpose

The California Water Quality Monitoring Council is forming workgroups to address California's need for timely and transparent information about water quality and associated ecosystem conditions. These guidelines explain the path to becoming a successful partner in the effort to accurately portray the best available information on water quality and the health of our aquatic ecosystems.

Senate Bill 1070 (Kehoe, 2006) required that the California Environmental Protection Agency (Cal/EPA) and the California Natural Resources Agency enter into a Memorandum of Understanding (MOU) establishing the California Water Quality Monitoring Council. The legislation and MOU mandated coordination of water quality monitoring and assessment activities among organizations both inside and outside state government, and that this information be made available to decision makers and the public via the internet. As stated in its December 2008 recommendations report to the Secretaries of Cal/EPA and the Natural Resources Agency, a key component of the Monitoring Council's vision for enhancing California's system for water quality monitoring, assessment and reporting is the development of a single point of entry to set of internet portals that connect decision makers and the public with water quality and related ecosystem health information. Each portal is developed by an expert stakeholder workgroup and includes interactive maps and monitoring data that focus on a specific water quality or aquatic ecosystem theme. The goal is to present this information in a timely and user-friendly manner that directly addresses users' questions.

A Monitoring Council workgroup is composed of experts representing a variety of agencies and entities, both within and outside state government, who are involved or have expertise in water quality and/or aquatic ecosystem monitoring and assessment that relates to a specific theme (e.g., the safety of eating fish from our waters). Under Monitoring Council oversight, the workgroup uses their collective scientific interest and capacity to design, develop and maintain an internet portal focused on their theme, thereby bringing monitoring and assessment information to the public in an easily understood manner.

The goal of the portal is to convey relevant and timely information about the thematic area, in a variety of spatial and temporal scales, to agency decision makers, legislators, and the public. The portal should directly address users' questions, as well as supply relevant background technical information. As a portal is developed, maintained and enhanced, the workgroup strives to concurrently enhance the associated monitoring and assessment efforts that underlie the portal. This may include coordinating monitoring and assessment activities, discovering and breaking down existing barriers to information sharing, and enhancing the efficiency and effectiveness of monitoring, assessment, and reporting for their theme. The workgroup seeks to achieve the level of standardization necessary to meet the needs of the information users, including the public, legislators, and agency decision makers. The Monitoring Council establishes common performance measures, policies and guidelines for the workgroups and the

monitoring programs they represent, and acts as a clearinghouse for standards, guidelines, and collaboration.

Workgroup Formation & Function

A workgroup may begin as an existing group or organization that seeks Monitoring Council guidance and direction in return for the increased exposure and recognition that result from publication of an internet portal accessed through the *My Water Quality* website (www.CaWaterQuality.net). Alternatively, workgroups may be organized *de novo* by the Monitoring Council to tackle a specific water quality or related ecosystem theme.

Initially, the workgroup asks itself a number of questions, designed to help identify its focus and representation.

1) What is the scope of the assessment that will be presented?
   (e.g., streams vs. wadeable streams, beaches vs. ocean beaches)

   a) Short-term focus – What relevant and timely information of sufficient quality is readily available in a form and condition that can be displayed in the initial portal roll-out?

   b) Longer-term focus – What information is needed to more fully and effectively cover the theme?

2) What are the questions that the workgroup is trying to answer about their theme? These should reflect common public questions and key agency management and legislative goals. These questions become the subjects of individual portal pages.

3) Who is the target audience?
   Again, this may be subdivided into short- and long-term.

   a) Public

   b) Legislature   minimum required pursuant to SB 1070

   c) Agency decision makers

   d) Water quality/watershed management scientists and practitioners

   e) Agency staff performing assessments, evaluating conservation investments, writing permits, developing local land and water use ordinances, taking enforcement, etc.

   f) Non-governmental organizations (e.g., Heal the Bay, Waterkeepers, SCCWRP, SFEI, citizen monitoring groups)

   g) Regulated community

4) Needs Identification

   a) What data sets and assessment tools are needed to effectively respond to the questions being addressed?

   b) Who are the key players, i.e., the sources of relevant data and assessment tools? The answer should inform the workgroup to appropriately expand its membership.

   c) What other workgroups share overlapping subject matter (e.g., related ecosystem health themes)? These workgroups need to establish relationships for cooperation, developing mechanisms for data sharing and dynamic linkages between their portals, and avoiding unnecessary redundancy.

5) Problems Assessment

    a) What are the potential barriers to success?

        (1) Institutional (e.g., data ownership, data access)

        (2) Technical (e.g., data management, web capabilities, GIS and database platform differences)

        (3) Funding / resources

    b) Are there critical players who are unable or unwilling to participate?
The Monitoring Council should be able to help to correct these problems by bringing responsible entities to the attention of agency secretaries.

6) Outreach – Sustainability hinges on getting the portals woven into the fabric of each agency's programs. Based on guideline #4 (b) and (c) above, the workgroup needs to market their portal development and coordination efforts to partner agencies, with the goals of improving participation, sharing data, making linkages between agency web sites, and using the portal as part of each agency's program implementation. Stress how each organization benefits from the effort. Fostering these relationships is an important goal of the workgroups.

7) Each workgroup should review existing assessments and their underlying monitoring programs within its thematic area, provide critical review and comment (e.g., biases, data gaps, redundancies, comparability issues) based on the performance measures developed by the Monitoring Council, and encourage improvement over time.

    a) Are existing monitoring and assessment programs able to adequately address key public and resource management questions?

        • What do we do well?

        • What is not being addressed?

    b) What needs to be done to correct the problems or improve performance?

A detailed critique should be sent to the Monitoring Council with recommendations for agencies/organizations responsible for the assessments. The performance measures provided in the December 2008 Monitoring Council recommendations report (see Section 2.1.2 and Appendix 3) should be used to structure the evaluations.

8) Assessment Threshold Review – A key component of coordination provided by theme-based workgroups involves the thresholds used to assess collected monitoring data and to answer relevant questions on a variety of spatial and temporal scales.

    a) Have commonly accepted metrics and thresholds been developed, if not why, and what can be done to establish them?

    b) What are the pros and cons of existing published thresholds?

    c) What statutory and regulatory requirements must be met in the selection of existing and future thresholds?

Each workgroup should develop recommendations to the Monitoring Council for making assessment thresholds more uniform across agencies and organizations involved in a particular theme. Recommendations must reflect the requirements of adopted statutory and regulatory mandates and consider regulations under development by potentially

affected agencies. The Monitoring Council will, in turn, make recommendations to the appropriate agencies & organizations.

Portal Focus and Content

9)   The central theme of each portal is expressed as a broad question, as presented on the *My Water Quality* home page (www.CaWaterQuality.net), shown in Figure 1 below. Alternatively, a portal may focus on a particular water body type within one of these main questions, e.g., a groundwater focus under the broader question of "Is our water safe to drink?" or a wetlands focus under the broader question of "Are our aquatic ecosystems healthy?"

10)   Each portal should inform a wide range of audiences, including the general public, agency decision makers, legislators, and scientists (see guideline #3 above). First present more generalized assessment products that address a broader audience. Allow users to drill
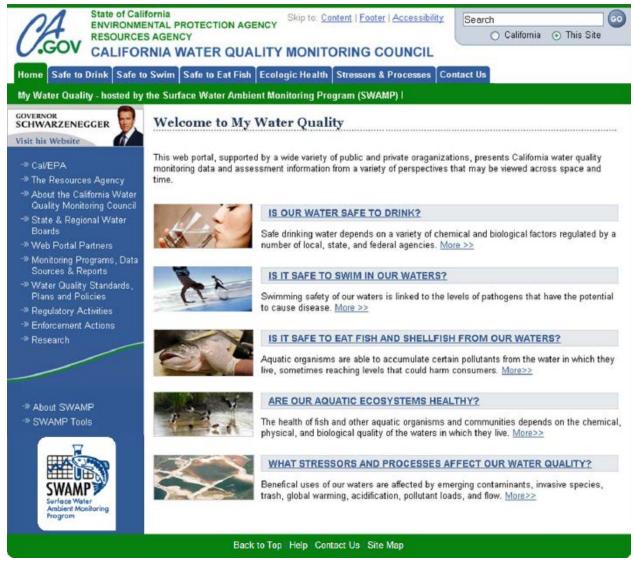

Figure 1. *My Water Quality* home page (www.CaWaterQuality.net)

down to more detailed information that relates to their specific interests.

11)   The portal home page should present several more-detailed questions (developed in guideline #2 above). These act as links to additional pages in the portal that present targeted assessments and summaries of monitoring data. See the "Questions Answered" box on the "Is it safe to swim in our waters?" portal home page, shown in Figure 2 below. The California map on the portal home page may also serve to provide place-based links to these more detailed questions. For example, as shown in Figure 2, the map provides links to the same question areas for each county, ecoregion, and/or other state division.

12)   Phrase questions in a straightforward manner as the public would likely ask them. Focus questions on topics of interest to agency decision makers, legislators, and the public.
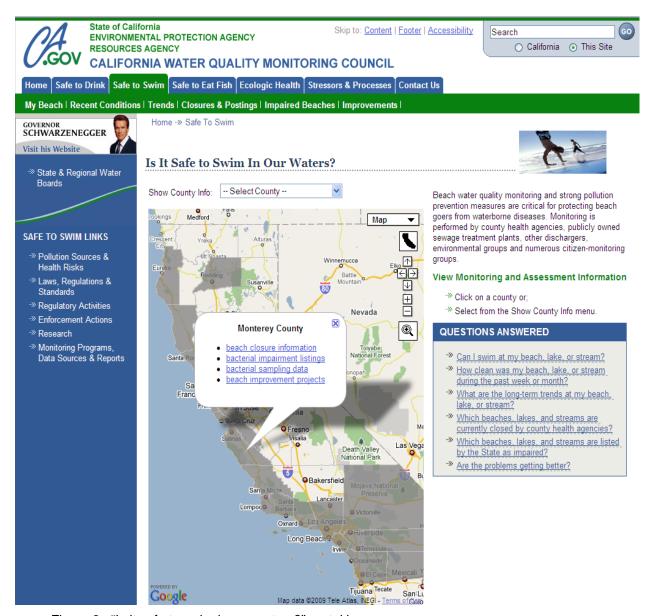

Figure 2. "Is it safe to swim in our waters?" portal home page
(http://www.mywaterquality.ca.gov/safe_to_swim/)

13) It is acceptable to ask questions that cannot currently be answered directly. In such cases, either present available monitoring and assessment information that is germane to the question or describe the nature of the data gap and what is being done, or could be done, to fill it. Each portal should clearly identify what is known and not known about the water quality or aquatic ecosystem health theme, with the purpose of identifying, focusing, and motivating efforts to improve monitoring and assessment programs.

14) Present multiple ways to view and interpret monitoring data by including different assessments made by appropriate agencies and organizations (for example, report cards, numbers and trends of exceedances, derived risk measures, indices of habitat or ecosystem health, neutral data summaries). If multiple reputable assessment approaches or thresholds have been published, each should be presented. The portal should explain the difference between the assessment perspectives and their relevance to the portal's questions in terms the public can readily understand.

15) Clearly communicate who is responsible for the monitoring programs and assessments presented in each portal map or data display, why each assessment has been made, its relationship to each question in the portal, and what decisions the assessment supports (see guideline #14, above). Displaying logos of the responsible organizations on the pages where their work resides is encouraged.

16) One or more statewide assessment perspectives should be presented whenever possible. Data gaps and uncertainties should be clearly described (see guideline #13, above).

17) On the home page or in a prominent manner, each portal should communicate that it is a work in process, initially showing what data are readily available, with the goal of adding information as it becomes available.

- Throughout the portal, highlight where data are not being collected or where data are being collected but not currently being compiled.

18) Provide definitions of technical terms in the form of pop-ups or links to pages that present appropriate background information.

19) Include background information on applicable laws, regulations, standards, policies, guidelines, regulatory activities, enforcement activities, and research that are appropriate to the theme of the portal. These are featured as links in the left navigation bar.

20) Include information about the sources of water quality and aquatic ecosystem health problems and their associated risks, threats and impacts on human health, natural resources, and/or ecosystems. These are featured as links in the left navigation bar.

21) Include a mechanism to solicit user input and an invitation to provide comments, e.g., "Did this page answer your question?" See guideline #30(d) below. Capture common comments and responses in the portal.

Portal Layout and Format

22) The following portals should be viewed as templates for other them-based portals:

a) "Is it safe to swim in our waters?" (http://www.mywaterquality.ca.gov/safe_to_swim/)

b) "Is it safe to eat fish and shellfish from our waters? (http://www.mywaterquality.ca.gov/safe_to_eat/)

23) Beginning with the portal main or home page and throughout the portal, emphasize maps and graphic representations of data and assessments in the main page content area.

a) Consistent cartographic design (e.g., colors and symbols) should be used across portals to enhance the clarity of information being presented. For example, red and other warm colors should be used to represent problems, impairments and older information while green and cooler colors should be used to represent better conditions and newer information.

b) Included legends to provide keys to colors and symbols used in maps.

24) Background information is featured as links in the left navigation bar and as hyperlinks within the main page content area.

25) Wherever possible, allow the user to access and download the raw monitoring data on which the assessments are based. For example, the Trends page of the portal "Is it safe to swim in our waters?" (http://www.mywaterquality.ca.gov/safe_to_swim/trends/) and the Data & Trends page of the portal "Is it safe to eat fish and shellfish from our waters?" (http://www.mywaterquality.ca.gov/safe_to_eat/data_and_trends/) provide direct access to bacterial indicator and fish tissue data, respectively. Adding a link to download these data (e.g., as an Excel spreadsheet) for a selected location or area would further improve this feature. Examples of such downloads are on the SWAMP-Moss Landing website at http://swamp.mpsl.mlml.calstate.edu/online-data/year-1-lakes-fish-contaminant-study. Note that the spreadsheets provide filtering tools for each column heading.

26) Use consistent units, scales of measurement, and chemical names throughout the portal. Metric units are expected, unless English units are normally used for the theme.

27) Where possible, use page formats and colors similar to those of existing *My Water Quality* portals to provide a consistent look and feel.

28) Portal content should strive to be accessible to persons with disabilities, so as not to interfere with an individual's ability to obtain and use information quickly and easily. For guidance, see http://www.webtools.ca.gov/Accessibility/.

29) Links to web pages that are outside of the portal should do so by opening a new window.

30) Include the following core page features on all portal pages:

a) A link to return to the main *My Water Quality* home page (www.CaWaterQuality.net), thereby providing access to the other portals. In the portals "Is it safe to swim in our waters?" (http://www.mywaterquality.ca.gov/safe_to_swim/trends/) and t "Is it safe to eat fish and shellfish from our waters?" (http://www.mywaterquality.ca.gov/safe_to_eat/data_and_trends/), this is accomplished via the tabs across the top of the page. Alternatively, one of the My Water Quality buttons may be used for this function.

b) A link to the workgroup information section of the Monitoring Council's page (see http://www.mywaterquality.ca.gov/monitoring_council/#workgroup). In existing portals, this is done via the left navigation link "Monitoring Programs, Data Sources & Reports".

c) A link to the Monitoring Council information page (http://www.mywaterquality.ca.gov/monitoring_council/). In some portals, this is

accomplished via the words "CALIFORNIA WATER QUALITY MONITORING COUNCIL" in the banner at the top of the page.

d)   A link to the Contact Us page (http://www.mywaterquality.ca.gov/contact_us/), which provides information on portal roll-out and a place to ask questions and provide comments. In the some portals, this is done via the right tab at the top of the page.

- An example comment link is "Contact the SB 1070 Coordinator with your comments and suggestions." with "SB 1070 Coordinator" linked to mailto:SB1070Coordinator@waterboards.ca.gov.

Portal Development Process

31)   The portal is a product of the theme-based workgroup, with conceptual approval by the Monitoring Council.

a)   For new portals, the workgroup is responsible for developing a mock-up, and presenting it to the Monitoring Council for approval, prior to portal development.

b)   The workgroup is responsible for maintaining the portal with regular updates as new monitoring data and assessment tools becomes available. To keep the portals efficient and timely, updates should be automated to the extent feasible (e.g., drawing information from a regularly updated data management system), with the goal of presenting information in real time.

32)   The Monitoring Council will review and approve questions, assessment products, and portal mock-ups prior to portal development. These should be presented to the Monitoring Council as a mock-up of main portal pages.

33)   New assessments (ones not formally made by agencies/organizations) presented in a portal are products of the theme-based workgroup. Monitoring Council review and approval of new assessments is required, especially for those expected to be controversial. A test-phase assessment map or data presentation may be included in a portal prior to full workgroup concurrence if it is clearly labeled as such with a mechanism for inviting comments and suggestions from portal users.

34)   Technical issues with the performance of maps and other web page displays are to be corrected prior to portal release. Address any GIS and web standards published by participating state agencies and the California Office of the Chief Information Officer.

35)   Consider convening one or more focus groups to review and comment on draft versions of the portal before public release. Members of such focus groups should reflect one or more of the target audiences discussed in guideline #3 above.

Data Management

36)   The Monitoring Council has endorsed the use of a distributed data management system, such as the California Environmental Data Exchange Network (CEDEN). The creation of new centralized master databases should be avoided, as they are more difficult to develop and maintain.

37)   Data from disparate sources should be brought together by establishing linkages and data exchanges. A goal should be automated real-time data exchange and movement of information to the portal.

38)   To ensure continued high quality, monitoring data should reside as close to its source as possible, preferably with the organization that generates the data.

39)   For monitoring data generators that lack in-house data management systems, their data may be managed through a regional data center, such as those associated with CEDEN. CEDEN regional data centers currently reside at Moss Landing Marine Labs (MLML), the San Francisco Estuary Institute (SFEI), the Southern California Coastal Water Research Project (SCCWRP), and the University of California at Davis (UCD).