

San Francisco Environmental Indicators Workshop

Oakland City Hall, Oakland, CA

January 26, 2005

Workshop Summary Report

A workshop for the San Francisco National Estuary Program (SFEP) entitled *Environmental Indicators Workshop* was held at the Oakland City Hall on January 26, 2005. Battelle supported development of the meeting with the San Francisco Estuary Program (SFEP) and San Francisco Estuary Institute (SFEI). The participant invitation letter announcing the meeting as well as the meeting agenda are included in Appendix A. Environmental professionals from federal, state, and non-profit organizations attended the workshop. The list of participants is included as Appendix B. Dr. Michael Connor, San Francisco Estuary Institute (SFEI) and Dr. Carlton Hunt, Battelle, facilitated the meeting.

The primary focus of the workshop was to bring together individuals who are currently conducting monitoring, research and assessment programs in the Bay area and high-level managers that use monitoring information to make decisions to discuss the process of developing indicators for the SFEP monitoring program. Ms. Marcia Brockbank, Director of SFEP, opened the meeting with a brief introduction and statement of the objectives. Ms. Brockbank identified four main objectives for the workshop including:

- Developing a statement describing the collective vision for how indicators will be used in the Bay-Delta Region;
- Defining terms and providing background information to high-level managers;
- Developing a framework strategy agreement that clearly outlines how data generators and data users will work together; and,
- Identifying potential funding sources and commitments of staff time.

The workshop was funded by the U.S. Environmental Protection Agency (EPA) and SFEP with technical and logistical support from SFEI, The Bay Institute, and Battelle.

Workshop Overview

The workshop was held on Wednesday, January 26, 2005. During the morning session, background informational presentations were given by members of the SFEP, SFEI, State Water Resources Control Board (SWRCB), and Battelle. Copies of all of the PowerPoint presentations are included as Appendix C. All workshop materials were distributed to the participants prior to or during the meeting. These materials are provided in Appendix D. Workshop highlights, a description of key presentations, and a listing of the suggested next steps are detailed below in the subsequent sections of this meeting summary.

Workshop Opening Remarks and Presentation

Ms. Marcia Brockbank of the SFEP and Mr. Grant Davis of The Bay Institute opened the meeting with an introduction and informed the group of the efforts leading up to the indicators workshops. Ms. Brockbank continued by stating the necessity to build consensus on the importance of, and need for scientifically valid, leading environmental indicators. She stated that it will be critical to

develop a framework for interagency cooperation and collaboration on the development, refinement and use of environmental indicators, and the importance of attracting commitments of ongoing financial and programmatic support.

Dr. Michael Connor followed the opening remarks with an overview of the workshop. He stated that for the indicator regional development process to be a success, a vision for the process must be developed including feedback from the participants. He reiterated the goal of the workshop was to develop a consensus on the importance and need for indicators. He also re-stated the need for commitment from the participating agencies. Dr. Connor noted that the participants provided a cross-section of interested parties from both federal and state agencies, and that the group as a whole should be able to reach consensus of many key issues.

Perspectives on Indicators, presentation given by Carlton Hunt, Battelle
(Appendix C)

Dr. Hunt followed with a discussion of the workshop charge. He focused on the reasons for coordination among monitoring programs and indicator development. He re-enforced the importance of indicators to track the status of an area and stated that they are a necessary part of any coordination effort. He also suggested the most important steps in the process are to develop an organizational framework and set of indicators. Currently there is no national legislative mandate to develop indicators, nor are there mandates to coordinate indicator development. However, many indicator initiatives are being conducted at national and regional scales. Dr. Hunt indicated the Gulf of Maine region was one model for a regional indicator development effort. A two-year process was followed to develop a coordinated monitoring framework and regional indicators although the program is not yet in the measurement mode. He suggested that the regional indicator process should start by identifying a set of general issues and then become more specific to focus on the regions needs.

Dr. Hunt also focused on the need for indicators as a means to communicate to the public, scientists, and managers the status of a given ecosystem. Furthermore, he stressed that indicators allow scientists and managers to focus monitoring programs on key parameters, confirm what is already known about a system, and to synthesize and integrate their efforts.

Dr. Hunt continued by presenting a process for developing a coordinated indicator development effort. He conveyed that a coordinated effort provides scientists and managers with the ability to identify and address data gaps and offers an avenue to develop a systematic approach. A coordinated effort was also suggested as a way to satisfy a range of interests, answer many questions, and address the most important issues facing an ecosystem. The process calls for a champion who is willing to provide time and energy. Furthermore, it is crucial to include managers early in the development process rather than later. This allows managers an opportunity to develop interest and invest in the effort. In response to questions, he noted that persistence in informing the public as well as education in the school systems are two valuable ways to communicate the effort to the public.

Proposal for Environmental Indicator Collaborative, A California Water Board
Perspective, presentation given by John Norton, State Water Resources Control Board
(Appendix C)

Mr. John Norton presented a proposal for environmental indicator collaboration to the participants. He mentioned that he is often asked the question “How good is the water quality?”

Many in the workshop noted that this is a hard question to answer. Importantly, participants identified the need to communicate the answer to both environmental managers and the public clearly.

Mr. Norton also discussed why the Water Board needs to develop indicators. The Water Board felt it was necessary to manage for environmental results; therefore, focus questions needed to be identified that would directly measure results, and that indicators need to be developed to answer the questions. Mr. Norton stated that the Water Board is able to communicate to the public through an environmental report card that addresses several issues. One successful effort noted was the environmental report card produced by *Heal the Bay*, a Santa Monica-based environmental advocacy group, which presented indicators related to water contact recreation that the public could identify with on a personal level. Further noted in the presentation was the need for indicators to support three levels of a system and that all levels must weave together to be successful. The three levels were:

- Project - What is the water quality of the river?
- Watershed/region - How is the bay doing?
- Statewide - What is the state of the state's watersheds?

Mr. Norton then discussed how a collaborative effort would allow regional boards to follow the same process in monitoring and reporting data. He stated that there is a critical need for a state-level database of monitoring data for programs to share. Buy-in from scientists, local and state agencies, as well as other key stakeholders was also identified as key to the success of the partnership.

Mostly, Mr. Norton discussed the reasons why the Water Board would like to establish a partnership for the process of developing indicators. Their primary need for indicators is to develop assistance with State and regional boards in sharing data, efficiency in addressing goals, and establishing a common language adequate to communicate to managers. He conveyed that the goal of the collaborative is to establish one voice for progress. A stronger voice is needed to communicate meaningful indicators at the national level, such as the EPA. Moreover, he acknowledged that development of meaningful indicators is important in contrast to choosing indicators to satisfy requirements. There was an initial consensus from the group that a collaborative effort was needed. However, it was noted that more discussions were necessary to define the details of the effort and the partnership.

Implementing a Regional Monitoring and Indicators Initiative

During lunch, a small work group formed to identify the focus of the afternoon session. Dr. Hunt presented the findings of the small work group to the workshop participants. He indicated that he was working under the assumption that the participants were in general agreement that the group must move forward on a collaborative effort. He also suggested that the effort may take a year or two to complete and would require commitments of staff by managers.

Several issues for moving forward with the indicator development process identified by the workgroup included:

- Developing a vision statement for the effort.
 - What are its attributes?
- Defining and developing a clear purpose statement.
 - What should it accomplish?
- Identifying who has ownership and who are the champions of the effort.

- Determining who should participate in the effort.
- Developing a survey of customers and products and what these need to accomplish.
- Developing a funding strategy.
- Identifying next steps.

The afternoon discussions focused on these issues and addressed the following questions:

- 1) Should we have a partnership?
- 2) Could an MOU such as the one proposed in the morning (and included in the agenda package) form the foundation?
- 3) Who would want to work on development of the partnership?

Each question was thoroughly discussed among the participants and agreements were produced. A summary of the answers to each question is provided below:

1) Should we have a partnership?

Discussion:

The Bay is a data-rich ecosystem. There are many critical gaps in measurement, and routine sampling is not currently conducted by many programs. One problem that was identified during the discussion is that meetings to develop measurement programs and indicators have been conducted every few years. Many felt that these resulted in lists of what to measure, but follow-up actions were few. This has led to cynicism with regard to these processes and led many to move forward independently to meet their mandates. The participants suggested two basic gaps that must be addressed for this collaborative effort to be useful:

- 1) A “hero” (someone who champions the effort) is needed, regardless of whether this takes on the form of an individual or group or many individual heroes working within their agency, for the environmental indicator development programs to be sustainable. Participants recognized that the Bay area lacks a hero today.
- 2) It is critical to make data useful. Scientific data are a product, and the customer or consumers of the data must be identified. The focus should be on identifying what products are most useful to the customer, how the product should be packaged, and how the customers will use the product on a daily basis.

It was suggested that the ultimate customer should be the public. It was noted that the public does not relate very well directly to water quality issues, since their main interest is in human use activities such as recreation (e.g., beaches, hiking, fishing, and biking). Therefore, indicators must be identifiable and quantifiable to the public for recreational and beneficial uses of the Bay area. Some suggested indicator topics for the Bay Area should include land use, social, and economic issues. One ultimate indicator that was discussed was the Bay fisheries and whether they can be sustained or improved, or if fish are safe to consume. The end result was an understanding that indicators must not only link to ecosystem health or water quality, but predominantly to public health, recreation, and other human-centered issues that people currently relate more to.

Several participants felt that the focus was much too aqua-centric, and the indicator focus must go beyond water quality and incorporate all aspects of the ecosystem. Others suggested that managers are most interested in water quality and require day-to-day feedback. It was recommended that water quality status could be detailed in a technical report developed solely for

managers instead of incorporating water quality issues into the package for the public. One issue noted was that public opinion does not always drive public policy.

The discussion continued by identifying which area(s) should be included in the collaborative effort. The participants generally felt that the partnership must designate an established geophysical area and suggested several: Region 2 & 5, nine Bay area counties, or the SFEP Outline based on 12 counties.

A clear sentiment expressed during the discussions was that a regional indicator effort must have the capacity to support most current environmental programs. Discussion also centered around the topic of support and commitment by the people living in the Bay Area for data collection efforts to inform environmental stewardship and the need for both “bottom up” and “top down” efforts. It was also noted that individual efforts are making progress towards indicator development and these efforts appeal to managers and provide a mechanism for continued support. Furthermore, this type of effort can be productive for a regional indicator effort. However, since many environmental programs must justify their efforts, this can be difficult. The need for a clear starting point, such as identifying large-scale indicators that can be scaled and modified to evaluate Bay area indicators, was acknowledged. It was also recognized that assessing performance measures for monitoring programs and recognizing the diversity of customers is important.

One issue discussed that appears to be a hindrance to developing a partnership is an expectation that the group would have to provide more funds contributed to these programs presently. After some discussion, it was acknowledged that the value added from a partnership is the enhanced use of information, and that more funds are not necessarily required to make indicator development and refinement sustainable.

Agreements:

The workshop participants identified several actions that the partnership must address during the indicator development process. These included development of a vision statement and purpose, active participation in developing the program by participants (including specific assignments to members), the identification of customers and products, and defining an implementation process and funding strategy. It was also noted that this process requires substantial effort and commitment to be successful. The workshop participants agreed that a partnership must have a hero/champion whose role is to frame and lead what the overall effort is considering and identifying sources of support.

Several agreements were reached by the group:

- The group reached a tentative consensus on the geophysical scale of the region of interest - the 12 counties at the bottom of the Estuary watershed. Inclusion of the 12 counties was felt to allow development of a diverse group of indicators with a small set of general indicators that could apply to all areas.
- The process is in its initial phase, and it is too early to discuss measurements and metrics.
- Participants committed to helping the process move forward, but felt it was too early to commit financial resources.
- The vision for the group should be how to communicate the effort to the public and define what issues are important to the public.
- The group also realized the importance of drawing on work that has already been done instead of starting at the beginning.

- It was agreed that the formation of a Steering Committee would be useful and would require feedback to the rest of the group.

2) Could an MOU such as this one form the foundation?

Discussion:

A draft MOU was presented to the workshop participants for discussion purposes only. The MOU was to provide the participants with guidance in the future collaborative efforts of indicator development for the San Francisco Estuary. Many points were made during the discussion:

- The partnerships should be defined with MOUs. It was also suggested that there should be multiple MOUs and partnerships established to be effective in the effort.
- There was a discussion focused on how to formulate a partnership. Consider visualizing an equilateral triangle with the sides titled beneficial uses, individual partners, and other partners. These three focus points could be the driver behind the partnership.
- A lot of effort is needed and required to form a consensus on a regional effort. It was suggested that agencies and groups move at different paces and the steps forward cannot be forced. Most anticipated a long process to identify issues, develop questions, and draft indicators. With focused leadership, it was felt the above process could take up to eight months. To minimize the time involved in the process, the group felt that developing a vision was a good place to start the process; they also did not wish to reinvent the wheel.

Agreements:

The group was cautious of signing an MOU without a clear vision and direction established for the partnership. It was generally felt that the purpose statement in the MOU does not address the larger issues, such as land use. Due to these concerns a formal agreement was not reached by the group.

3) Who would want to work on development of the partnership?

Discussion:

The workshop participants were reminded that commitment of time and expertise is critical to the success of the indicator development process. The group acknowledged essential steps that are vital to the process including identifying the appropriate geographic scale, customers, products, and use of products, administering assignments, and developing a funding strategy. Furthermore, the group indicated that folks must play the hero internally in their agencies if the effort is to continue and to identify others who would take part in the process. The importance of selling the effort to the Bay area community to establish a buy-in was recognized. The importance of a vision that the public can identify with, such as the coexistence of urban areas and wildlife with a connection to the landscape, was also recognized.

Participants conveyed that a mechanism to commit money and time is needed to aid in the indicator development process. Each month, SFEP could hold a meeting in which participants of the workshop are committed to attend. It was suggested that the monthly SFEP meeting could be used as a mechanism to support the indicator partnership. One thought was to modify the agenda for the October 2005 State of the Estuary Conference to include a topic discussion about indicator development. This action could create one track for all agencies to work together with one goal. Participants inquired as to whether the existing group that was pulled together by SFEP could be the leader for the process, and they obtained a sense that the current consortium would do its best to continue in its leadership role. Access to high-level managers was also noted as necessary. It

was indicated that other types of monitoring, such as monitoring conducted by citizen groups, should also be included in the process.

An inquiry was made about the length of the process to develop and implement a coordinated indicator program. A time frame of two years for the process was suggested. The group expressed concern regarding the length of the process and the time frame it will take to obtain the end result.

In response to questions about existing monitoring activities that could feed indicator development, the participants were asked to brainstorm on current efforts in the Bay area. The list developed at the workshop included:

- Regional Monitoring Program - funded to monitor water quality in the Bay and develop an annual pulse report.
- USGS - developed maps identifying ecosystem parameters that cause changes in San Francisco Bay.
- Bureau of Reclamation - monitor for protection of salmon and salinity with CVP (central valley project) waterboard.
- CA Dept. of Fish and Wildlife - report abundance of many species.
- Bay-Delta ecosystem restoration effort - developed list of indicators and worked with science group to develop performance measures (completed in 2002), but still need conceptual models to support indicators.
- Santa Clara County - monitoring permit conditions, but have not been good at using data effectively to inform stewardship or influence policy decisions. The group is in a stage to get data into indicators, indicator development, identify data gaps, and generate more useful information. Also collaborated with watershed management initiative for wastewater and water discharge indicators.
- It was stated that the Heinz Center is developing a new indicator report. It started with the state of the nation's ecosystem and scientific understanding rather than public interest. Indicators that deal with human use were included. Costs of monitoring programs are shared between the public and agencies.
- EPIC: Environment Protection Indicators for California – A 2002 report was developed and an updated version of report using new data is being posted. EPIC is an agency-directed, yet broad-based effort with a high-level directive, however it is currently unfunded.
- SWRCB - conducts monitoring under sections 303(d) and 305(b) of the Clean Water Act.

Agreements:

During the discussion the participants were pushed to develop consensus on next steps for starting the process of indicator development. All agreed that the effort is worthwhile and agreed to support the next steps. The next steps were defined as:

- Develop a 1-page text for the SFEP meeting on February 4th to present to participants and solicit more support. A workgroup, made up of Anitra Pawley (The Bay Institute), Andrew Gunther (Center for Ecosystem Management and Restoration), and Rainer Hoenicke (SFEI), was established that would complete this assignment.
- Participants agreed that a state-wide effort was needed. The goal is to develop a state-wide effort to look at various monitoring programs and then determine whether those programs can be modified to address indicators. While evaluating the monitoring programs, another goal will be to identify whether any of the managers or stakeholders of the programs could fund and/or participate in the indicator development effort. Mr. John Norton (SWRCB) and Ms. Cathy Bleier (CA Resource Agency) agreed to lead this effort.

- Conduct a working session to present a regional framework for a collaborative indicator effort.
- Develop a progress report within six months. This should be presented during or shortly after State of the Estuary Conference.

Summary of Workshop Discussion

In general, the workshop participants felt the most successful approach to developing indicators for the Bay is to be holistic with a champion to coordinate the process. It is also recognized that agencies must reach out to users through as many avenues as possible, such as web surveys and education materials. Furthermore, it appears that there is no recent inventory of monitoring programs in the region of interest and this is vital to the success of the indicator development process. Interest was expressed by several participants for the inclusion of social and political scientists as well as environmental scientists in the process. Some key points made during the discussions are:

- Develop a robust set of indicators that will feed a vision. Tell a compelling story of how the Bay is an integral part of the overall ecosystem, one that will intrigue the public and gain support. One possible vision statement drafted by a participant stated that “Address the question through quantitative measures, which would be developed using indicators: Is the bay and delta area getting better or worse?.”
- Indicators should be developed that use and support long-term data sets and identify gaps.
- Concerns were expressed over how to obtain money if work has not been completed and vice versa. Also discussed was an uneasiness of how to get the process going and how to keep the momentum up. The solution was to involve more partners and stakeholder groups to gain support.
- Increase the level of investment or the way that money is being spent to answer one question or vision. Many participants felt that it was critical to focus on the vision rather than requirements or regulations to be successful in the process.
- Form a workgroup to develop a vision and then collect feedback from larger group. The next step would be to present the vision to high-level managers for buy-in and commitment on a broad conceptual approach. In the near future, participants should conduct another workshop to identify and implement the next steps to move forward.
- It was recognized that the top-down/bottom-up approach must work both ways (top-down is money). Identify who is up the chain to sell the effort to.

There is a general sense that the indicator collaborative is needed and the vision needs to be defined to keep momentum going. To further the momentum, SFEP will follow up with the participants through emails and in-person meetings to collect feedback. Furthermore, the workshop effort will assist SFEP with meeting their directive from the EPA to develop a suite of indicators. It was noted that the San Francisco estuary is a large one and SFEP needs support from others to be successful in developing indicators. The collaborative effort from the workshop would indicate agreement and provide ownership to those involved.

Next Steps

The workshop closed with a brief summary of the next steps suggested during the discussion among the participants. These include:

- 1) Complete the workshop summary;

- 2) Establish a straw vision for SFEP meeting February 4th. This is to be completed by the workgroup consisting of Anitra Pawley (The Bay Institute), Andrew Gunther (Center for Ecosystem Management and Restoration), and Rainer Hoenicke (SFEI);
- 3) Develop a strategic plan by May 2005;
- 4) Develop a progress report within six months. This should be presented during or shortly after the State of the Estuary Conference.
- 5) Meet next year for a working session to present information for a regional framework with an integrated indicator development approach. Additionally, meet with the extended working group to provide feedback to the Steering Committee within a 10-11 month timeframe,
- 6) Develop a state-wide effort to evaluate whether the various monitoring programs can be modified to address indicators; identify whether any of the managers or stakeholders of the programs could fund and/or participate in the indicator development effort. Mr. John Norton (SWRCB) and Ms. Cathy Bleier (CA Resource Agency)), will lead this effort.
- 7) Provide northeast website for reference (<http://www.gulfofmaine.org/nciw/>), and
- 8) Obtain commitments of resources.

Workshop Closing

Dr. Michael Connor and Ms. Marcia Brockbank closed the meeting, stating that they felt the workshop had achieved and even exceeded some of the goals that SFEP and SFEI had hoped to accomplish. The success of the group can be seen in their agreement and willingness to establish a partnership on indicator development process and begin to move forward. As indicated in the list of next steps, there is additional work to do and workshop participants are asked to continue assisting in the process.

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Appendix A

Participant Invitation Letter and Agenda

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Agenda

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San Francisco Estuary Project

Indicators Workshop

Oakland City Hall, Hearing Room 3, First Floor

January 26, 2005

9:30am – 5pm

Workshop Purpose

- Build consensus on the importance of, and need for, scientifically valid, leading environmental indicators.
- Develop a framework for interagency cooperation and collaboration on the development, refinement and use of environmental indicators.
- Attract commitments of ongoing financial and programmatic support.

Agenda

9:30 – 10:00 Workshop Welcome, Introductions, and Charge to Workshop

- Why we are all here
- Introductions including participants
- Workshop overview, schedule, expectations of each session and entire workshop

10:00 – 10:20 Perspectives on Indicator Development

(Carlton Hunt)

- Brief overview of indicators, their use, national initiatives that are making their development necessary, and lessons learned by other coordinated programs.

10:20 – 11:00 State Directions and Reasons to Partner

(John Norton, Chief, State Water Resources Control Board, Office of Statewide Initiatives)

- Draft Memorandum of Understanding
- Key Questions

11:00-11:45 Discussion

11:45 – 1:00 Lunch – to be supplied

1:00 – 2:30 Cooperative Indicator Program Development

(Facilitator – Carlton Hunt)

- What are the uses of the environmental indicators for the Bay-Delta System?
- What issues should be included in the program?
- What decisions might be based on indicators?
- How might these indicators be useful to managers?
- How do geographic scales and indicator topics differ among users?

2:30 – 3:00 Break

3:00 – 3:45 Framework for Moving Forward

(Facilitator – Carlton Hunt)

Joint Agency Indicator Collaborative

- Agreement on use
- Commitment to support a resolution indicating multi-organizational/agency support
- Agreement that funding and leadership are crucial

3:45 – 4:30 Discuss Draft Memorandum of Understanding

(Facilitator – Carlton Hunt)

4:30 – 4:45 Summary of Day's Accomplishments

(Mike Connor, Carlton Hunt)

4:45 – 5:00 Closing Remarks

(Marcia Brockbank, Mike Connor)

Optional Social Hour – For those who would like to wait out some of the traffic or visit with a colleague, the group will adjourn to a nearby restaurant after the meeting adjourns.

Invitation Letter

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Dear

Several new initiatives at the state and federal level highlighting the need for “performance-based environmental management” and recent successes in the San Francisco Bay Area in moving closer to a meaningful environmental indicator system prompted us to organize a one-day workshop on Environmental Indicators. On behalf of the Bay Area Indicator Consortium, I would like to invite you to a workshop on January 26th, 2005, to be held at Oakland City Hall from 8am till 3:30pm.

We consider your participation in this workshop, jointly sponsored by U.S.EPA and the San Francisco Estuary Project, particularly important. The Estuary is considered one of the best-studied ecosystems in the world, but the myriad of disparate data collection efforts has not yet resulted in a coherent performance measurement system. In fact, an assessment by the General Accountability Office applies to California as much as to the nation as a whole. In a recently released report to the Chair of the Congressional Subcommittee on Science, the GAO highlighted the need for leadership at the highest levels of government if the dispersed efforts conducted by multiple agencies and organizations are ever to result in a coherent environmental management system based on meaningful, science-based indicators. You have the ability and authority to provide that kind of leadership. We hope that this workshop will be the catalyst to eventually expand the efforts conducted in the San Francisco Bay Area statewide.

An effective assessment effort to answer the question of “How healthy is the San Francisco Estuary ecosystem?” will need to function long-term with the support of a broad array of stakeholders. The purpose of this workshop is to foster partnerships among public agencies at all levels of government and non-governmental organizations to develop and continually refine environmental indicators for the San Francisco Bay-Delta Estuary, which can then be used to expand into other areas of the state.

Why do we need environmental indicators?

Currently, there is no single, objective, and comprehensive assessment of the health of the Bay and its watersheds that is widely recognized as valid by ecosystem managers and policy makers. Such an assessment is needed to identify problems early, direct agency efforts towards real priorities, and measure the impacts our collective actions are having on the system’s health so that we can continue to adapt and improve our management strategies.

What are environmental indicators?

Environmental indicators, are the “vital signs” that indicate if the condition of the ecosystem is improving or deteriorating. They are derived from chemical, biological and physical measurements of the environment. A variety of federal, state, local agencies and non-governmental organizations in the Bay Area have long-term, high quality data that can be used to create indicators.

What has been accomplished thus far?

In 2003, The Bay Institute produced a report card that assembled pertinent data from hundreds of disparate data sources, scoring the health of the Bay in eight areas including habitat, freshwater inflow, water quality, food web, shellfish, fish, fishable-swimmable-drinkable, and stewardship. Based largely on that pioneering effort, the San Francisco Estuary Project has recently proposed 12 Primary Indicators of Estuary Health

derived from nearly 50 different measurement parameters. Considerable momentum exists through our Indicator Development Consortium to refine this proposed set of indicators and evaluate its applicability for other regions of the state.

What are desired outcomes of this workshop?

- A statement describing the collective vision for how indicators will be used in the Bay-Delta Region
- Define terms and provide background information to high-level managers
- A framework strategy agreement clearly outlining how data generators and data users will work together
- Identification of several potential funding sources and commitments of staff time

Our workshop facilitator, Battelle, will send you an agenda and background material within the next couple of weeks. I, or one of my fellow Steering Committee members, will call you personally to answer any questions you may have and confirm your participation. I sincerely hope that you are able to make this workshop a priority in your busy schedule.

Sincerely,

Marcia Brockbank
San Francisco Estuary Project Director

Cc: Larry Kolb, Assistant Executive Officer, SFBRWQCB
John Norton, Office of Statewide Initiatives, SWRCB
Terry Young, Environmental Defense
Mike Connor, San Francisco Estuary Institute
Grant Davis, The Bay Institute

Appendix B

List of Attendees

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San Francisco Environmental Indicators Workshop Participant List

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Appendix C

**Presentation by Dr. Carlton Hunt, Battelle
And
Presentation by Dr. John Norton, SWRCB**

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Perspectives on Indicators,
Carlton Hunt

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San Francisco Estuary Project Indicators Workshop

January 26, 2005

Oakland City Hall

Welcome

- Why we are here?
- Introductions
- Purpose of Workshop
 - Build consensus on the importance of, and need for scientifically valid, leading environmental indicators.
 - Develop a framework for interagency cooperation and collaboration on the development refinement and use of environmental indicators.
 - Attract commitments of ongoing financial and programmatic support.

Overview

- Overview of initiatives throughout the nation on indicator development
- Define the aspects of a Cooperative Indicator Program
- Discuss the framework for moving forward
- Discuss developing a Memorandum of Understanding for the cooperative program
- Anticipated outcomes
 - Resolution to move forward with the regional indicator development
 - Commitment to continue the process towards a more formal regional indicator coordination and development arrangement

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Perspectives on Indicator Development

Overview and Foundation

- Why and Importance
- What
- How
- Who
- Barriers/challenges
 - No national legislation or regulations as a driver
 - Diversity of issues, indicators, and questions
 - Scales of applicability (site, town/county, state, regional, national)
- Governance
 - Distributed
 - Associations
 - Regional councils
 - ???

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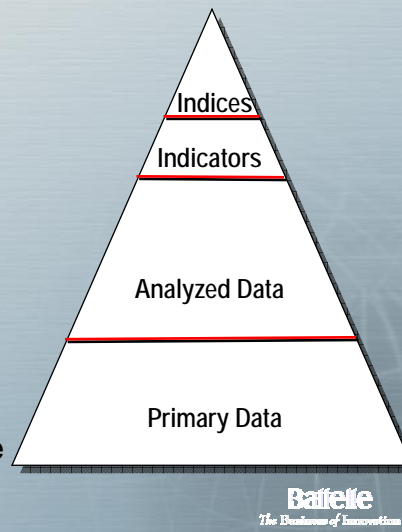
Why indicators?

- Easy to understand and convey information
 - status and trends at a higher level (e.g., general stock market trend verses specific stock)
 - To Public/Managers/Regulators/Legislators/
- Helps focus measurement programs on key parameters
 - Assumes reasonable understanding of how a watershed or water body works
- Supports deployment of cost effective measurement programs
- Development process can help managers and scientists focus on what is known (and not!) about
 - ecosystem processes and interactions
 - stressors and responses
- Forces scientists and managers to compare their conceptualizations of the system and think in terms of synthesis and integration and to cross cut scientific disciplines

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Indicators and Their Purpose

- Indicator – is a particular characteristic or reference marker used to measure in a simplified manner whether a desired outcome is being achieved
- Indicators:
 - Quantify information so its significance is more readily apparent
 - Simplify information about complex phenomena to improve communication



National Indicator Development Efforts

- Several National Programs have directives/initiatives to develop indicators
 - National Ocean Survey (NOAA)
 - National Coastal Assessment (EPA)
 - Environmental Indicator Initiative (EPA)
 - National Estuary Programs (EPA)
 - Estuarine and Great Lakes (EAGLE) Program (EPA)
 - National Parks Service (NPS)
- Several recent reviews of indicators (need, use and applicability, development processes)
 - It's a wave

Why Coordinated Approach?

- Need for:
 - Application of consistent (though not identical) methods
 - Consistent monitoring approaches (but not identical)
 - Aggregation of information from local to regional and higher levels
 - Consistent set of drivers, champions, support, and coordination

Why Coordinated Approach?

- Consistency in informing decision-makers and public on progress in coastal protection and restoration
- Ensure the right things are monitored; with flexibility to meet regional/local needs
- Address gaps between monitoring and management:
 - Reach out to managers to ensure measurements are relevant
 - Constituency and meeting management needs
 - Developing the questions to ask
 - Ensure relevant information is produced in a timely manner

Changing Paradigms in Indicator Development

- Old methods:
 - 1) Choosing indicators from available data or parameters being monitored currently
 - 2) Brainstorming indicators that optimally answer key questions whether data are available
- New Trends - Use of a systematic approach linking questions and issues to conceptual models and indicators

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Some Lessons Learned on Indicator Development

- Realize up front the amount of time it takes to develop good indicators and indicator-based products (e.g., report cards)
- Continual feedback from Query the target audience (means you have to identify and connect with them)
- Involve a wide range of interests and individuals from the beginning (don't do it in a vacuum)
- Define the questions and issues early
- Develop conceptual models that address the need at the geographic scale(s) of concern
- Select indicators with good prospects for long-term, relevant monitoring

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Lessons Learned

- Indicator-based products need clear and direct linkages between the indicators and results/needs (e.g., management decisions, program funding, informing the public/policy makers, etc.)
- Don't rush though important decisions but be persistent
- Design for flexibility (replacement indicators) if an indicator does not produce meaningful results
- Understand and design communication documents (reports, fliers, websites, etc.) a range of audiences (scientists, managers, public, and policy makers, etc.)
- Sell managers and policy makers on the need, concepts, process and value before and after release

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Cooperative Indicator Program Development

Factors Regional Coordination Efforts Need to Consider

- Scale
- Scope/Reach (issues)
- Links to Managers
- Organization constructs and governance
- Program Design and Implementation/Methods
- Data Management
- Data Synthesis
- Communication/Outreach/Services
- Links to Research

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Regional Coordination

Function

- Scale – local, regional, state, multi-state, or national
- Scope/Reach – single or multiple issue(s)
- Organization – form, location, functions, coordination, links
 - What is the charge to the organization/program do
- Program Design and Implementation/Methods – what questions will be answered; which indicators will be used; where and how often does data need to be collected
- Data Management – single location or distributed; data accessibility/ownership
- Data Synthesis – who will analyze the data and which reports will be prepared
- Communication /outreach – types, who, when
- Links to Research – Flexibility, updating understanding, methods, etc.

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Questions to Answer This Session

- What are the uses of the environmental indicators for the Bay-Delta System?
- What issues should be included in the program?
- What decisions might be based on indicators?
- How might these indicators be useful to managers?
- How do geographic scales and indicator topics differ among users?

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Framework for Moving Forward

Regional Coordination Considerations

- Structure
- Type of organization
- Geography
- Governance/decision-making
- Operating budget
- Funding sources
- Partners
- Staffing

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Regional Coordination Considerations

- Structure – Steering Committee, Board, Single Director
- Type of organization –public or private, nonprofit or profitable
- Geography – Will depend on the functional scale
- Governance/decision-making – Voluntary compliance, consensus, legislative mandates
- Operating budget – seed funding, operating and report production budgets
- Funding sources – each partner gives funds, work conducted in house covered by that particular partner
- Partners – Government, NGOs, businesses, academics, regional organizations
- Staffing – Partners supply staff, focused full time staff

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Indicator Collaborative

- Is it needed?
- Agreement on use
- Commitment to support a resolution indicating multi-organizational/agency support
- Agreement that funding and leadership are crucial
- What form should it take?

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Summary and Closing Remarks



Optional Social Hour

Proposal for Environmental Indicator Collaborative,
A California Water Board Perspective,
John Norton

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Proposal for Environmental Indicator Collaborative

A California Water Board Perspective

**SFEP/EPA
Environmental Indicators Workshop**

**January 26, 2005
Oakland City Hall**

Why Water Boards Need Environmental Indicators

- Essential to performance management
 - “Managing for environmental results”
- Using outcome-focused goals and indicators to answer these questions:
 - “Are we addressing the right problems?”
 - “Are we making a difference?”
 - “Are our decisions based on results?”
 - “Are we accountable to the public?”

Why Water Boards Need Environmental Indicators (cont.)

- Various State and federal mandates
 - Environmental Protection Indicators for California (EPIC) *[2001-ongoing]*
 - Budget requirements *[2004-ongoing]*
 - California Performance Review *[pending]*
 - EPA indicators & program activity measures *[2004-ongoing]*

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Indicators are needed to serve at three levels:

- Project level
- Watershed/regional level
- Statewide level
 - Communicate state of State's waters to Legislature, EPA, public

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Water Board Experience

- Still struggling to report results on Water Board measures after three years (e.g., inadequate data systems)
- Difficult
- Time-consuming
- Limited resources
- Buy-in

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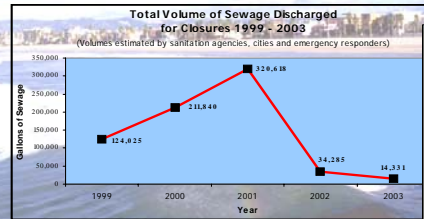
Example of Water Board Challenge

- National indicator = Counts of beach closures or days beaches are open
- State indicator = Beach Mile-Days (BMDs)
 - Water Boards coordinate with County health departments and environmental groups

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Example – Beach Closures & Spills

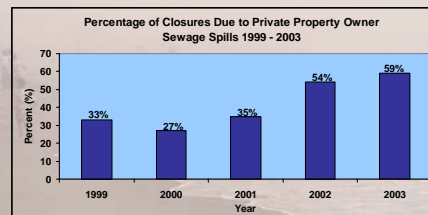
Orange County



Discovery: As public collection systems improved, a greater portion of spills originated on private property.

While the number of sewage spills increased, the volume of spilled sewage decreased.

Orange County



Why partner?

- Communicate to the Legislature, public, etc.
- Communicate to National agencies (e.g., EPA)
- Common goals and language
- Meaningful indicators
- Data system sharing
- Improved efficiencies?

Draft Partnership MOU Highlights

- Purpose: Coordinate environmental indicator development and refinement, and data monitoring, sharing, and use.
- Goal: Create and support monitoring and information distribution system.
- Scope: Regional vs. statewide
- Definitions
- Participant involvement
- Governing Board
- Host

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Questions

- Should we have a partnership?
- Could an MOU such as this one form the foundation?
- Who would want to work on development of the partnership?

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Appendix D

Workshop Materials

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Environmental Indicators: Better Coordination is
Needed to Develop Environmental Indicator Sets
that Inform Decisions,
U.S. Government Accountability Office

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**Memorandum Of Understanding for the
Environmental Indicator Development Collaborative**

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MEMORANDUM OF UNDERSTANDING
for the
Environmental Indicator Development Collaborative

The signers of this non-binding Memorandum of Understanding are governmental agencies, intergovernmental organizations, and nongovernmental organizations, including academic, research, or other nonprofit entities, each of which is engaged in the collection of physical, biological, chemical, or geologic data in the area surrounding and tributary to the San Francisco Estuary. The signers have decided that a coordinated effort is needed to develop, monitor and interpret data on Indicators to measure the health of the San Francisco Estuary and beyond by coordinating monitoring efforts and putting to use the vast and growing quantities of data in their respective programs. Through the coordinated development of a mutually agreed upon list of indicators and access to the respective data, the signers wish to advance a truly integrated monitoring system for ecological health, demonstrate its utility in the San Francisco Bay Area and ultimately for the state as a whole, promote an understanding of the diversity and distribution of life in the San Francisco Estuary, and contribute to integrated estuary management with the intent of transferring lessons to other regions of the state.

The signers of this MOU hereby express their intention to become Participants in the San Francisco Indicator Coordination Partnership (hereinafter called “Partnership”).

Paragraph 1
DEFINITIONS

1. Data: biological, oceanographic (including plankton and chemical), geological, human use and cultural resource data relating to the aquatic environment of the San Francisco Bay Area.
2. Indicator: a measurement of an environmental variable or state, an index composed of several environmental metrics, or a model that characterizes an ecosystem or one of its critical components (EPA 2000).
3. Participant: an organization or individual within an organization that monitors, observes, or makes measurements of or relating to the indicators developed for the San Francisco area and that supplies the resulting data for research, operations, decision-making, or other purposes; or an organization that represents organizations that supply such data; or an organization that uses the data for its own performance-based management purposes and entices others to take appropriate action based on the data; or an organization whose mission includes disseminating such data and communicating environmental management outcomes.

Paragraph 2 UNDERSTANDINGS

1. The Partnership is an open-ended, coordinated program set up to collect data to be aggregated into an agreed-upon set of indicators and to provide for access to and integration of continuously updated and archived scientific data for research and management of the San Francisco Estuary.
2. The Participants' involvement in this MOU are subject to the good will of and appropriations and allocations of funds by the appropriate authorities and to the applicable laws and regulations governing the Participants.
3. This MOU is not legally binding, nor does it impose an expectation of contravening the security or intellectual property policies of the Participants.
4. The Governing Board of the Partnership will strive to reach decisions by consensus whenever possible.

Paragraph 3 PURPOSE AND GOAL

1. Purpose

The purpose of the Partnership is to promote the coordinated development and refinement of environmental indicators, and coordinate the monitoring of specific indicators and sharing, linking, electronic dissemination, and use of data that can be aggregated into indicators in the San Francisco Bay Area.

2. Goal

The goal of the Participants is to create and support a monitoring and information distribution system that:

- a. is technically and institutionally capable of choosing, monitoring, and analyzing indicators by Participants or financially supporting the monitoring and analysis of indicators and, where necessary and appropriate, to report the findings
- b. is region-wide in scale;
- c. is compatible with other regional, national, and international indicator programs;
- d. is accessible by individuals throughout the San Francisco region and beyond;
- e. acknowledges and maintains the integrity of all data sources.

Paragraph 4
INVOLVEMENT OF PARTICIPANTS

1. Each Participant, while maintaining control of its respective monitoring programs, will make its best efforts to:
 - a. Participate actively in the formulation and implementation of the Partnership's indicators program;
 - b. Promote the sharing of data under a common set of database and exchange protocols and standards; and
 - c. Promote the continued refinement of indicators and data supporting those indicators.
2. Participants agree to make their best efforts to contribute to the necessary support of the Partnership, as established by the Governing Board. Participants will bear the costs of their own participation in the Partnership, including the costs of travel and attendance at meetings.

Paragraph 5
GOVERNING BOARD

1. Role and Purpose

The Governing Board will be the means by which the Participants will make collective decisions on all matters relating to the Partnership, which will then be put into effect by the Participants. No Participant will be expected to implement any decision that is contrary to its own rules and policies.

2. Establishment

The Governing Board will come into existence at the first meeting of the Participants after establishment of the Partnership, subject to the provision of Paragraph 8, and for administrative purposes will be a program of the San Francisco Estuary Project and its scientific partner, the San Francisco Estuary Institute.(otherwise known as the Host).

3. Composition

The Governing Board will consist of one representative from each Participant, who shall be named in writing by the Participant. The representative may serve until replaced by the Participant. Each representative may designate in writing one person who may participate in the meetings of the Governing Board in the representative's absence and may vote on behalf of the named representative.

4. Voting

a. The Governing Board should strive to work by consensus whenever possible. Except where mandated in this MOU that a decision must be made by consensus, if consensus cannot be reached after reasonable attempts have been made, then approval by super-majority of those present and voting is required. A quorum is 50% of the Governing Board's members.

b. A super-majority vote is the affirmative vote of a two-thirds majority of the representatives present and voting. "Present" can mean in person, by telephone, video conference, or other practical means determined in advance by the Governing Board.

5. Responsibilities

The Governing Board may:

- a. Adopt an annual work program and budget for the Partnership.
- b. Adopt a schedule of suggested contributions to be made by Participants necessary to fund the annual budget.
- c. Provide for the addition of Participants and their data to the Partnership and its information system.
- d. Carry out the other functions conferred upon it by this Memorandum of Understanding, including any Annexes or modifications made thereto.
- e. Modify this Memorandum of Understanding and any Annexes thereto.

6. Procedures

The Governing Board may establish such committees and rules of procedures, including the date of an annual meeting and meeting notice requirements, as are required for its proper functioning.

Paragraph 6 HOST

1. Role and Purpose

Provided that the necessary resources are received according to the Governing Board's annual work program, the Host of the Partnership will provide the location, one or more portals and other facilities, and services agreed to in this Memorandum of Understanding and in the work program adopted by the Governing Board. The services may cover

analytical, data management, and information dissemination support, and other services as determined by the Governing Board.

2. Scope of Authority and Duties

- a. The Host will be accountable to the Governing Board for all matters pertaining to the Association.
- b. The Host will provide staff to organize, convene, provide technical assistance to, and follow up on the meetings of the Governing Board.
- c. The Host will prepare and submit to the Governing Board three months prior to the beginning of the Governing Board's annual meeting a work program and a proposed budget to implement the work program.
- d. The Host will endeavor to implement and, as appropriate, assist the Governing Board and Participants in implementing the adopted work program.
- e. The Host will maintain a separate account for funds raised to develop, operate, and maintain the Partnership, for collecting assessments approved by the Governing Board and placing the assessments into this account, and for holding in trust for the benefit of Participants any assets which may accrue to or be acquired for the Partnership.
- f. The Host may accept, on behalf of the Governing Board, grants, income, or other funds for the purposes set out in this Memorandum of Understanding.
- g. The Host shall be reimbursed expenses and costs reasonably and properly incurred, consistent with the adopted annual budget, in fulfilling its responsibilities as Host. The Host shall not commit to expenditures beyond the funds that are in the account maintained for the purposes of supporting the Partnership.

Paragraph 7 INTELLECTUAL PROPERTY

1. Applicable Law

Nothing in this Memorandum of Understanding should be read to alter the scope and application of intellectual property rights and responsibilities as determined under relevant laws and rules to which Participants are subject.

2. Access to Data

To the greatest extent possible, the Partnership's information collection system is foreseen as an open-access facility. All users, whether Participants or not, will have access to the databases affiliated with the Partnership's information system.

3. Attribution

The Partnership should seek to ensure that the source(s) of data is (are) acknowledged and that such attribution is maintained in any subsequent use of the data.

4. Access to Specific Data

Recognizing that it is an objective of the Partnership to make as much data as practicable available for use by the public, it is nevertheless the right and responsibility of the owners of databases to determine what data will be made available to the Partnership's information system and when such data will be made available.

5. Validity of Data

It should be a condition of access to and use of the Partnership's information system that, at the direction of a Participant providing the data, users acknowledge that the validity of the data in any databases affiliated with the Partnership's information system cannot be assured, or the range of error that may be associated with the data. The Partnership, at the direction of a Participant, should disclaim responsibility for the accuracy and reliability of the data as well as for the suitability of its application for any particular purpose.

Paragraph 8 ESTABLISHMENT OF PARTNERSHIP; ASSOCIATION AND DISASSOCIATION OF PARTICIPANTS

1. Establishment of the Partnership

The Partnership will come into existence on January 1, 2005, or when the Host and at least four other Participants have signed this MOU.

2. Association of Participants

Association with this MOU is open to any entity that meets the definition of a Participant. Such association becomes effective upon signature of this MOU.

3. Disassociation of Participants

Any Participant may disassociate itself from this MOU by advising the Governing Board in writing of its intention to do so and of the effective date. In the event of disassociation of a Participant, the Governing Board may agree by consensus to adjust the work program, budget, and/or suggested contributions to take account of such disassociation.

SIGNATORIES

(Open to any entity that meets the definition of Participant)

Print:

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TBI Score Card Approach,
Anitra Pawley

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Key terms related to Indicator Selection and Development developed for TBI's Scorecard Process

<u>Term</u>	<u>Definition</u>	<u>Source</u>
Attribute	Measurable part or process of a biological system (i..e., water quality, fish health, etc.)	Karr and Chu 1999
Conceptual model	The process of articulating implicit models (simplified mental illustrations about the most critical cause-and effect pathways) to make them explicit	CALFED Strategic Plan 2000
Ecosystem	The term ecosystem as broadly defined connotes a geographic region defined by natural ecological boundaries	Meffe and Carroll 1997
Ecosystem attributes	Characteristics of ecological structure and function, including biological communities/assemblages/species, ecological processes, and habitat types that together define and distinguish ecosystems	Karr and Chu 1999
Indicator	A generalized term that refers to measures used to translate goals and objectives into measurable benchmarks of success. They can be direct measures of ecological attributes or can be a synthesis of several independent measures	Harwell et al. 1999, CALFED Indicators Work Group 1998
Index	Multimetric indexes combine multiple metrics to measure the impact of anthropogenic disturbance on communities and provide a stronger signal than single metrics for assessing biological integrity.	Karr and Chu 1999
Index of Biotic Integrity	Most common multimetric indicator used to evaluate biological integrity, generally composed of indices of biological community function and structure (initially developed by Dr. Jim Karr for stream ecosystems, see text and following reference for additional detail)	Karr and Chu 1999

Indicator Selection and Development Process	Stepwise procedure to select attributes and associated indicators and develop appropriate indicators to develop a "report card" or "suite of indicators"	This report
Indicator Organizational Framework	Structure to categorize indicators in a pre-defined way to ensure that the suite of indicators represents an array of essential attributes or properties embodied in the classification scheme.	This report
Metric	A specific measure associated with an attribute that is empirically shown to change in value along a gradient of human influence	Karr and Chu 1999
Monitoring	Sequential measurements of metrics over extended time periods.	This report
Multimetric Index	A number that integrates several biological metrics to indicate a site's condition	Karr and Chu 1999

Note: This list of terms was developed to clarify the meaning of the terms used in this publication. The source of the term is identified; however, in many cases these terms were adapted or slightly modified from the original source.

TABLE 2:
Description of Ecosystem Attribute Categories

<u>Attribute Category</u>	<u>Description</u>
Water Regime (Hydrology and hydrodynamics)	Water supply; surface and groundwater flow; water storage/volume; and hydro-period including timing, duration and magnitude.
Soil characteristics and Geomorphology	Soil characteristics (i.e., mineral, organic composition and other structural characteristics); dynamic channel morphology: natural geomorphic processes that shape channels (e.g., erosion, scour, and deposition), channel complexity, sediment accretion, and sediment-materials transport.
Water Quality	Physical and chemical characteristics of surface or groundwater.
Habitat Extent	Extent of specific aquatic related habitat types: riparian, wetland (tidal marsh, freshwater, vernal pools), floodplain, and intact instream river corridors
Energy source, Trophic dynamics, and Biotic interactions	Primary and secondary productivity; biogeochemical cycling; decomposition; energy flow; succession Predation, competition, parasitism
Biota (Native Species & Communities)	Biodiversity; community composition; trophic structure; threatened or endangered species, focal species including economically or aesthetically important species
Human Actions	Dams, water diversions, Land conversion, invasive species

Note: The attributes in each attribute category were derived from Karr 1995, Levy et. al. 1996; Young et al. 1998, CALFED Indicators Workgroup 1998, Harwell et al. 1999; Karr and Chu 1999 and discussions with the Scorecard Expert Panel. Each attribute will be represented by at least one indicator for each of the four selected regions. This list was modified somewhat for the final list of Scorecard indexes.

