

**SURFACE WATER AND AQUATIC HABITAT
MONITORING ADVISORY COMMITTEE**

**The Committee's
Report and Recommendations**

**Submitted to the
Washington State Department of Ecology**

9 MARCH 2007

SURFACE WATER AND AQUATIC HABITAT MONITORING ADVISORY COMMITTEE
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A NOTE ON BEHALF OF THE COMMITTEE

This report is nearly identical to the report that the Surface Water and Aquatic Habitat Monitoring Advisory Committee issued on 11 January 2007. The difference is that this final report contains key findings from the Committee's research and analysis of eleven regional monitoring organizations across the United States. The Committee's work is intended to help expedite the development of the Puget Sound Basin Regional Coordinated Monitoring Program's governance structure.

The Committee anticipates that further analysis of these models will help identify components of an organizational structure that would be appropriate for the Puget Sound Basin. Committee members do not anticipate that any one model will achieve all the interests and needs, but that components of the different existing models might be combined to create an organizational structure and a decision-making process that are tailored to the unique interests, needs, issues, and circumstances that produced the demand for the Puget Sound Basin Regional Coordinated Monitoring Program.

Jim Reid, The Committee's Facilitator
16 March 2007

SURFACE WATER AND AQUATIC HABITAT MONITORING ADVISORY COMMITTEE

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THE RECOMMENDATIONS

The Surface Water and Aquatic Habitat Monitoring Advisory Committee members unanimously and strongly recommend:

1. Establish a new coordinated multi-party structure to collect, analyze, and disseminate credible and useful information about the Puget Sound Basin's freshwater, marine environments and aquatic habitat to strengthen policy and management decisions that affect the Basin.

2. Because there is an urgent need for and widespread interest in a coordinated regional monitoring approach in the Puget Sound Basin, the Puget Sound Basin Regional Coordinated Monitoring Program should be established with "seed" funding provided in 2007 to initiate its development. The program should develop a framework that is capable of addressing questions in the following categories:
 - a. What are the status and trends of surface waters and aquatic habitat in the Puget Sound Basin?
 - b. Do surface waters and aquatic habitat meet water quality goals?
 - c. If the goals are not being met, what are the reasons for that and what would it take to achieve them?
 - d. How do we ensure monitoring is applicable and useful?

3. The State Legislature should allocate funding for the 2007-'09 biennium to ensure that sufficient resources, including staffing, are available to successfully start this program.

4. In addition to providing a framework to coordinate the collection, analysis, and dissemination of credible and useful information about surface waters and aquatic habitat, the Puget Sound Basin Regional Coordinated Monitoring Program should be structured to:
 - a. Attract the voluntary participation of parties who are interested in, affected by, or likely to benefit from monitoring of surface water and aquatic habitat in the Puget Sound Basin.

- b. Build upon and implement the recommendations of existing policy and technical forums and programs, including, but not limited to, the State's Comprehensive Monitoring Strategy, the on-going work of the Governor's Monitoring Forum, the Puget Sound Partnership, and the Department of Ecology's requirements and expectations for monitoring by NPDES permittees.
 - c. Provide information that improves decision-making for public policy and aquatic resource management through more direct communication and connection between policy-makers and the scientific and technical community.
 - d. Assist regulators and the regulated to work collaboratively to ensure that monitoring-related regulatory requirements are consistent with the monitoring priorities identified by the regional monitoring program.
1. The Puget Sound Basin Regional Coordinated Monitoring Program needs to be designed, organized, and focused to address these interests: a) facilitate multi-party collaboration; b) integrate disciplines and programs; c) improve policy and management decisions; d) produce information that is useful and readily accessible; e) achieve monitoring-related mandates; f) recognize jurisdictions' unique interests and obligations; g) strengthen the credibility, trust, and transparency of monitoring activities and the data generated from them; h) develop consistency in data collection and reporting; i) ensure flexibility to adjust to changing needs; j) be cost-effective and efficient; k) rely on incentives to secure participation and funding; and l) ensure early successes in the program's initial efforts.
 2. To increase the likelihood of widespread participation in and support for the program, parties that could affect or be affected by it need to be involved in making decisions about the organizational structure and initial scope of work of the Puget Sound Basin Regional Coordinated Monitoring Program. At a minimum, representatives of the following parties should participate: a) federal government agencies; b) state government agencies; c) regional and local government agencies, including intergovernmental planning groups that address water and habitat issues; d) Tribes and tribal groups; e) businesses and business associations; f) commercial shellfish and aquaculture groups; g) environmental advocacy groups; h) academic and scientific institutions and associations; i) non-governmental organizations, including volunteer groups, that are addressing similar or related issues; and j) non-profit organizations and foundations.
 3. The Department of Ecology should convene and initially chair the Puget Sound Basin Regional Coordinated Monitoring Program. Decisions about how the program is managed, organized, and staffed should be made by those who develop the organizational structure and who commit to implementing its objectives.

THE EXECUTIVE SUMMARY

Representatives of twenty-four public and private organizations met between September and December 2006 to discuss the need for and components of a regional monitoring program for surface waters and aquatic habitat. The Surface Water and Aquatic Habitat Advisory Committee members quickly reached agreement that there is a need for and interest in coordinated regional monitoring throughout Washington State. The Committee also reached consensus that initially the joint monitoring program needs to focus on the Puget Sound Basin before being extended throughout or replicated elsewhere in the State.

Increasing interest in coordinated monitoring efforts is reflected in recent recommendations from forums such as the Puget Sound Partnership and Shared Strategy for Puget Sound. The Committee's recommendations are intended to integrate, coordinate, and expand existing programs and initiatives that currently address freshwater or marine environments of the Puget Sound Basin. The recommendations build upon the existing monitoring direction and coordination efforts of and the lessons learned by the Governor's Monitoring Forum, the Salmon Recovery Funding Board, the Puget Sound Assessment and Monitoring Program (PSAMP), and others. They also are intended to help increase the likelihood that a Puget Sound Basin-wide program that successfully coordinates regional monitoring activities will eventually lead to the efficient and cost-effective expansion or replication of the program across the State.

In addition to providing a framework to coordinate the collection, analysis, and dissemination of credible and useful information about surface waters and aquatic habitat, the Committee's recommendations call for structuring a Puget Sound Basin Regional Coordinated Monitoring Program to achieve the following goals:

1. Attract the voluntary participation of parties who are interested in, affected by, or likely to benefit from monitoring of surface water and aquatic habitat in the Puget Sound Basin.
2. Build upon and implement the recommendations of existing policy and technical forums and programs, including, but not limited to, the State's Comprehensive Monitoring Strategy, the on-going work of the Governor's Monitoring Forum, the Puget Sound Partnership, and the Department of Ecology's requirements and expectations for monitoring by NPDES permittees.
3. Provide information that improves decision-making for public policy and aquatic resource management through more direct communication and connection between policy-makers and the scientific and technical community.

4. Assist regulators and the regulated to work collaboratively to ensure that monitoring-related regulatory requirements are consistent with the monitoring priorities identified by the regional monitoring program.

To expand on these goals, the Committee believes that on a participation spectrum ranging from “participation is completely voluntary” to “participation is required,” the stakeholders’ participation in the Puget Sound Basin Regional Coordinated Monitoring Program needs to be closer to completely voluntary. If it is focused on a few specific and meaningful priorities or projects at the outset, its initial successes will attract key parties and players in monitoring, and over time they will see that it is in their best interests to participate. In other words, the Committee wants this program to become a magnet for collaboration, coordination, communication, creativity, and trust.

This vision will become reality if the program is not only voluntary but flexible and dynamic. It must be flexible enough to allow jurisdictions and organizations to participate at various levels or according to different topics of interest. It must be flexible enough to incorporate and integrate existing programs and forums, including but not limited to the Comprehensive Monitoring Strategy, PSAMP, and the Governor’s Monitoring Forum. It also needs to create a dynamic relationship between policy-makers and technical experts so that the results of monitoring—the information generated and the analysis offered—become cornerstones in the policy decisions and management actions that give future generations a healthy Puget Sound Basin.

WHY COORDINATED REGIONAL MONITORING IS NECESSARY AND URGENT

Monitoring done well provides information that is thoughtfully considered by decision-makers as they develop, adopt, or refine public policy. Exemplary local monitoring programs exist throughout the Puget Sound region. However, they are often efforts designed to help shape local policies and direct local management decisions. While of potential interest to the State, region and other jurisdictions, their development in isolation and with a local focus means that we cannot expect these efforts to help us gain a broad perspective or picture of the health of the Puget Sound at a time when we so greatly need one. The need and desire for a more complete picture is a major impetus for the growing interest in a coordinated regional approach to monitoring.

Other reasons why coordinated regional monitoring appears to be more necessary and urgent today than ever are:

1. An increasing number of organizations, both public and private, are required to monitor their activities and the environment. The costs of these monitoring programs are considerable to each organization, and it is believed that efficiencies and economies of scale could be realized by coordinating efforts.
2. Regional monitoring could fill in the geographic and informational “gaps” that are created when local or individual monitoring efforts are not coordinated. Furthermore, independent monitoring efforts can lead to contradictory data and conclusions due to differing protocols based on study goals.

3. Reporting and monitoring protocols could become more uniform and data more comparable and credible as more parties share and blend their expertise, protocols, and methodologies.
4. A regional approach is more likely to produce information and findings that are more meaningful and relevant to a larger audience, including elected officials and the public-at-large in the Puget Sound Basin.
5. A regional program that convenes regulatory agencies with those they regulate is likely to facilitate a greater shared understanding, cooperation, and trust between these entities that often have competing interests.
6. By raising the profile of monitoring, the regional program should increase the credibility of and attention to the information it produces. It should also increase accountability for the expenditure of funds necessary to generate the information. The regional monitoring program might even contribute to greater accountability in the policy decisions and management actions necessary to achieve successes in conserving, protecting, and restoring the Puget Sound Basin.

The opportunity to more efficiently gather credible and relevant monitoring data leads the Committee to unanimously and strongly recommend the establishment of a coordinated Puget Sound Basin Regional (i.e., interjurisdictional) Coordinated Monitoring Program.

The Committee recommends that initially the program be focused on the Puget Sound Basin for these four reasons:

1. Interjurisdictional management of Puget Sound and its watershed and tributary surface waters is currently a priority of the State of Washington and a coalition of public and private interests in the region.
2. Forums and programs focusing on some aspects of monitoring fresh and marine waters in the Puget Sound Basin already exist and provide a foundation upon which to build a more coordinated interjurisdictional program.
3. Active participants in the Committee were predominantly from the Puget Sound region.
4. Successful efforts elsewhere demonstrate the value of starting small, thereby affording an opportunity for the lessons learned from a successful Puget Sound Basin Regional Coordinated Monitoring Program to more efficiently and cost-effectively establish similar programs throughout the State.

STATE GOVERNMENT IS WELL POSITIONED TO LEAD THE WAY

A regional monitoring program has already been identified as a goal by the State in discussions about the new municipal stormwater permits and by the counties, cities, and citizens of the Puget Sound Basin. Thus, the Committee believes it is in the State of Washington's interest to help launch the program. **The Committee recommends that the State Legislature allocate funding for the 2007-'09 biennium to ensure that sufficient resources, including staffing, are available to successfully launch it.**

Because this proposed program requires development of a formal organizational structure and a negotiated long-term vision or scope of work, and because local jurisdictions are devoting their limited monitoring-dedicated resources to working to comply with existing federal and state requirements, counties and cities would be in a difficult position to initiate such an effort. Furthermore, a State investment would likely be attractive in leveraging federal, regional, local, and private investments to help build and expand the program. Therefore, the Committee strongly encourages the State take the initial leadership role in convening this effort and providing the funding necessary to facilitate the development by interested and affected parties of an organizational structure, an initial scope of work, and an implementation plan that outlines the region's monitoring priorities.

In addition, the Committee believes that the Department of Ecology is well positioned to convene and initially chair the regional monitoring program's development efforts until the parties decide the program's governance structure, including decisions regarding how the program is managed, facilitated, and staffed.

THE ELEMENTS OF A SUCCESSFUL REGIONAL MONITORING PROGRAM

To address the needs, concerns, and interests of stakeholders throughout the Puget Sound region, including the State of Washington, the Puget Sound Basin Regional Coordinated Monitoring Program needs to:

1. Achieve the four goals contained in Recommendation 4 (pages 1-2).
2. Address the interests identified in Recommendation 5 (page 2) and more specifically defined in the "Mutual Interests" chapter of this report (page 7).
3. Answer the broad "framework" questions listed in Recommendation 2 (page 1).
4. Invite the participation of *at least* the parties listed in Recommendation 6 (page 2).
5. Demonstrate that its findings are useful and credible.
6. Demonstrate that the expenditure of funds in pursuit of those findings is fiscally prudent.

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THE RELATIONSHIP OF THE RECOMMENDATIONS TO EXISTING EFFORTS

One question the Committee discussed as its recommendations emerged was how its findings, interests and recommendations relate to the on-going efforts of existing groups that also address monitoring. The Committee believes that the proposed Puget Sound Basin Regional Coordinated Monitoring Program would complement and help fulfill the goals and objectives of two existing efforts designed to coordinate environmental and water quality monitoring, the Puget Sound Assessment and Monitoring Program and the Governor's Monitoring Forum.

The Puget Sound Action Team's Puget Sound Assessment and Monitoring Program (PSAMP) is designed to coordinate long-term monitoring and selected research efforts of several federal, state, and local agencies. State agencies involved in PSAMP are the departments of Ecology, Fish and Wildlife, Health, and Natural Resources. The other participants include the U.S. Fish and Wildlife Service, NOAA Fisheries, the King County Department of Natural Resources, and the University of Washington.

PUGET SOUND ASSESSMENT AND MONITORING PROGRAM

PSAMP's 2005-'07 strategy is to:

1. Conduct research and monitoring activities to improve the scientific understanding of the Puget Sound ecosystem and evaluate the effectiveness of environmental resource management programs.
2. Collaborate with academic and scientific institutions, local and tribal governments, and citizen monitoring groups to ensure interdisciplinary efforts use consistent and efficient data management, sampling, and analysis protocols.
3. Provide information to citizens, government leaders, and resource managers.

The Committee's recommendations are consistent with this strategy, and offer a specific regional structure to facilitate the coordination of monitoring efforts among local, regional, state, and federal agencies, private businesses, and advocacy and public interest groups. The Committee did not discuss replacing PSAMP but rather finding ways to complement and work with PSAMP at this time. Further discussion of the roles of different state programs is needed in the next phase of the development of the Puget Sound Basin Regional Coordinated Monitoring Program.

GOVERNOR'S FORUM ON MONITORING

The Governor's Forum on Monitoring Salmon Recovery and Watershed Health includes twenty agencies. Eleven participants are Washington State agencies or boards: the departments of Agriculture, Ecology, Fish and Wildlife, Health, Natural Resources, and Transportation; the Conservation Commission; the Governor's Salmon Recovery Office; the Interagency Committee for Outdoor Recreation; the Puget Sound Action Team; and the Salmon Recovery Funding Board. Five federal agencies are also members: NOAA Fisheries; the U.S. Environmental Protection Agency; the U.S. Fish and Wildlife Service; the U.S. Forest Service; and the Northwest Power and Conservation Council. The additional members are the: Lead Entity Advisory Group; Lower Columbia Fish Recovery Board; Northwest Indian Fisheries Commission; and the Regional Fisheries Enhancement Advisory Group.

The Forum's goal is to coordinate state government monitoring efforts associated with salmon recovery and watershed health. The Forum has developed a list of specific tasks to meet this goal:

- Provide a multi-agency venue for coordinating technical and policy issues and actions related to monitoring.
- Recommend biennial reporting of monitoring results and progress in watershed health and salmon recovery.
- Foster integrated analysis and reporting of monitoring information.
- Provide monitoring recommendations to appropriate state agencies.
- Develop a broad set of easily understood measures to convey results and progress.
- Encourage federal, tribal, regional, and local partners to standardize measures and indicators.
- Coordinate with local and regional watershed and salmon recovery groups.

The Committee's proposal to establish a Puget Sound Basin Regional Coordinated Monitoring Program is consistent with these goals and tasks. The monitoring program would provide the coordinated regional structure by which the tasks identified by the Forum are implemented.

The proposed Puget Sound Basin Regional Coordinated Monitoring Program could potentially serve as a regional implementing body to conduct actual on-the-ground monitoring and research tasks consistent with both PSAMP and the Governor's Monitoring Forum. Coordination among these bodies will remain important to ensure alignment of strategic priorities. Assuming that coordination is effective, a Puget Sound Basin Regional Coordinated Monitoring Program would complement the efforts of both PSAMP and the Governor's Monitoring Forum.

MUTUAL INTERESTS

As part of the process of determining whether or not there is a sufficient need for and interest in establishing a coordinated regional monitoring program for the Puget Sound Basin, the Committee identified what it believes are the mutual interests of the key stakeholders. By doing so the Committee reached consensus that there is both the need for and interest in establishing such a program. The mutual interests that the Committee defined are:

- **FACILITATE MULTI-PARTY COLLABORATION:**

Coordinate and leverage the knowledge, expertise, and resources of local, state, and federal agencies and the private sector to jointly conduct and assess the results of monitoring surface waters and aquatic habitat.

Help regulators and those they regulate work more collaboratively to ensure that monitoring-related regulatory requirements are understood and supported by those who must address them.

Create and enhance opportunities for direct communications and connections between policy-makers, the scientific and technical community, and the public-at-large about monitoring data and findings.

- **INTEGRATE DISCIPLINES AND PROGRAMS:**

Integrate disciplines such as hydrology, hydraulics, chemistry, biology, toxicology, and geology, and programs such as stormwater, groundwater, and wastewater, that are affected by regulatory acts such as the Endangered Species Act, the Shoreline Management Act, and the Clean Water Act, and other water-related management and regulatory programs and laws.

- **IMPROVE POLICY AND MANAGEMENT DECISIONS:**

Use the results of regional monitoring efforts to improve the quality of policy and management decisions.

With these results, provide a common foundation for the shared vision that clearly articulates what we are trying to achieve and why with monitoring and work programs. In addition, develop mutual interests for policy or management decisions that frame and guide scientific/technical discussions and investigations.

- **PRODUCE INFORMATION THAT IS USEFUL AND READILY ACCESSIBLE:**

Regional monitoring should focus on producing information that is useful, applicable, and comparable. The program should, therefore, assist in guiding us in making the right decisions about protection and restoration priorities and funding decisions.

The information should be accessible to individual organizations and the public as well as to interjurisdictional or public-private initiatives, and should enable us to gain a greater perspective on conditions, causes, and solutions.

- **ACHIEVE MONITORING-RELATED MANDATES:**

Conduct regional monitoring to achieve federal and state mandates while addressing the key “big picture” questions about the health of the Puget Sound Basin. Ensure that applicable permit-required monitoring is aligned with the context of and priorities identified by the regional monitoring framework.

- **RECOGNIZE JURISDICTIONS’ UNIQUE INTERESTS AND OBLIGATIONS:**

As we develop and strengthen collective efforts through regional monitoring, recognize that jurisdictions need to address their unique individual interests and obligations and, therefore, need to retain autonomy and authority.

- **STRENGTHEN THE CREDIBILITY, TRUST AND TRANSPARENCY OF MONITORING ACTIVITIES AND THE DATA GENERATED FROM THEM:**

Whatever monitoring (including collecting and analyzing data and information) is conducted, it must be credible in the eyes of policy-makers, technical experts, and the public.

In addition, the activities undertaken should be performed in a way that enables the stakeholders (e.g., decision-makers and the public) to trust that we are wisely investing resources and making a difference in improving both water quality and the protection and preservation of fish and wildlife habitat.

To ensure that the regional monitoring program is accountable, credible, and helps build trust, the processes by which it is conducted must be transparent.

- **DEVELOP CONSISTENCY IN DATA COLLECTION AND REPORTING:**

Through the regional monitoring program, achieve more consistent standards, protocols, practices, and methodologies related to monitoring, analysis, and recording.

- **ENSURE FLEXIBILITY TO ADJUST TO CHANGING NEEDS:**

Gear each project to the specific issues, problems, and challenges, identifying who needs to be involved to address and resolve them.

The organizational structure and decision-making processes of the regional monitoring program needs to be flexible to allow for or accommodate changes in scope as the program matures, gains credibility and support, and expands.

- **COST-EFFECTIVE AND EFFICIENT:**

By improving coordination, avoid unnecessary duplication of effort, thereby helping to use limited resources as efficiently and effectively as possible.

- **RELY ON INCENTIVES TO SECURE PARTICIPATION AND FUNDING:**

Rely on incentives as well as regulations and requirements to ensure that we achieve our vision, interests and goals.

- **ENSURE EARLY SUCCESSES IN THE PROGRAM'S INITIAL EFFORTS:**

Start at a scale both geographically and substantively that enables the program to achieve "early" success before expanding or replicating it across Washington State, or before addressing and undertaking more complex issues or projects within the Puget Sound Basin.

THE “FRAMEWORK” QUESTIONS

The Committee recommends that the Puget Sound Basin Regional Coordinated Monitoring Program should develop a framework that is capable of addressing questions in the following categories:

1. What are the status and trends of surface waters and aquatic habitat in the Puget Sound Basin?
2. Do surface waters and aquatic habitat meet water quality goals?
3. If the goals are not being met, what are the reasons for that and what would it take to achieve them?
4. How do we ensure monitoring is applicable and useful?

The Committee also identified more detailed questions under each category to help focus the work of developing the Puget Sound Basin Regional Coordinated Monitoring Program. They are:

1. *What it is and how it is changing:* **What are the status and trends of surface waters and aquatic habitat in the Puget Sound Basin?**
 - a. What monitoring is currently being done to determine status and trends? Who is doing it? Is the monitoring the result of regulatory directives or is it being done voluntarily? Does that have any impact on the direction of studies (i.e., are the study designs inherently creating bias)?
 - b. Does the data we have accumulated or are currently collecting answer the questions for which the project/study was initiated?
 - c. In light of current monitoring efforts and how they are being done, is there scientific monitoring that is not currently being done that should be done to determine status and trends of surface water and aquatic habitat in the Puget Sound Basin? What would it take to do it? Should it be done differently in light of current protocols and factors outside our control?
 - d. What process or criteria will help us prioritize the monitoring that needs to be done?

- e. Are other tools or data management processes needed and/or available to more effectively and efficiently determine status and trends?

The Committee suggests that “status and trends” of what, where and when is defined by any one or a combination of the following:

Parameters: weather, flow/water level, temperature, oxygen, N/S, TSS/solids, metals, organics, toxicity, fish populations, habitat, macro-invertebrates, bacteria, bioassay, human health factors, consumption.

Media: surface water, groundwater, stormwater, sediment, tissue, air or soil.

Timeframes: short- vs. long-term, trends in wet weather/storms, dry weather, annual or seasonal weather, day vs. night.

Geography: lowlands vs. uplands, urban vs. rural, fresh vs. marine, jurisdictional, water body vs. every reach.

2. *Progress in meeting goals:* **Do surface waters and aquatic habitats meet water quality goals?**
 - a. What are the goals and standards? (Fishable, swimmable, etc. for all water bodies?)
 - b. Are scientifically appropriate performance standards available to help determine success in achieving the goals and standards?
 - c. Does the data we have accumulated or are currently collecting answer the questions for which the project/study was initiated to answer?
 - d. Is the monitoring that is being done facilitating the determination of whether or not we are meeting the goals and standards?

3. *If not, why not:* **If the goals are not being met, what are the reasons for that and what would it take to achieve them?**
 - a. What are the sources and characteristics of the problem(s)?
 - b. Are we doing appropriate compliance, effectiveness or performance monitoring?
 - Temporal
 - Spatial
 - Gaps in our knowledge
 - c. Are the tools and resources at our disposal sufficient to accurately determine why the goals and standards are not being met? If not, what additional tools and resources are needed to make that determination?

d. What would it take to meet the goals and standards?

4. *Practical application of monitoring:* **How do we ensure monitoring is applicable?**

- a. How do we ensure that the processes and means by which we conduct regional monitoring support and help achieve our interests and goals?
- b. How do we consistently perform and apply effective, defensible and scientifically powerful monitoring regionally? And how can we most effectively and efficiently share the information that results from monitoring so that it is accessible and understandable to everyone in the region who needs it?
- c. How do we ensure that monitoring helps determine whether or not management strategies are successful? How can we measure the success or failure of our management strategies to ensure efforts are resulting in improvements?
- d. How do we identify and analyze potential alternative management strategies in light of the results of our monitoring?
- e. How are changes in management structure reflected in the monitoring that we are conducting? How does monitoring assist in reviewing goals and standards, actions and technologies?
- f. How do monitoring efforts and results assist in revising goals and standards, actions and technologies?

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KEY STAKEHOLDERS

As noted earlier in this report, the Committee consisted of representatives of twenty-four public and private jurisdictions, including representatives of government agencies at the federal, state and local levels. Committee members recognized that all parties who were needed were not available. When taking the next steps, the parties who were not previously available must also be involved.

To increase the likelihood of widespread participation in and support for a Puget Sound Basin Regional Coordinated Monitoring Program, parties that could affect or be affected by it need to be involved in making decisions about the organizational structure and initial scope of work of the Puget Sound Basin Regional Coordinated Monitoring Program. At a minimum, representatives of the following entities should participate: a) federal government agencies; b) state government agencies; c) regional and local government agencies, including intergovernmental planning groups that address water and habitat issues; d) Tribes and tribal groups; e) businesses and business associations; f) commercial shellfish and aquaculture groups; g) environmental advocacy groups; h) academic and scientific institutions and associations; i) non-governmental organizations, including volunteer groups, that are addressing similar or related issues; and j) non-profit organizations and foundations.

The Committee offers a more detailed listing of organizations that should be involved in developing the governance structure and work plan based on the experience of this first round of discussions. This is not intended to be a complete list. The Committee recommends that it would be wise to err on the side of being more inclusive; “cast a wide net” to involve more rather than fewer stakeholders. Over time they can decide whether or not it is in their best interests to participate, and what level of involvement meets their interests.

STATE GOVERNMENT AGENCIES:

- Department of Ecology
- Department of Transportation
- Puget Sound Action Team
- Department of Fish and Wildlife
- Department of Natural Resources
- Department of Health
- Governor's Salmon Recovery Office
- Interagency Commission on Outdoor Recreation

FEDERAL GOVERNMENT AGENCIES:

- Environmental Protection Agency (EPA)
- NOAA Fisheries
- US Geological Service (USGS)
- National Park Service
- US Fish and Wildlife (USFW)
- US Forest Service (USFS)

LOCAL GOVERNMENT AGENCIES:

- Cities and Counties covering the 19 WRIAs of the Puget Sound Basin
- County and City Health Departments
- WRIA planning groups
- Ports

TRIBES:

- NW Indian Fisheries Commission
- Individual Tribes

PRIVATE INDUSTRY:

- Association of Washington Business (AWB)
- Association of General Contractors (AGC)
- Puget Coast Shellfish Growers' Association (PCSGA)
- Puget Sound Processors' Association (PSPA)
- South Sound Aquaculture and other Aquaculture groups
- The Farm Bureau
- Private consulting firms

ADVOCACY GROUPS:

- People For Puget Sound
- Shared Strategy for Puget Sound
- National Wildlife Federation
- Puget Soundkeepers Alliance
- Washington Trout

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GOVERNANCE FINDINGS

Believing that the Puget Sound region and the State of Washington can and should learn from the experiences of others, the Committee identified eleven regional monitoring organizations that are currently operating in diverse regions of the United States. The Committee expects that the stakeholders involved in developing the organizational structure for the Puget Sound Basin Regional Coordinated Monitoring Program may find components of existing programs that could be emulated, thus saving time and resources in launching the program and, perhaps, helping the Puget Sound Basin's program avoid some pitfalls that other similar programs have encountered.

Appendix C of this report contains issue papers that identify and describe each of these eleven organizations, and a matrix that summarizes their key components.

The Committee selected these eleven organizations because they are engaged in monitoring on a regional level (which, in some cases, means "multi-state"). The Committee assessed them in light of the interests that need to be addressed by the Puget Sound Basin program (see Mutual Interests, pages 9-11). The Committee believes that components or processes of any of these organizations, such as their missions or scope of work, who "sits at the table," decision-making processes, and funding mechanisms, may be emulated by the Puget Sound Basin Regional Coordinated Monitoring Program to ensure achievement of the identified mutual interests of the parties.

As a result of researching and assessing these organizations, the Committee has identified some qualities and characteristics that together define an effective regional monitoring organization. In addition to the interests that need to be achieved, these are attributes that should define the future Puget Sound Basin Regional Coordinated Monitoring Program:

- **Science informs policy, and vice versa.** The organizations that the Committee studied appeared most effective when they developed and utilized mechanisms that explicitly and strategically insert scientific and technical monitoring information and data into policy and management decisions. They also developed and used mechanisms to enable policy issues and considerations to inform the science. Policy- or decision-makers need to acquire ownership of the scientific/technical data rather than have it "dumped in their laps." This indicates that establishing the connections between policy and management questions and decisions and scientific/technical information and data must occur early, systematically and routinely.

- **“Top down” direction and “bottom-up” or “grassroots” initiative are balanced.** A “top down” decision-making structure is not as sustainable as the approach that blends some direction from above and “bottom-up” participation and initiative. Those organizations in which the federal government or a state agency dictates the program’s mission, goals, priorities, projects, and approaches do not appear to enjoy the same level of support from key stakeholders, including local governments and private industry. Programs in which local government and private interests are partners in organizing and operating the program appear to achieve greater credibility, accountability and financial sustainability.
- **Independence.** Independent monitoring organizations appear to have broader support, greater credibility, more sustainable funding, and greater accountability than those that are operated by a single government agency. “Independent” is defined as a regional monitoring program in which all participants have convened voluntarily and share decision-making responsibility and authority (a “coalition of the willing”).
- **Regulatory requirements and an ecosystem approach are both addressed.** The organizations the Committee assessed appeared to be most effective when they addressed specific and focused regulatory requirements as well as the broader interests, needs and concerns of an ecosystem. In addition, those organizations that involve both regulators and those they regulate in a partnership that addresses these issues appear to have gained greater credibility and more widespread support.
- **Data is compatible and comparable across jurisdictions.** The organizations appeared to be most effective when the data they generate is compatible and comparable across jurisdictions. Furthermore, that data is collected, organized, analyzed, and communicated in a highly transparent manner. The data, methods, and analysis are, therefore, readily available to a wide range of stakeholders in addition to their members.
- **Accountability.** Another characteristic of the most effective programs is that they answer key policy questions, including whether or not the organizations are achieving their vision and goals. The scientific and technical data they generate and apply contributes to answering important policy questions by providing decision-makers with clear and credible information about whether or not conditions are improving, and why. A tool that is commonly used to ensure that scientific and technical data can answer policy questions is performance indicators. Thoughtfully developed performance measurements allow policy-makers to tangibly track progress in achieving goals and standards, and to effectively determine where limited resources should be invested and, in some cases, redirected.
- **The structure is tailored to the organization’s unique issues.** The regional monitoring organizations that the Committee researched and analyzed are strikingly different in their governance structures, decision-making processes, funding sources, programs and projects, and customers and clients. Even those that appeared to share the qualities and characteristics listed above, and appear to have achieved the most effective outcomes, are different from one another. This indicates that various approaches can work, but that they need to be tailored to the unique issues and circumstances of the particular region.

Of the eleven programs, the San Francisco Estuary Institute appears to address surface water and aquatic habitat issues most similar to those in the Puget Sound region, and to most effectively apply the elements of a coordinated regional monitoring program that would achieve the interests of the parties that need to be involved in establishing the Puget Sound Basin's program. The Southern California Coastal Watershed Research Project (SCCWRP) also appears to contain many of these attributes.

So, too, do the Puget Sound Assessment and Monitoring Program (PSAMP) and Project ENVVEST, which coordinates monitoring in Sinclair and Dyes Inlets near the Puget Sound Naval Shipyard in Bremerton and its surrounding watershed. But it should be noted that these two local programs operate at different scales than the two in Southern California, and from what is needed for a Puget Sound Regional Coordinated Monitoring Program.

SURFACE WATER AND AQUATIC HABITAT MONITORING ADVISORY COMMITTEE
The Committee's Report and Recommendations

THE COMMITTEE'S PROCESS

The Surface Water and Aquatic Habitat Monitoring Advisory Committee was established in late summer 2006 as the result of numerous conversations about the idea of and opportunities for regional monitoring in the Puget Sound area and Washington State.

Staff from counties and cities seeking coverage under the National Pollutant Discharge Elimination System (NPDES) municipal stormwater permits from the Washington State Department of Ecology (DOE) discussed how joint stormwater monitoring might assist them in cost-effectively meeting monitoring-related permit requirements. The work of the Governor's Monitoring Forum and the Puget Sound Partnership heightened interest in monitoring. Advocacy groups proposed interjurisdictional monitoring as an avenue for helping policy-makers more clearly and accurately measure the conditions of Puget Sound and the water bodies that drain into it, identify water-related problems and their sources, and assess the effectiveness of regulatory programs. Finally, Ecology, stimulated by a grant from the U.S. Environmental Protection Agency (EPA), concluded that the time had come for more formal, direct discussions among all these parties and others.

In August 2006 the Committee's process started to take shape. The Committee's purpose was to determine the level of interest in regional monitoring of surfaced waters and aquatic habitat, and, if high, articulate why regional monitoring is necessary at this particular time and define the elements of an effective regional monitoring program.

Committee members first met on 19 September 2006. The Committee met five times between September and December before reaching agreement on the recommendations presented in this report. In addition, the group used three subcommittees to discuss specific issues more deeply and draft recommendations for the Committee's consideration. A workshop in Tacoma on 19 October 2006 that was sponsored by DOE, organized and managed by People For Puget Sound, and attended by nearly 150 people, showcased three approaches to regional monitoring in California and added valuable information to the Committee's deliberations.

Comprising the Committee were representatives of twenty-four public, private and not-for-profit organizations. Because a number of parties who should be involved in the establishment of a regional monitoring program could not participate because of limited staffing (among them the City of Seattle and the Northwest Indian Fisheries Commission), the Committee has included in this report a recommendation about defining the interests that need to be represented at the table in the next round of discussions, when the governance structure of a regional monitoring program and a scope of work are created.

SURFACE WATER AND AQUATIC HABITAT MONITORING ADVISORY COMMITTEE
The Committee's Report and Recommendations

APPENDIX A: CURRENT MONITORING EFFORTS

Federal, and state agencies, local governments, tribes, private concerns, and volunteer groups conduct environmental monitoring at hundreds of sites throughout Washington. While the committee did not carefully catalog existing programs, it recognized that there are many monitoring programs and coordinating efforts currently in progress around Puget Sound and the state. These include, but are not limited to, efforts by local jurisdictions, the Governor's Forum on Monitoring, the Salmon Recovery Funding Board, the Ecology NPDES stormwater permit program, the Puget Sound Shared Strategy, and the Puget Sound Partnership. Some summaries of monitoring efforts have been recently compiled and are provided in the following documents:

State agencies that regularly monitor surface waters and aquatic habitat include the Departments of Natural Resources, Ecology, Fish and Wildlife, the Washington State Conservation Commission, and the Interagency Committee for Outdoor Recreation. These five agencies collaborated to write the *Report to the Office of Financial Management Concerning Monitoring Programs and Associated Databases* published on 2 October 2006. This report describes the monitoring programs conducted by five state agencies. Tables in the five appendices give detailed information about individual programs. To access this report, please follow the link:

http://iac.wa.gov/Documents/Monitoring/OFM_Final_Monitoring_Report.pdf

In 2003 The Interagency Committee for Outdoor Recreation (IAC) surveyed monitoring programs across Washington. The survey report includes municipal, tribal, volunteer, and other local monitoring efforts. Although the appendix describes over 70 programs, this inventory is not comprehensive. The IAC acknowledges that the survey did not locate many monitoring programs. Readers should regard this report as a small sampling of current monitoring efforts. To view an abridged document including only survey results for Puget Sound Basin monitoring programs, please follow this link:

http://www.ecy.wa.gov/programs/wq/swahm/ps_monitoring_appendix.pdf

To view the IAC's 2003 *Survey of Environmental Monitoring Programs and Associated Databases within Washington State* in its entirety, please follow this link:

http://iac.wa.gov/Documents/SRFB/Monitoring/Environmental_Monitoring_Survey.pdf

In addition to the programs included in these summaries, there are also monitoring efforts by local governments, federal agencies, businesses, environmental organizations, and others that were not catalogued in these reports.

In spite of the diversity and extent of these monitoring programs, there are gaps in critical information for policy and management actions. There are also problems sharing information because of different protocols and sampling designs, spatial extent, and other technical problems that arise when trying to compile data from disparate, individual monitoring efforts.

SURFACE WATER AND AQUATIC HABITAT MONITORING ADVISORY COMMITTEE
The Committee's Report and Recommendations

APPENDIX B:
**THE SUMMARY OF THE OCTOBER 19TH, 2006
REGIONAL WATER QUALITY MONITORING WORKSHOP**

October 19, 2006
Tacoma Washington
Notes compiled by Scott Redman, Melanie Forster and Heather Trim

Welcome and Introductory Remarks by Senator Phil Rockefeller

Senator Rockefeller discussed the interplay of various government efforts. Specifically he mentioned:

- Transportation Permitting Efficiency Advisory Committee (TPEAC) – major transportation projects – water impacts account for 80-90% of impacts from these projects.
- Need to connect the dots between permitted agencies' monitoring projects and environmental effects
- Need to look collectively at the common landscape and take a Watershed approach
- Important NPDES (National Pollutant Discharge Elimination System) Phase I and Phase II stormwater permits will be issued by the WA Department of Ecology in December
- The Governor's Puget Sound Partnership is about to release their recommendations which include the following items of interest to this workshop:
 - Reduction of toxics in fresh and marine waters
 - Active stormwater management programs in 80% of communities/affecting 80% of population
 - "Implement a coordinated water quality monitoring program" that involves stakeholders and looks at larger impacts on Puget Sound and freshwater

Introduction to the WA Department of Ecology's Regional Monitoring Advisory Committee by Melodie Selby (WA Department of Ecology)

Melodie described the new Advisory Committee that is forming to look at coordination of urban receiving water monitoring – the committee will try to investigate:

- What would joint monitoring look like?
- How will we know it's effective?
- What should be in? What should be out?
- What have others already done?

Ecology requested EPA funds to work on establishing a joint monitoring consortium. Some of the goals for the overall effort are:

- Important to involve stakeholders and not be dictated by Ecology
- Have people work together since many of us are monitoring. In the past budget cycles, etc. have made this difficult
- Ask the governor to include a budget request to continue this

Melodie concluded by stating that “Today is a resource information collection effort – what can we learn from their experiences? What can we extrapolate/apply here in WA? Today is also about conversation – what did we get out of the California models? What challenges do we see in WA? How can we tackle those as we move forward?”

The Featured Speakers

STEVE WEISBERG

Executive Director, Southern California Coastal Waters Research Project

What is SCCWRP?

- Joint powers agency founded in 1969 – e.g., similar to a regional fire department
- Founded by multiple organizations with a common mission, including both regulators and regulated agencies
- Offers unique opportunity for neutral science that is delivered for these various users
- Offers a forum for the partners to work together on a collaborative path
- Is a neutral scientific organization – do science and quickly infuse it into management
- Non confrontational opportunity for different stakeholders to interact
- Work is not policy, regional or site specific – rather focuses on new models, new indicators, etc – so no one is on the spot

Monitoring program overview

- Previously, most of investment was not delivering useful information – 2% was being monitored; different methods, no Quality Assurance (QA), no integration of data management; no one could put results into context.
- The biggest problem was that the data was collected on a site-specific basis and therefore one couldn't answer the most basic questions. Each of the site specific efforts were written by different people and measuring different constituents.
- Regional monitoring work makes up about 20% of SCCWRP's work
- In 1997 they spent \$31 million (\$24 million by permittees + 3.1 by feds + 1.9 by universities + 1.3 by state?) for overall program
- Once every 5 years do regional monitoring surveys to get big picture – take a year off the routine effort
 - \$3M in 94, 12 organizations
 - \$8M in 98, 62 organizations
 - \$9M in 03, 66 organizations
- These organizations are participating on a voluntary basis - doesn't require permit change
- Majority of monitoring is done by permittees

- Random, probability based sampling, similar to EMAP (Environmental Mapping and Assessment Program) designed to answer “spatial extent of problem” and multiple indicators at each site (sediment chemistry, toxics, benthic, fish tissue contaminants, gross pathology, biomarkers) – they do not preselect sites. Doesn’t point at individual outfalls.
- Stratifications include – river mouths; small & large POTW outfalls; bays/harbors, national marine sanctuary, Mexican coastal waters
- Each time they add in special efforts – for example, endocrine disruptors in fish

Products of Regional Monitoring Program

- Assessment of condition—least important product
- Cumulative distribution function (CDF) gives percent of sites with certain levels of contaminant — allows comparison from other year’s data from other studies (put your data point in context of CDF) – offers perspective
 - Helps with prioritization
 - Identifies all the worst spots? Helps define worst 10% (impacted) and best 10% (reference)
 - Most often done by subpopulation -- % of area in each subpopulation vs. % of contaminant mass (6% of area is bays/harbors but has 35% of mercury – focus there; Publicly Owned Treatment Works (POTWs) have high DDTs, Polychlorinated Biphenyls (PCBs) relative to their area)

Methods standardization—most important product

- Methods manuals to make sure everyone’s using the same equipment and methods
- Dischargers help write the manuals, Dischargers and regulators help writing methods manuals; people then adopt these; fear was that methods would devolve to the lowest common denominator, actually everyone uses this to justify improvements. Ensures greater compliance
- Regulated agencies tended to upgrade equipment and methods, rather than opt for lowest common denominator
- Lab intercalibration exercises (there are 26 labs in So Cal)
 - Critical aspect of SCWWRP’s effort
 - Found that most of the lab errors were transcription errors. 20% of the failures were due to poor QA/QC (Quality Assurance/Quality Control)
 - Examples of successes:
 - CA was first state to approve IDX method for enterococci, was adopted at all participating labs. Labs participated so could agree with new methodology; errors pointed out weak methods/labs – most errors are data transcription problems and programs fix data management
 - Lab results varied widely for sediment Polycyclic Aromatic Hydrocarbons (PAH), 137 to 2300 for sum from different labs; every parameter 10 to 100-fold difference —it took a year to fix this (new range was 1296 to 1748) - one group does extracts

Other product – Regional Assessment Tools

- Get players together so we make sense of how to interpret data. For example, their work to get Sediment Quality Criteria is reliant on working together on the technical foundation (how to relate chemistry, toxicology and biology?)
- SCCWRP gets data from 66 organizations
- Easy, once you get standardization of methods, agreement of how to interpret data

- Biocriteria development—how to interpret?
- Opportunity to dialog in a non-regulatory setting

Information management

- Sharing data is now a “piece of cake,” once you get standardization of methods, agreement of how to interpret data
- Dialogue – see all above – ACTUALLY THIS IS the KEY PRODUCT for cooperative regional monitoring

Catalysts

- A common question for which you need each other and have an audience for the answer (SCCWRP commission = CEOs, general managers) who will act on the answers
 - Example of a common question--What percentage of the Bight is impaired?
- Money
 - Available resources, most work done by research exchange ('03 work was only \$200K cash so most is by resource exchange)
 - Seed money
- Technical expertise (SCCWRP)
- Perception of likely success— first time lots of skepticism; later players don't want to be left out; keys are continuity and prior success
- Leadership organization is neutral– not just regulators or permittees

Challenges

- Time is the major challenge = interminable meetings; core oversight + many subcommittees + many cross-cutting groups
- Flexibility/Willingness to change – I have an investment in one approach and can't change (On the positive side—offers good opportunity to upgrade)
- Intercalibration costs are high—largest expense. Survey sample processing is cost neutral but meetings and intercalibration swamp those costs
- Loss of autonomy - some managers too invested in their own programs; data interpretation especially hard

Growing the program:

- SCCWRP has been expanding to new habitats, adding new partners (initially on an ad hoc, case by case basis)
- Addressing new questions
 - Beach monitoring, big concern due to recreational use in CA; new focus on other areas—How far from storm drains do pollutants go?
 - How far offshore do stormwater plumes extend – this is a question but also an opportunity to see if remote sensing is helpful
 - Mass balance of contaminants – sediment, water, biota (this is showing need to expand geographic extent); this has led them to radio dating and other new methods
 - Beach monitoring – supported refocus of management (we don't have a beach problem, we have a storm drain problem)
 - Adding – wetlands, stream systems (Chris Crompton (see below) is involved in this effort)

Institutionalizing the program – Permits have 3 phases:

- Core (compliance monitoring)

- Regional monitoring – a level of effort, not defined in the permit
- Special studies to investigate what we've learned – suggested by regulators to regulated community

Audience Questions to Steve Weisberg:

1. *Q. How do you assess spatial and temporal scope? How do you answer – is it getting better or getting worse? ?* A. Need to prioritize questions—this one not a top priority right now; you get answer over time. SCCWRP is radio dating top 2 cm sediment at 30 random sites throughout Bight. This should help answer these temporal questions.
2. *Q. Freshwater/stream monitoring?* A. SCCWRP is just beginning to monitor streams
3. *Q. How much does the monitoring cost and where does the \$ come from?* a) SCCWRP member organizations contribute annual funding (dues) totaling about \$1.5M. b) External contracts and grants - research especially - provide \$3.5 mil more and \$2 mil for outside projects. c) Every 5 years monitoring effort costs \$8 mil – but only \$600K in cash, other is in permittees ongoing investments and part is cash from fines. d) Commercial (e.g., Chevron) participants —SCCWRP is a JPA so private companies can't be part of base structure.
4. *Q. How do dischargers get over fear of hanging themselves with their own data?* A. Initially did not try to convince everyone. Small core group was successful after first year. Others followed after initial success. Fear of being left out of the process is worse.
5. *Q. Do programs change to conform to SCCWRP?* A. Yes, sometimes
6. *Q. Is the JPA stable?* A. Only open to governmental agencies. Current size is manageable and still flexible. Since base contributions are about 30%, organization is relatively autonomous
7. *Q. Transboundary issues?* A. SCCWRP does limited work with the military. Military bases provide reference sites because they are relatively undeveloped

MIKE CONNOR

Executive Director, San Francisco Estuary Institute

History of SFEI's Regional Monitoring Program

- Regional Monitoring Program (RMP) funding allows for regional surveys every year
- History: Resolution of San Francisco Water Quality Control Board (a state agency) which gave the choice of taking part (for a small fee) in the program or doing it yourself - "if you join we'll try to make it cost neutral." Payment goes directly to Institute.
- Collaborative of dischargers – Municipalities, Wastewater dischargers, stormwater agencies, dredgers, cooling water dischargers, etc. All join
- \$3.4M annual (44% municipalities, 23.5% stormwater, industrial 11%, cooling water 4%). Started in 1993 at \$1M at a time of little support (no one particularly wanted to participate and required "stick" rather than carrot from SWRCB)

Evolution, successes and challenges

- Like SCCWRP SFEI's program has grown into many more things so now Regional Monitoring Program is about ½ of their effort. (SCCWRP's program is about 20% of their overall program)
- One measure of success—peer reviewed scientific literature, but this is NOT the only measure
- Best accomplishment—data is trustworthy, the form and structure allow participants to agree.
- Evaluator considers timely synthesis and integration as SFEI's weak points
- Started with "Water Board needs regional data" but NOW it's our program and we can trust the data; has influence in Water Board hearings (TMDLs, permits) – a feedback loop has evolved
- Core element of program is Status & Trend and have added in pilot and special studies
- One issue – if data are high quality they should be in scientific literature

Success through Governance

- 70-member steering committee (SFEI is their staff)
- Environmental community is hooked in
- 3 work groups with quarterly meeting below a technical review committee that also meets quarterly
- RMP annual meeting

Success through Relevance - Six major objectives

- Objective 1 describe distribution and trends of pollutant concentrations in the estuary
 - Polychlorinated Biphenyl (PCB) study in mussels best example of temporal trends
 - Data used in 303d list so SFEI has changed their design to a stratified random sampling (EMAP type design).
 - Data help set priorities rather than "hang" people. Don't look too near-field. Coordination has the advantage of helping the different players set priorities—once agreement is reached on the real data. There are already enough data to hang people; the need is to put it together for a coherent decision about what to work on.
 - California banned Polybrominated Diphenyl Ethers (PBDEs) based on this monitoring research

- PAHs shifted from High (200) to Low (2005) on list of management priorities for restoring the chemical integrity of water; pyrethroid have replaced organophosphate pesticides (sediment toxicity problem with new chemical that replaced water toxicity of old chemicals)
- Objective 2—Project future contaminant status
 - Box models help with this
- Objective 3—describe sources, pathways and loading of pollutants entering the Estuary
 - Guadalupe River; Mallard Island – this has changed perception about relative sources: thought major rivers delivered most suspended sediments, mercury, and PCBs but now they understand that smaller urban tributaries deliver these contaminants, especially in the southern part of the Bay
- Objective 4—measure pollution exposure and effects on biota
 - Regional Monitoring Program shows problems in South Bay are similar to the Delta (but not from river source)
- Objective 5—Compare monitoring information to relevant benchmarks compare to relevant benchmarks such as water chemistry & toxicity; sediment chemistry & toxicity, sport fish, Total Maximum Daily Load (TMDL) targets
- Objective 6—effectively communicate information from a range of sources
 - Biggest issue - Be Useful or Be Useless; stay relevant
 - Most people just like to look at pictures
 - *Pulse of the Estuary* publication - contains about 40 pages of graphics; web site
 - 10 year synthesis, special issue in *Environmental Research*
 - Annual meeting—more than just steering committee and technical workgroups
 - Workshops—PAHs, pyrethroid insecticides

3Cs—Coordinate, Collaborate, Communicate

- Questions SFEI has addressed in the past
 - How do pollutant levels compare to guidelines (1998)
 - What should our cleanup goals be (2004)
- SFEI new questions
 - Can we extrapolate from local studies to system-wide effects? (also being addressed by Eric Stein at SCCWRP)
 - Reevaluation of standards for status and trends monitoring
- Success through Trust
 - Data verification, intercomparison, QA/QC, etc.
 - Transparency and 5-Year outside peer reviews
 - Easily accessible data—tool for adaptive management (SQL to help people find the data they need)

Comparable regional monitoring approaches elsewhere - Chesapeake Bay Program (gets \$35 M from Congress), Massachusetts Water Resource, New York-New Jersey- Connecticut Sanitation Authority

- Similar governance—institutional lead, environmental group inclusion, budget
- Similar design elements—stratified random sampling (EMAP approach), work on indicators, model feeding, performance measures, research studies (based on core results), emphasis on sources, status, and effects
- Notes on comparison of programs
 - Environmental community is part of RMP structure; MA (where big POTW is lead) and have oversight group that includes environmental community
 - Cost is \$1M-\$10M -- \$1 per person?

- Modeling drives MA and heavily committed to in CHB; NY-NJ-CT still using axis of Bay (old design) – stuck with equipment
- Nonpoint source loads only being done at SFEI and CHB
- Special studies and research: most at SCCWRP and least at NY-NJ-CT (which to do? When to start & stop?)
- MA has 50 specific predictions about how discharge would maintain health of Bay; so measures are related to condition related to those predictions; CHB reliant on Pressure-State-Response

Audience Questions to Mike Connor:

1. *Q. What is the relation of SFEI to Brake Pad Partnership (group concerned with copper)?* A. Bay is listed for copper; thought to come from Highway Runoff - from grinding of brakes; SFEI is working with them on this; RMP stops at head of tide; stormwater agencies are hardest to get to join RMP.
2. *Q. How long did it take to reevaluate and redesign the program?* A. About 1 year
3. *Q. What are advantages to regional monitoring?* A1. Shared QA/QC. RMP managed by SFEI and subcontracted to others with operating labs (could be members) – do all data management; QA, and synthesis. If you get a lab you have to keep it running.

A2. Most angry members are those that can't see the relationship between what's in the RMP and what's in the permit. RMP has had difficulty with Endangered Species Act fish listings—NOAA does not participate in RMP; NOAA lab yes, but not NOAA regulators. Not making links to essential fish habitat, and all parts of NOAA (20 people from 13 sites) so management questions are not driven by NOAA's interests/needs.

A3. Another advantage—gives opportunity to think grander thoughts “big picture.”

A4. If people were working from the same factual basis, (pollyannish, hopeful) In actuality people are able to take action – they don't forego right to sue, etc.

CHRIS CROMPTON

Chair, Southern California Monitoring Coalition and Manager, Environmental Resources, County of Orange, CA

Orange County Stormwater Program

- Orange County is a discharger; a member of SCCWRP; a paying member of regional monitoring surveys
- 36 permittees in Area-wide stormwater permit where County is the principal permittee (11 watersheds)

- Implementation agreement underpins the program; shared budget of \$6M annual covers program management, monitoring, and public education (3M people in Orange County)
- “Glue” for program: 2003 Drainage Area Management Plan- program effectiveness assessment. Principle policy and guidance document for NPDES permit.

Stormwater Monitoring Coalition

- Goal is to develop the technical information.
- Created local implementation plan
- Committee structure
 - Engages city managers and elected officials
 - Public works directors (mostly on technical committees)
 - Other technical experts
 - Participants include all water boards (regional boards of the state agency),
- Created a multi-party agreement; 5-year initial time frame; initial project is assessment of research/monitoring needs; subsequent projects overseen by a steering committee of SMC members

Assessment of needs – white paper outlining technical issues and management questions of interest; SCCWRP managed process of discussing; 50 ideas distilled to 15; 15 are in 3 categories

- Regional Stormwater monitoring infrastructure – some data weren’t being used - can we mine existing data? Sampling and analysis plan.
- Stormwater mechanisms and infrastructure—getting ahead of the curve, improvement of conceptual model through evaluation of reference conditions, beneficial uses, relative contribution of different sources
- Receiving water impacts – tools for assessing conditions (bioassessment, toxicity testing, rapid microbial testing, microbial source tracking, peak flow impacts)
- Issue in Steering Committee – letting streams be streams rather than developing right up to the edge and then having to engineer solutions.
- Final product = February 2002 report on stormwater research needs

Project selection - How to get slow moving agencies to work together

- Meet quarterly to discuss projects and progress. Projects selected by consensus (more than one party constitutes consensus, if others don’t agree, they don’t participate)
- Key aspect - Not all Stormwater Monitoring Coalition members have to participate in all projects
- Outside agencies may sometimes participate in projects – projects have their own set of players/participants not bounded by Stormwater Monitoring Coalition agreement, etc.
- A lead agency is identified to manage each project. Sometimes this is SCCWRP, but not always. LID project will be managed by San Bernardino County
- Agreements are executed to fund each project individually– Attorneys sometimes make this difficult.
- Over \$1M of projects funded to date from SMC and other sources:
 - Project #1: Standardized sampling and analysis (define monitoring questions of interest; assess current monitoring programs; create an optimum design. Conduct initial lab intercalibration—due to problem with lowest bidder having poor quality. Lab intercalibration takes care of that
 - #2: Microbial source tracking – evaluate new MST methodologies to discriminate human versus non-human sources. No method was perfect but host specific PCR worked best.

- #3: Peak flow impacts – Establish connection between impervious surface and physical condition of streams. Create stream classification system; results. Developed sites were unstable (a distinct west coast phenomenon)
- #4—Freshwater Bioassessments. Regionally consistent bioassessment monitoring program (methods standardization; calibrating and validating a regional assessment tool, designing and implementing an integrated, coordinated regional program. A unique opportunity to start a program from scratch without the baggage of existing approaches.
- #5- Lab intercalibration

Plans for the next 5 years

- SMC plans to extend cooperative agreement
- 5 new organizations want to join (CalTrans, EPA Region 9, City of LA, State water rights control board, Cincinnati EPA)
- Update the research needs report
- Follow up on previous studies. Add toxicity and organics components to the intercalibration program
- Development of a web based structure for watershed management (CalSWIM—Wikipedia type approach)

Other regional approaches

- Stormwater Quality Standards Task Force – science and policy not just science and permit; cost about \$1M to date – collaborative program to look at recreational beneficial uses and WQ objectives in the basin plan; funding agreement between counties (Orange, SB, Riverside) and the Santa Anna Watershed Project Authority (they committed 0.5 FTE?); includes regulatory agencies & NGOs; accomplishments include assessment of existing data, camera survey of recreational uses, investigated the background of EPA guidance & its flexibility; basin plan amendments expected in 2007
- CA Stormwater Quality Association -- 501c3 organization funded by members at rate based on discharger size; key accomplishments – meetings and conferences; comments on regulatory documents; scientific and policy studies e.g., guidance on program effectiveness; coordination on key statewide issues such as numeric standards; CA BMP manuals; next conference in fall 2007; could be good model for association in WA

Collaboration is essential in stormwater management

- Cities and counties were not created with consideration of watershed boundaries
- Water always runs downhill across boundaries if necessary
- Multiple parties grappling with the same issues and questions (share resources to address common problems)
- Collaboration occurs at many levels – watershed, county, region, statewide; many models (cooperative agreements, JPAs, Non governmental organizations, foundation), size of budget and collaboration affects (loss of) control.
- Easiest way to get together is not to be threatening – allow people to opt in/out; people don't want to give up authority.

Audience questions to Chris Crompton:

1. *Q. How do you assess program effectiveness?* A. Significant draft available at end of 2006 and finalized in early 2007
2. *Q. How do prevent free riding by non-active but participating organizations.* A. Electeds buy-in, get \$ in later FY, but they just accept no as an answer.
3. *Q. Does CalTrans participate?* A. They are a member of California Stormwater Quality Association (CASWQA) and are proposing to be part of SMC. They have invested a lot and set the course forward a while back when they developed relationships with universities. SCCWRP also answered: CalTrans not a strong collaborator; not first group to involve.

Afternoon Session

Audience comments with responses from our speakers' panel addressing these questions and more:

- What are common elements of success of the three models and could these be applied to Washington?
- What challenges are anticipated for Washington's program and what can we do to overcome those challenges?
- *What other issues should be considered? Example topics to discuss: scale, phasing, funding.*

What are the common elements of success of the three models and could these be applied to Washington?

- Emphasis on receiving water monitoring
- Driven by management rather than science (What do we need to do, e.g. about stormwater? What are our goals in a watershed? What makes sense to do?)
- Integration of science-management in coastal urban areas (e.g., NRC book on Managing Wastewater in/for Coastal Urban Areas). Ecosystem based management.
- Collaborative, multi-institutional. All players need each other.
- Recognized that not all have to participate to get started.
- Credible organization (implementer, contractor)
- Don't need a new organization. Monitoring function assigned to existing organizations: SFEI was a science arm of the NEP organization before RMP; SCCWRP was there for years before regional monitoring surveys
- Evolving structure, studies, designs, etc.
- Money needed (cost neutral may not be relevant in WA)
- Perceived benefits are recognized (by different entities in the example programs)
- Time commitment. Sometimes necessary to reprioritize.
- Charismatic leadership or some other form of leadership (SF RMP needed leadership at the Water Boards; self-interest or demand could provide this)
- Independent of state mandate (but legislature has come around to support & build upon these examples)

- Legislation can improve standardization, relevance and usefulness
- Trust is important—trust among stakeholders, regulators, trust in process, data reliability
- A real or perceived distance between monitoring & research and the regulatory process
- Perceived benefits recognized by all participants. Benefits at many levels: policy makers and lab managers/staff
- Regional programs that are not statewide work best. Need buy-in from stakeholders that care about the region with common questions. Good to have geographic focus where there are common questions/concerns
- Protection of beneficial uses—recreational in CA, salmon and shellfish in WA
- Limited scope at inception
- Questions/findings are not focused on individual discharges
- Spent time articulating the questions; then figured out how to answer them
- Saw and responded to writing-on-the-wall
- Succeeded with early efforts and grew from there
- Non-threatening
- Short time scale for commitment

Managing Waste Waters in Coastal Urban Areas by Alan Mearns, published by the National Science Foundation—worth reading

What challenges are anticipated for Washington’s program and what can we do to overcome these challenges?

- Cost neutral may not be relevant here; assess the current situation to decide if we are looking for new types of monitoring or are we looking to do existing work better?
- Disconnection between Puget Sound Ambient Monitoring Program (PSAMP) (strong on status & trends but weak on responses to “red flags” and program effectiveness, compliance) and regulatory monitoring (pieces are there but need to work together)
- Not ready to start out too big. Building something at the Puget Sound relevant scale/scope (not starting too small) -- commit agency resources to Puget Sound synthesis (ambient + beyond; bigger than Puget Sound Action Team publications) or have this be a first project; start small to develop quick successes
- In(Decision) about receiving water monitoring as requirement in municipal stormwater permit
- Need Endangered Species Act and Clean Water Act coordination (address by focus on protecting beneficial uses)
- Bringing resource agencies into the organization, process (easier at inception than later)
- Two choices to get going:
 - Regulatory agencies and stormwater agencies get together proactively and not wait for a legal mandate
 - Could be driven by review/critique of existing monitoring from an outside group as one way of getting attention (Are the existing programs address the problems facing Puget Sound? Are they helping with solutions?) – create a white paper on what needs to be done
- Infighting means we don’t have “joint power”;
- Long-time frame needed for results
- Example organizations in our state/region are competitive not collaborative
- Perceived fairness of cost allocation among stakeholders
- Information might lead to unintended consequences – Orange County example points out need to have strong relationships among the players

- Getting buy-in at the highest levels (agency heads) – SCCWRP example was having EPA Regional Administrator support.
- State lab accreditation is no substitute for lab intercalibration. Current laboratory performance accreditation assures that labs have capability; users have responsibility to assure quality
- Uncertainty about whether receiving water monitoring can provide information about program effectiveness (see CASWQA report for a few examples; smelter on Harbor Island; Copper abatement in 1980s)
- Science requires an interdisciplinary collaboration—there can be cultural differences between disciplines. One solution is to develop forums for conversation
- Possible battles over data/science, although other scientists/labs can be found to do the work. Could also be addressed by peer review; review committees (including sector liaisons)
- Lack of prominence of monitoring in Puget Sound Partnership’s draft recommendations
- Scientific issues are relatively easy. It’s people issues that are tough. Impediments are rarely technical.
- Program effectiveness: Can receiving water monitoring provide information about program effectiveness?

What other issues should be considered? Example topics to discuss: scale, phasing, funding.

- National Marine Fisheries Service, Northwest Fisheries Science Center
- Importance of communicating (i.e. *Pulse of the Estuary*)

Closing comments by Jay Manning, Director, WA Department of Ecology:

- Underneath it all is the science – how are we doing? Where are the signals and what are they telling us? Then, connection to regulation
- What happened at Puget Sound Partnership has happened many times before. Monitoring, data management, research falls to the bottom – even if prior discussions and underlying interests have clearly stated the need a base of information. We neglect the foundation of the house.
- Governor’s GMAP forces us to ask questions such as: do sewage treatment plants control toxics? What’s the result of spending this money on this program? We can’t answer now so it’s hard to win more money.
- We need to better integrate academia into our approach
- We haven’t done enough and we have to
 - be more coordinated
 - enlist academia
 - improve our systems to develop, extend the baseline
- Request to assembled group: deliver to him the best, most cost-effective system we can and Jay will try to make it happen. Destroy, run over, remove the lines that divide us.

SURFACE WATER AND AQUATIC HABITAT MONITORING ADVISORY COMMITTEE
The Committee's Report and Recommendations

APPENDIX C:

REGIONAL COORDINATED MONITORING GOVERNANCE MODELS FROM ACROSS THE NATION

Believing that the Puget Sound region and the State of Washington can and should learn from the experiences of others, the Committee identified eleven regional monitoring organizations that are currently operating in diverse regions of the United States. The Committee expects that the stakeholders involved in developing the organizational structure for the Puget Sound Basin Regional Coordinated Monitoring Program may find components of existing programs that could be emulated, thus saving time and resources in launching the program and, perhaps, helping the Puget Sound Basin's program avoid some pitfalls that other similar programs have encountered.

The Committee selected these eleven organizations because they are engaged in monitoring on a regional level (which, in some cases, means "multi-state"). The Committee assessed them in light of the interests that need to be addressed by the Puget Sound Basin program (see Mutual Interests, pages 9-11). The Committee believes that components or processes of these organizations, such as their missions or scope of work, who "sits at the table," decision-making processes, and funding mechanisms, may be emulated by the Puget Sound Basin Regional Coordinated Monitoring Program to ensure achievement of the identified mutual interests of the parties.

Of the eleven programs, the San Francisco Estuary Institute appears to address surface water and aquatic habitat issues most similar to those in the Puget Sound region, and to most effectively apply the elements of a coordinated regional monitoring program that would achieve the interests of the parties that need to be involved in establishing the Puget Sound Basin's program. The Southern California Coastal Watershed Research Project (SCCWRP) also appears to contain many of these attributes.

So, too, do the Puget Sound Assessment and Monitoring Program (PSAMP) and Project ENVVEST, which coordinates monitoring in Sinclair and Dyes Inlets near the Puget Sound Naval Shipyard in Bremerton and its surrounding watershed. But it should be noted that these two local programs operate at different scales than the two in Southern California, and from what is needed for a Puget Sound Regional Coordinated Monitoring Program.

On the following pages are the brief descriptions of each program. The organizations are listed in alphabetical order. Following these descriptions is a matrix that efficiently summarizes these elements.

CHESAPEAKE BAY PROGRAM

The Chesapeake Bay Program (CBP) is a regional partnership originally composed of the states of Maryland, Pennsylvania, and Virginia, and the District of Columbia, the United States Environmental Protection Agency (EPA), and the Chesapeake Bay Commission, a tri-state legislative council. Today the partners also include the headwaters states of New York, Delaware, and West Virginia. The USGS, NOAA, and several universities collaborate with the partners on monitoring and research projects.

This report focuses on the activities of the Chesapeake Bay Program's Monitoring and Analysis Subcommittee.

Geographic Area

Chesapeake Bay is the largest estuary in the United States. The CBP encompasses the entire Chesapeake Bay watershed, which stretches across six states and the District of Columbia.

Focus

The Chesapeake Bay Program has led and directed efforts to restore Chesapeake Bay since 1983. The Monitoring and Analysis Subcommittee has assessed the condition of Chesapeake Bay and tracked the progress of restoration efforts for twenty-two years. Restoration projects initially focused on eutrophication, or excess algae growth caused by nutrient pollution, and its threat to the Bay's living resources. While nutrients remain a top priority, the focus has expanded to include sediments, metals, toxics, and other pollutants. **[Criteria: Flexibility to Fit the Circumstances, Focus on Priorities]**

Governance Structure

The CBP's Executive Council consists of the governors of member states, the administrator of the EPA, the mayor of the District of Columbia, and the chair of the Chesapeake Bay Commission. The Principals' Staff Committee, composed of the executives of member states' environmental and natural resource agencies, advises the Executive Council on policy. Reporting directly to the Executive Council and the Principals' Staff Committee, the Implementation Committee oversees the Monitoring and Analysis Subcommittee. For an organizational chart for CBP, please click on the following link: <http://www.chesapeakebay.net/committee.htm>. **[Criterion: Partnerships]**

Each state agency designates expert technical staff to participate in the Monitoring and Analysis Subcommittee. USGS and universities also contribute staff with expertise in modeling and monitoring design. This core team has authority to designate staff from their agencies to support CBP projects. This enables agencies to prioritize CBP

activities without sacrificing their core functions. **[Criterion: Preserve Autonomy while Promoting Collaboration]**

The Monitoring and Analysis Subcommittee oversees five technical workgroups: Analytical Methods and Quality Assurance, Data Management and Acquisition, Indicators, Non-tidal Water Quality, Tidal Monitoring and Analysis.

Monitoring Programs

The Monitoring and Analysis Subcommittee maintains approximately 150 water quality stations in Chesapeake Bay's tidal waters, including the bay itself and tidal portions of its tributary rivers. Monitoring and modeling coordinators used probability-based sampling designs to determine station locations, the approach EPA uses in its EMAP program. The staff collects and analyzes samples 12-16 times annually for over 100 parameters including temperature, salinity, pH, sediments, dissolved oxygen, nutrients, bacteria, metals and toxics. The tidal waters program also includes several indices of biotic integrity including invertebrates, fish, plankton and phytoplankton. The program also conducts fisheries, submerged aquatic vegetation, and shallow water habitat surveys. In addition, some Chesapeake Bay Program partners conduct limited monitoring of sediment and fish tissue contaminants.

The non-tidal workgroup maintains 70-80 water quality and flow stations that monitor parameters similar to those of the tidal stations. This group focuses on the non-tidal portions of the major rivers that flow into Chesapeake Bay. These portions lie above the fall line, a physical barrier west of the bay marked by waterfalls and rapids.

CBP's monitoring program uses 14 different labs to analyze samples. These labs follow the same methodology and protocols. All underwent a split sample program to ensure compatibility and comparability of results. All must comply with a single QAPP and follow the same operating procedures. **[Criteria: Scientific Credibility, Consistency]**

Monitoring data feed into CBP's extensive modeling program. Through modeling, the program has expanded the spatial and temporal scale of its assessments. Modeling also enables CBP to determine the role of atmospheric deposition on the health of Chesapeake Bay. The airshed modeling program helps assess the fate of air pollutants and how they affect levels in the bay. Sediment transport and oyster filter feeding models yield valuable information on contaminant fate. Spatially diverse monitoring data provide feedback to refine and improve the accuracy of models. **[Criteria: Regional Monitoring, Integrate Individual Disciplines and Programs]**

Data Management

Old Dominion University runs the server in which CBP participants input data. Quality assurance software automatically ensures that each data point meets rigorous standards upon acceptance into the system. This enables relatively fast turnover. Stakeholders and the general public may access CBP's data on the program's website. The website also posts metadata. Old Dominion's server immediately duplicates and sends the data to a back up facility to prevent irretrievable loss in the event of a disaster. **[Criteria:**

Produce Information that is Useful and Accessible to Us All, Trust and Transparency]

Funding

Federal to state matching contributions at a ratio of 80 to 20 percent constitute the funding for CBP. The budget for all of CBP's programs, including monitoring and assessment is approximately \$15 billion over the six-year period of 2001-2007.

Successes

The Chesapeake Bay Program has expanded its membership and maintained a sustainable level of funding for over 20 years. According to CBP's most recent annual report, restoration efforts have achieved some gains in healthy aquatic vegetation and declines in nutrient loadings. Harmful algal blooms and anoxic events have slightly decreased in the bay's mainstem. Much room for improvement exists, however, and Chesapeake Bay remains significantly impaired.

The Chesapeake Bay Program's monitoring programs have successfully collected high quality, scientifically credible data for over 20 years. A scientific consensus of standards needed to achieve a clean Chesapeake Bay arose from this data. CBP's six member states agreed upon necessary reductions of pollutants to improve the health of the bay-- a significant accomplishment. Science-based practices have informed policy decisions. Each member state has set caps on certain pollutants based on the monitoring data. A benthic index of biotic integrity (BIBI) is now required in the listing and de-listing of impaired water bodies. **[Criteria: Policy/Management Issues and Questions Guide Science and Technical Issues and Questions, Better Management Decisions]**

Academic participation has contributed to the success of the partnership. At the beginning, the monitoring program utilized laboratory analysis methods designed for wastewater. Collaboration with universities resulted in partner laboratories adopting lower detection levels. The partnership successfully integrated academia into its programs by offering universities long-term contracts, research funding and input in decision making.

Chesapeake Bay Program has secured and retained public support throughout its history. The monitoring program has contributed to this success by offering readily accessible data. The program reports findings openly to ensure transparency. **[Criterion: Trust and Transparency]**

COMPREHENSIVE EVERGLADES RESTORATION PLAN

The Comprehensive Everglades Restoration Plan (CERP) was established by the United States Army Corps of Engineers (USACE) and the South Florida Water Management District (SFWMD) to conduct assessment, evaluation, and planning activities using the best available science. Restoration Coordination & Verification (RECOVER) is the water quality monitoring component of CERP.

Geographic Area

The Florida Everglades originally covered almost the entire southern half of the state. European settlers diverted the natural sheet flow of fresh water into channels to prevent flooding and provide water for irrigation. After many generations, channelization increased flooding and water quality problems. USACE and SFWMD established CERP to restore the south Florida ecosystem to the best possible extent. Restoring the Everglades to their historic condition is impossible, but CERP is researching the best alternative to prevent further degradation of the ecosystem.

Focus

CERP's monitoring program has four objectives: 1) Support scientific investigations to increase understanding of the ecosystem establishing cause and effect relationships; 2) Detect unexpected responses to CERP program implementation; 3) Assess system-wide responses to CERP implementation; and 4) Establish a reference for conditions before CERP projects.

Governance Structure

The U.S. Army Corps of Engineers and South Florida Water Management District are the sponsoring agencies of the RECOVER program. Other partners include Seminole and Miccosukee Tribes, the U.S. Fish and Wildlife, EPA, USGS, NOAA, National Park Service, Florida Department of Agriculture and Consumer Services, Florida Department of Environmental Protection, and the Florida Fish and Wildlife Conservation Commission.

The Monitoring and Assessment Plan (MAP) generates scientific and technical information to provide a process for RECOVER to evaluate the effectiveness of CERP Programs. RECOVER's Adaptive Assessment Team has lead responsibility for developing and implementing the MAP. The goal is for participating agencies and tribes to use an integrated, system wide monitoring and assessment program (the MAP) to track the performance of CERP.

The RECOVER leadership group coordinates the activities of the RECOVER technical teams. The Leadership Group ensures that implementation of monitoring activities is

consistent with program goals. It sets priorities, makes budget recommendations, delegates staff and reviews their performance, issues an annual report card for the program, and reviews documents prior to publication.

The leadership group consists of the two RECOVER program managers from the U.S. Army Corps of Engineers and the South Florida Water Management District plus one member from each partner organization.

Monitoring Programs

RECOVER monitors program effectiveness of CERP restoration efforts. Because CERP is involved in so many restoration activities, only a few examples of monitoring programs are given here. Replacing the Everglades ecosystem's historic sheet flow of water with a series of channels drastically changed the hydrology of the region. CERP's restoration efforts do not attempt to fully restore natural conditions. The goal is to mitigate the harmful effects of artificial channels and levees. RECOVER hydrology monitoring assesses the effectiveness of CERP restoration projects.

In addition to hydrology changes, alterations to natural water flow in the Everglades have exacerbated pollution problems. Natural conditions allow infiltration of pollutants, but the more direct, artificial channels carry pollutants to other bodies of water where they cause eutrophication and other problems. RECOVER monitors nutrient loads and sulfide/sulfate concentrations. They also monitor toxins and metals in some projects like the Southern Florida Fish Bioaccumulation Mercury Study. RECOVER programs also monitor aquatic species including fish and wading birds.

Data Management

Each involved agency or university maintains its own data, accessible on the Web. RECOVER is attempting to create a system wide database that will incorporate STORET data among other sources.

Funding

CERP receives about half of its funding from the State of Florida and half from the federal government. Implementation of the Everglades restoration plan is estimated to cost \$7.8 billion over the duration of the project. CERP estimates the cost to monitor, operate, and maintain the program will cost an additional \$182 million annually.

Successes

CERP's extensive community outreach programs keep citizens informed. CERP translates many of its newsletters and other documents in Spanish and Creole to increase accessibility to Florida's diverse population. The Environmental and Economic Equity Program Management Plan brings an environmental justice component to CERP.

CERP is a very new program. It is impossible to assess the effectiveness of the Everglades restoration projects at this time.

COOPERATIVE MONITORING EVALUATION AND RESEARCH COMMITTEE

The Cooperative Monitoring Evaluation and Research (CMER) Committee was established by the Forest Practices Board to ensure the effective implementation of the recommendations in the Forests and Fish Report. The CMER includes the Washington State Departments of Natural Resources, Ecology, and Fish and Wildlife, and the Forest Practices Board of Washington State.

Geographic Area

CMER monitors streams in non-federal forestlands throughout Washington State, usually at the watershed scale.

Focus

CMER conducts research to provide compliance with the Endangered Species Act (ESA) for aquatic and riparian-dependent species, restore and maintain riparian habitat, and meet requirements of the Clean Water Act on non-federal lands using an adaptive management approach. CMER does not make policy recommendations but identifies policy implications of its research results and monitoring data. CMER's current priorities include temperature, habitat impacts and sediments in both fish-bearing and non-fish-bearing streams.

Governance Structure

CMER consists of seven scientific advisory groups. FPB raises policy questions or draw them from public comment and refers them to CMER to investigate. Forest Practices Board (FPB) approved scientific representatives with natural resource expertise of forest landowners, tribes, state agencies, county governments, federal agencies and environmental organizations make up the CMER committee.

Monitoring Programs

CMER's work plan outlines recommendations for the monitoring and modeling programs. The CMER work plan is organized by forest practices rules identified in the Forest and Fish Report (FFR). These rules relate to resources, such as wetlands, fish bearing streams, and wildlife. They also relate to specific forest practices such as building and maintaining roads and applying forest chemicals. Effectiveness monitoring programs evaluate the effectiveness of FFR prescriptions. CMER also has an Extensive Status and Trends monitoring program to assess watershed conditions and document trends over time as FFR prescriptions are applied. The Intensive Monitoring Program evaluates the cumulative effects of multiple forest practices at the watershed scale. The research component of CMER focuses on Rule Implementation Tool Development. One

of these tools is the Stream Typing Program. This program designates streams as fish bearing (type F) and non-fish bearing (type N). These designations affect forest practices and the monitoring associated with them.

Current monitoring projects include fish passage, habitat conditions including large woody debris, hydrology, and water temperature. CMER also monitors the abundance of stream-associated amphibians in type-N streams due to their sensitivity to habitat changes. CMER monitors riparian conditions, including water quality, large woody debris, mass wasting (downward movement of soil and rock due to road building and forest clearing), and other habitat concerns. Effectiveness monitoring programs assess the effectiveness of stream buffers in both type F and type N streams.

Participating agencies follow protocols outlined in the CMER manual. The manual includes descriptions of quality assurance and methodology. The manual is available on DNR's website.

Data Management

Reports are available on the DNR website. Other CMER data are available upon request from DNR.

Funding

CMER began with both federal and state funding. State funding will soon replace all federal funding. Agencies and private industry partners also contribute in-kind resources including staff time and laboratory use. The larger forest products companies, including Weyerhaeuser, provide some funding for research.

Successes

CMER has the voluntary cooperation of the timber industry. Participants generally agree on the scientific findings resulting in greater trust between the timber industry and state regulatory agencies. Although disagreements occur, such as the determination of where perennial streams begin, participants agree on the scientific process for resolving these disputes.

GREAT LAKES COMMISSION

The Great Lakes Commission is a public agency dedicated to the management and protection of the natural resources of the Great Lakes and St. Lawrence River basins. The partnership consists of eight states, two provinces and EPA region 5. The Commission also works with tribes, municipalities and environmental organizations.

Geographic Area

The Great Lakes consist of 15,000 miles of shoreline in the states of Michigan, Wisconsin, Minnesota, Illinois, Indiana, Pennsylvania, Ohio, and New York.

Focus

When the Great Lakes Commission began its monitoring and restoration efforts more than 30 years ago, it focused on eutrophication. Their mission has expanded to include other water quality parameters as well as monitoring of toxins in sediments and fish tissues. The GLC coordinates ecosystem wide monitoring including air and soil as well as water.

Governance Structure

The Great Lakes Commission was established by joint legislative action of the Great Lakes states in 1955, the Great Lakes Basin Compact, and granted congressional consent in 1968. A bi-national memorandum of agreement between the US and Canada establishes the partnership between the two nations. A Declaration of Partnership enacted in 1999 established associate membership for the provinces. Each jurisdiction appoints a delegation of three to five members comprised of senior agency officials, legislators and/or appointees of the governor or premier. Monitoring programs began about 30 years ago.

The GLC established Lakewide Management Plans (LAMPs), for each of the five lakes. The LAMPs have open meetings with broad participation including environmental groups and other interested parties. Representatives from member states, provinces, US EPA, USGS, and Environment Canada have voting rights. Environmental groups and business interests participate in meetings but do not have voting rights.

Monitoring Programs

The Great Lakes Commission holds a biennial conference called the State of the Lakes Ecosystem Conference (SOLEC). The SOLEC compiled a list of 80 ecosystem health indicators. The most recent conference focused on biological indicators. Great Lakes Commission members base programs on SOLEC reports. Although GLC does not work directly on stormwater issues, the Council of Great Lakes Mayors, representing all major

US cities in the Great Lakes region, used SOLEC reports to establish effluent limits and standard for stormwater permits.

Great Lakes Commission oversees many ecosystem wide monitoring programs. Programs monitor a wide range of water quality parameters as well as sediments and fish contaminants. A beach monitoring program assesses bacterial contamination in recreational areas. Most water monitoring programs focus on the lakes although GLC is currently developing a Coastal Wetlands monitoring program. Local jurisdictions monitor tributary rivers and streams, but GLC coordination of these programs is limited.

GLC monitoring programs inform fish consumption advisories due to toxic contaminants. USGS and the states of Wisconsin and Michigan sampled high flow events for toxics for a two year study. GLC also conducted the Lake Michigan Mass Balance study. They sampled pollutants of concern including PCBs to determine when the fish consumption advisory could be safely lifted. According to current trends, 2024 is the target year. The Lake Trout Program measures PBDEs, PFOS and currently used pesticides in fish tissues. GLC ecosystem monitoring programs include air quality as it impacts water quality as well as overall ecosystem health.

The Great Lakes states conduct monitoring for their 303(d) lists every five years and rarely collaborate as their priorities often differ. Their coordination of protocols and analysis are limited to following EPA QA/QC guidance. Canada's QA approach differs, but the data are usually comparable to the states'. The states and provinces collaborate more in the Lakewide Management Plans (LAMPs) than in other GLC programs.

Data Management

Data are posted on the website on the GLINDA database. Some metadata are also available if the file size is manageable. GLC is currently developing an inventory of over 600 monitoring programs in the Great Lakes Basin. They plan to develop a searchable database.

Funding

Funding for the GLC is a line item in the federal budget. The GLC spends \$4.7 million annually on monitoring programs. Participants in the GLC have access to EPA Region 5's 180 foot research vessel, provided they share all data. Due to maintenance and rental costs, this results in tremendous cost savings to states, universities and other partners who take advantage of this opportunity. The EPA also provides a smaller vessel for nearshore research.

Successes

Eutrophication became a major problem during the 60s and 70s due to phosphorus loading in the Lakes. GLC research helped set target loads for the United States and Canada. This successfully improved water quality. Unfortunately, these gains were short lived due to the introduction of invasive zebra and quagga mussels. These bottom dwelling mollusks recycle phosphorus in the sediments, reintroducing it to the water

column. The GLC monitoring programs identified these invasive species as the cause of nutrient loading in the water column and efforts to control them are underway.

The GLC has also identified watershed areas of concern due to sewage contamination. They have established a system for identifying outfalls of concern. Elimination of poorly treated sewage discharge resulted in the delisting of four U.S. and Canadian streams.

OREGON WATERSHED ENHANCEMENT BOARD

The Oregon Watershed Enhancement Board (OWEB) is a cabinet level state agency. OWEB funds projects to improve watershed health and salmon habitat. These projects comprise the Oregon Plan for Salmon and Watersheds (OPSW or Oregon Plan). This program includes the State of Oregon Department of Fish and Wildlife, Department of Environmental Quality, Department of Natural Resources, Department of Forestry, Department of Agriculture, Oregon Watershed Enhancement Board, Water Resources Department and Division of State Lands. OWEB relies on voluntary participation rather than on a regulatory approach.

Geographic Area

The Oregon Plan implements restoration projects and monitors surface waters across the state of Oregon. About two-thirds of the state contains salmon habitat.

Focus

The Oregon Plan's key focus is watershed health including, but not limited to, salmon habitat restoration. The OWEB provides funding for Oregon Plan projects implemented by ninety different agencies. One-quarter to one-third of the budget funds monitoring efforts. Watershed restoration priorities guide monitoring decisions.

Governance Structure

Because the OWEB is a cabinet level state agency, federal agencies do not have an official vote. State agencies and local governments are well represented. The representatives of these agencies meet monthly and make decisions by consensus. Being part of the governor's cabinet gives Oregon Plan a direct link to decision makers. The Core Team consists of the Governor's Natural Resource Advisor or designee (chair) and senior management from state natural resource agencies. The Core Team develops and recommends watershed protection and restoration projects. Oregon Plan decisions transcend those of any single state agency.

The Core Team coordinates the activities of eight subgroups: Implementation; Outreach; Monitoring; the Interdisciplinary Science Team; and four regional Teams. The Monitoring Team meets monthly and works closely with the Interdisciplinary Science Team. The Monitoring Team plans and coordinates monitoring efforts to evaluate the effectiveness of Oregon Plan restoration programs and to identify necessary changes.

Monitoring Programs

Oregon Plan monitoring programs assess status and trends and effectiveness of watershed programs. The Oregon Department of Environmental Quality (DEQ) monitors physical, chemical and biological indicators through its Watershed Monitoring Program. The DEQ Ambient River Monitoring Program collects samples at least six times a year at 151 locations. DEQ also maintains a Coastal Environmental Monitoring and Assessment Program (CEMAP) that monitors estuary sites. The number a location of sites varies from year to year. Current objectives of CEMAP include addressing low dissolved oxygen and eutrophication, chemical and biological contamination, habitat modification, and the cumulative impacts of all these indicators.

Oregon Department of Fish and Wildlife monitors salmonid populations and several indicators of aquatic habitat. These programs include Index of Biotic Integrity (IBI), smolt trapping, adult spawning surveys, juvenile salmon population census, and stream habitat assessment. In addition, the Oregon Department of Forestry's Forest Practices Monitoring Program provides data for adaptive management on non-federal forest land. Local jurisdictions and volunteers also contribute to Oregon Plan monitoring programs.

Data Management

OWEB is currently updating its data infrastructure and hopes to make monitoring data more readily available in the near future. The participating agencies, DEQ, ODFW, etc. have much data posted on their web sites, however, not all data are currently available to the general public.

Funding

Much of OPSW's funding (through OWEB) comes from the Oregon State Lottery. Another significant source of funding is the Pacific Coastal Salmon Recovery Fund administered by the National Marine Fisheries Service. Sales of salmon-themed license plates contribute funds to the OPSW to a lesser degree.

Successes

The results of the Coastal Coho assessment look very promising and may result in the ESA de-listing of this salmon run, although conservation efforts will continue. The Coastal Coho project has successfully integrated disciplines over a wide geographic area.

Oregon Plan's success results from voluntary efforts. Even though it is not a regulatory program, the Oregon Plan has strong connections to policy. OWEB often funds projects that meet regulatory requirements. For example, OWEB funded the relocation of a dairy that caused nutrient pollution in a local stream.

PROJECT ENVVEST

Project ENVVEST (Environmental Investment) is a joint operating agreement among the US Navy, EPA Region X and The Washington State Department of Ecology (DOE). Contributing partners include Battelle Laboratories, the cities of Bremerton, Port Orchard, and Bainbridge Island, the Kitsap County Public Utilities District (PUD), Kitsap County Health District, Washington State Department of Health(DOH), the Suquamish Tribe, and the Washington State Department of Fish and Wildlife.

Geographic Area

Project ENVVEST coordinates monitoring of Sinclair and Dyes Inlets. It focuses on the Puget Sound Naval Shipyard in Bremerton, Washington, and its surrounding watershed.

Focus

Project ENVVEST, an EPA Project XL program, formed to assess the condition of Sinclair and Dyes Inlets due to their inclusion on the 303(d) list of impaired water bodies. The EPA created Project XL to give federal agencies, state and local governments and industrial sectors opportunities to propose cleaner, cheaper, smarter ways to protect the environment. Project XL selected ENVVEST as a pilot study to remediate fecal coliform, metals, and PCB contamination of Sinclair and Dyes Inlets.

Governance Structure

The Department of Defense selected ENVVEST as a pilot study to improve environmental quality on military lands. While the Navy takes the technical lead, Ecology and EPA review sampling plans. **[Preserve Autonomy]** The Marine Environmental Support Office of the Space and Naval Warfare Systems Center San Diego (SSC SD) has maintained a Northwest Detachment in Bremerton to provide technical support and coordination for the execution of Project ENVVEST.

Military sites fall under federal jurisdiction. Therefore the EPA administers the Navy's NPDES stormwater permit with input from the Department of Ecology. The outcome of the TMDLs for Sinclair and Dyes inlets will affect the Navy's permit. **[Partnerships]**

The technical steering committee includes Kitsap Health District, the cities of Bremerton, Port Orchard, and Bainbridge Island, and 2 wastewater treatment plants. This technical steering committee reviewed the monitoring plan for the fecal coliform TMDL.

The Navy, Ecology and EPA Region 10 form the management team for ENVVEST. The team meets once or twice annually. The technical steering committee actively reviews all ENVVEST projects. Due to their interest in maintaining a healthy shellfish harvest, the Suquamish Tribe, Washington State DOH and Kitsap County Public Health form a regulatory work group that informs the technical steering committee.

Monitoring Programs

Project ENVVEST chose to develop the TMDL for fecal coliform as a first project due to the partners' greater experience with this parameter. ENVVEST participants collected more than 1,200 fecal coliform samples from Sinclair and Dyes Inlets and the surrounding watershed. In addition, the Navy used historical data on fecal coliform from Kitsap County Health District, DOH and Kitsap County Surface and Storm Water Management. With these data, they characterized fecal coliform sources and estimated loading to the Inlets. They are currently using these data to develop a cleanup plan for the Sinclair/Dyes Inlet watershed. ENVVEST has also developed models to simulate stormwater runoff and loading into the watershed as well as fate and transport of fecal coliform in the Inlets. Ecology's Manchester Laboratory analyzed FC samples. **[Focus on Priorities]**

ENVVEST has developed a sampling plan to synoptically sample the top 10 cm sediments from stations in Dyes Inlet, Rich Passage and Port Orchard Passage. This occurred in conjunction with clean up monitoring following the remediation and dredging of sediments for Operable Unit B Marine, a CERCLA site near the Bremerton Naval Complex as well as sampling from areas adjacent to the Shipyard. The results of this study will determine future 303(d) listing of Sinclair and Dyes Inlets for metals.

As part of PSAMP, Washington Department of Fish and Wildlife collected bottom-dwelling fish and invertebrate species from several reference locations to analyze tissues for PCBs, metals and pesticides. The department will use the data to assess the status and trends of chemical contamination in fish and macroinvertebrates. **[Integrate Individual Disciplines and Programs]**

ENVVEST has also conducted ambient and sediment studies in the watershed. They have also conducted stream benthic invertebrate sampling.

Data Management

Data are available on Ecology's website at the following link:
<https://fortress.wa.gov/ecy/publications/SummaryPages/0610054.html>

[Data Accessibility]

Funding

The Department of Defense provides the funding for ENVVEST activities. **[Incentives]** Partner agencies provide in-kind support by staffing projects.

Successes

The fecal coliform study helped to identify and reduce combined sewer overflows (CSOs) in the City of Bremerton's stormwater collection system. As a result of the fecal

coliform data that the Project ENVVEST study generated, DOH reopened several shellfish areas for harvest. **[Better Management Decisions]**

PUGET SOUND ASSESSMENT AND MONITORING PROGRAM

Washington State's legislature created the Puget Sound Assessment and Monitoring Program (PSAMP) as a partnership for Puget Sound. Partner agencies include the Washington State Departments of Ecology, Natural Resources, and Health. US Fish and Wildlife and the King County Department of Natural Resources are also partners in this program.

Geographic Area

PSAMP monitors the marine waters of Puget Sound. Sites include nearshore and open water locations. Some freshwater monitoring also takes place in tributaries of the Puget Sound Basin.

Focus

Since its inception, PSAMP has focused on ambient monitoring of the waters of Puget Sound. In 2005, PSAMP's management reviewed monitoring programs and determined that the organization did not adequately assess the effectiveness of management strategies. Management recommended inclusion of some effectiveness, validation, and other assessment monitoring programs in addition to the ambient monitoring.

Governance Structure

The Puget Sound Action Team (PSAT) determines the design and scope of PSAMP. Action Team support staff includes a science coordinator and a representative on the PSAMP Management Committee. Partner agencies staff the PSAMP management committee and the Steering Committee. The agencies implement the studies directed by the Action Team and the committees. The Management Committee oversees program planning, staffing, implementation, data management, and budget. Agency scientists comprise the Steering Committee. This committee coordinates planning, design, and implementation of programs.

Monitoring Programs

The Department of Ecology's Ambient Monitoring Program collects and analyzes monthly samples from about 30 stations in the Puget Sound Basin. The staff monitors total suspended solids, fecal coliform bacteria, metals, temperature, nutrients, dissolved oxygen, and other parameters. Ecology's Ambient Marine Sediment Monitoring Program monitors sediment chemistry and toxicity and sediment dwelling organisms throughout the Sound. Ecology also has a Marine Water Monitoring Program that provides monthly data on temperature, salinity, dissolved oxygen, turbidity, bacteria, and other parameters.

The Department of Health monitors fecal coliform bacteria concentrations in shellfish growing areas around Puget Sound six to twelve times per year at several locations. Health also measures concentrations of paralytic shellfish poison in shellfish from several locations in Puget Sound.

The Department of Natural Resources maps aquatic vegetation. It conducts inventories and monitoring of marine plants and animals.

The Department of Fish and Wildlife monitors contaminant concentrations in five fish species. They also conduct bottom trawls to estimate ground fish abundance. Fish and Wildlife also surveys marine birds and harbor seals.

Data Management

Each agency is responsible for posting data. The PSAMP website contains many links to the appropriate agencies' databases.

Funding

State agencies request funding in the Governor's budget through the Office of Financial Management. PSAMP receives funding for coordination from the state's General Fund.

Successes

PSAMP has provided data and analysis on the health of Puget Sound and assessment of the cumulative effects of management actions at the regional scale. For example, PSAMP has clearly documented and reported extensively on oxygen depletion of Hood Canal. The DOH shellfish component is very effective in assessing bacterial contamination and identifying specific corrective actions.

SAN FRANCISCO ESTUARY INSTITUTE

The San Francisco Estuary Institute (SFEI) is a non-profit organization composed of more than seventy stormwater management districts, dischargers, industries, and Publicly Owned Treatment Works (POTWs). Membership also includes city and county government agencies, utilities, environmental organizations, and federal agencies, including EPA Region IX and the USGS.

Geographic Area

The Institute's Regional Monitoring Program (RMP) focuses on San Francisco Bay and its tributaries. San Francisco Bay-Delta is a tidally influenced estuary, the largest estuarine system on the entire west coast of the Americas.

Focus

SFEI is a science-based organization that conducts monitoring and research studies of the San Francisco Bay ecosystem. Initially, the Regional Monitoring Program for Trace Substances (RMP) focused on copper and nickel pollution in the Bay. Later research included mercury, PCB, and PAH contamination. Current efforts also include pyrethroid insecticides, which have largely replaced organophosphate pesticides in the San Francisco Bay area. RMP continues to focus on trace pollutants while sometimes conducting ancillary monitoring of other water quality parameters. **[Focused on Priorities]**

Governance Structure

The RMP is managed by the Program Manager. Decisions are made by consensus. The Technical Review Committee advises the Steering Committee with input from the three workgroups: Contaminant Fate, Sources, Pathways, and Loading, and Exposure and Effects. Local scientists, regulators, and other scientists with expertise in areas of interest to the RMP serve on the three workgroups. The steering committee allocates funds, determines the budget and manages the program. The Technical Review Committee oversees the activities of the three workgroups.

The workgroups meet 2-3 times per year to plan and implement pilot and special studies. The RMP meets 2-3 times per year. Scientists outside the agency regularly participate, providing a level of peer review. The formal peer review process takes place every five years. **[Scientific Credibility] [Flexibility]**

Monitoring Programs

Status and trends monitoring form the basis of the RMP. The organization focuses on six major objectives:

1. Describe distribution and trends of pollutants in the estuary.
2. Project future contaminants
3. Describe sources, pathways and loading of pollutants entering the Estuary.
4. Measure pollution exposure and effects on biota.
5. Compare monitoring information to relevant benchmarks such as water chemistry and toxicity, sediment chemistry and toxicity, sport fish and TMDL targets.
6. Effectively communicate information from a range of sources.

RMP maintains five long-term water quality sites and seven long-term sediment sites to assess trends. The sampling design follows the Environmental Monitoring and Assessment Program (EMAP) design for its status and trends monitoring. Water and sediment sampling for the Status and Trends component now occurs once a year in the summer for both trace elements and trace organic contaminants, as well as concurrent water quality and sediment quality measurements. Bivalve bioaccumulation sampling also occurs in the summer.

Many long-term special studies have been conducted by RMP. Due to hazards to human health and wildlife, RMP has monitored methylmercury in the water column and sediments for the past few years. Because methylmercury tends to accumulate in the food web, RMP also measures concentrations in silverside fish in the Bay and sport fish in tributaries. Although no longer in use, PCBs remain problematic in the Estuary. The RMP monitors several sites for PCB contamination in sediments in the Bay and sport fish tissues in the Bay and tributaries. California's legislature recently banned the use of two PBDE mixtures due to concerns about effects on wildlife and human health. Current monitoring efforts seek to determine the effectiveness in the ban and the necessity of further actions to reduce PBDE loading into the Bay. RMP monitors the most abundant PBDE congeners, 47 and 209, in water and sediments around the Bay. Selenium tends to accumulate in the tissues of diving ducks, and is therefore monitored throughout the Bay.

The city of San Jose conducted extensive monitoring of copper, one of RMP's major concerns during the early '90s. This monthly monitoring helped determine that dissolved copper levels remained relatively static over the last 9 years, allowing for less frequent sampling. RMP has recently begun monitoring levels of perfluorinated chemicals (PFCs) (found in Teflon®, Gore-tex®, and coatings in food packaging, stain repellents, etc.). Their association with cancer and developmental abnormalities are a cause for concern. (From 2006 *Pulse of the Estuary*)

In addition to water chemistry, RMP participants conduct surveys of aquatic life including fresh and marine fish, birds and invertebrates. They also conduct toxicity testing of

effluent on test organisms like *ceriodaphnia* (water flea). RMP also uses box models to project future contaminant status of the Bay.

Data Management

All data are available on the website. RMP staff maintains the database using the State of California's SWAMP database format. RMP stakeholders input the data. The state's Water Board, dischargers, RMP staff, the scientific community and environmental groups frequently utilize the data. For the general public, SFEI publishes its annual report, *The Pulse of the Estuary*. This document contains many illustrations and graphs and presents the data analysis in an easy-to-read format. **[Information is Relevant and Accessible]**

Funding

Cash contributions from dischargers, large and small POTWs, industry, stormwater management districts, and the dredging industry fund SFEI's RMP. Flow determines allocations among the categories of stormwater, industry, dredging, etc. Members of each contingent have discretion over further distribution of funds. **[Financial Accountability, Trust and Transparency]**

Successes

Participation in the RMP has steadily increased since its inception in 1993. Originally, the regulators agreed to give the dischargers some relief in monitoring requirements in exchange for participation in the RMP. **[Incentives, Flexibility]**

Site-specific requirements led to changes in pollutant loadings to San Francisco Bay. Studies of copper and nickel in the Bay determined that impairment due to these metals was unlikely, freeing resources to focus on other priorities like persistent and bio-accumulative toxins (PCBs, PBDEs, pesticides, etc.) As a result, the Estuary's waters were de-listed for copper and nickel. **[Policy Guides Science]**

RMP data forms the basis for 303(d) listings in the San Francisco Bay Estuary. These data help to set priorities for clean up plans. RMP's data on PBDE provided the impetus to ban use of this chemical in California. The RMP strives to answer questions outside of mandates as well. **[Monitoring Results are Helpful in Making Policy Decisions]**
[Multi-Disciplinary]

SOUTHERN CALIFORNIA COASTAL WATERS RESEARCH PROJECT

The Southern California Coastal Waters Research Project (SCCWRP) is a joint powers agency formed in 1969 focusing on research in the Southern California Bight. Its members include the Orange County Sanitation District, City of Los Angeles Bureau of Sanitation, County Sanitation Districts of Los Angeles County, California State Water Resources Control Board, California Regional Water Quality Control Board (Los Angeles, San Diego and Santa Ana Regions), City of San Diego Metro Wastewater Department, US EPA Region IX, Ventura County Watershed Protection District, County of Los Angeles Department of Public Works, and County of Orange

Geographic Area

SCCWRP focuses on the marine waters of the Southern California Bight, beaches and estuaries.

Focus

The Project's 2006-7 Research Plan states the following objectives:

- Understand background contaminants and natural variability.
- Identify and quantify sources of anthropogenic pollutants.
- Develop assessment tools.
- Assess the effects of management efforts to prevent and mitigate negative impacts.

Governance Structure

SCCWRP has a two-tiered system in which science and policy remain separate. A twelve-member Commission includes dischargers and regulators working together to protect the marine waters of the Bight. The Commission's Technical Advisory Group (CTAG) includes representatives from each member agency. CTAG members generally have technical backgrounds and hold positions within their respective agencies that allow them to view the activities of SCCWRP from both a scientific and managerial perspective. CTAG members serve as liaisons between SCCWRP staff and member agencies. They keep their agencies informed of SCCWRP activities, provide technical and scientific review, and collaborate with SCCWRP on special research projects.

Monitoring Programs

Regional monitoring comprises about twenty percent of SCCWRP's work. Permit holders conduct most of the monitoring. To answer the spatial extent of pollutants, SCCWRP uses random, probability-based sampling similar to the EMAP approach. Stratifications include river mouths, small and large POTW outfalls, bays and harbors, national marine sanctuary, and Mexican coastal waters. They use multiple indicators including sediment chemistry, toxics, benthic invertebrates, fish tissue contaminants and pathology, and biomarkers. SCCWRP adds special projects each time it conducts regional monitoring. They recently included studies of endocrine disruptors in fish. SCCWRP also currently radio dates the top 2 centimeters of sediment at 30 random sites to better assess temporal trends. Additionally SCCWRP has recently begun monitoring freshwater streams.

SCCWRP conducts extensive status and trends monitoring every five years in place of routine monitoring efforts. These regional surveys give a "big picture" of the condition of the Southern California Bight.

Data Management

Due to standardization of methods, SCCWRP participating organizations share compatible data. They agree on interpretation of data. All sixty-six organizations provide data for the database.

Funding

SCCWRP members pay dues. Cost neutral participation is the goal.

Successes

Twenty-six laboratories conduct analysis for SCCWRP programs. They successfully achieved standardization of methods through the development of manuals. The regulated agencies conduct most of SCCWRP's monitoring. Therefore, dischargers and regulators collaborated on writing methods manuals. Instead of devolving into the lowest common denominator, participating organizations actually tended to upgrade equipment and methods. All 26 labs underwent intercalibration exercises resulting in improved quality assurance (QA).

Previous to SCCWRP's implementation of regional monitoring, assessing the condition of Southern California's marine waters was impossible. Monitoring data existed for only 2% of the Bight. QA was nonexistent and data were not integrated. Different entities conducted monitoring on a site-specific basis, using different protocols and measuring different constituents. Therefore no one could put results into context. SCCWRP's standardization of methods and improved sampling design led to better assessment of condition. The cumulative distribution function of the database proved most helpful in setting priorities. It identifies the worst 10% (most impacted) sites and the best 10% (reference) sites. Subpopulation analysis identifies the percent of area in each subpopulation vs. the percent of contaminant. For example, bays and harbors comprise only 6% of the Bight's area, but contain thirty-five percent of the mercury pollution. This indicates a need to prioritize these areas for cleanup.

STORMWATER MONITORING COALITION

The Stormwater Monitoring Coalition (SMC) consists of thirty-six permit holders under an area-wide permit principally held by Orange County, California. Regional Water Quality Control Boards, the issuers of permits, also participate. Representatives of the Southern California Coastal Water Research Project (SCCWRP) and CalTrans are also members.

Geographic Area

The SMC concentrates its efforts in much of Southern California. In addition to Orange County, participating jurisdictions include the city of San Diego, Ventura County, Los Angeles County, and the urban portion of San Bernardino County.

Focus

The SMC strives to develop technical information necessary to better understand stormwater impacts and tools to more effectively improve stormwater decision making. Current projects include standardizing chemistry and toxicity approaches, QA and methodology, and regional bio-assessment.

The SMC collaboration prioritizes projects with the support of multiple agencies. Often permit requirements, for example indices of biotic integrity, drive this support. **[Policy guides science]** Participants determine what projects will make meaningful improvements in water quality. Recently that has led to a shift in focus from legacy pesticides, like DDT to a focus on whole toxicity.

Governance Structure

SMC is a partnership between regulators (Regional Water Quality Control Boards) and regulated stormwater dischargers. The organizing structure is a multiparty implementation agreement with an initial timeframe of five years. SMC members meet quarterly to discuss ongoing and future projects. Decisions are made by consensus; however, not all members participate in every project. Outside agencies including NGOs often participate in projects as each project has its own set of participants and is not necessarily bound by SMC agreement. A single agency takes the lead for each project. Often SCCWRP takes this role, but the SMC's LID project lead is San Bernardino County. A separate agreement is executed for each project. Member organizations fund only projects in which they choose to participate.

Monitoring Programs

SMC is a member of Southern California Coastal Water Research Project (SCCWRP) and participates in the marine water quality assessment every five years. Previously, this five-year assessment has focused on the waters of the Bight shelf, but research has shown that pollutants travel farther from the coast. The USGS has collaborated on sampling these more distant marine waters. SMC's interest in the interface between more inland and marine waters has led to the funding of storm event sampling in the Santa Ana River.

Watershed scale programs focus on constituents of concern due to their impact on beneficial uses. These are iterative programs that seek to identify water bodies of concern and determine the sources of problems. Parameters measured include bacteria, toxins, metals, trash and debris, and pesticides.

Data Management

SMC data are posted on the CalSWIM database. SMC is currently developing its own website which will enable quicker updates and more accessible metadata.

Funding

Member organizations fund projects as they deem appropriate. Often projects receive state and federal matching funds. The state awarded the current LID project a \$600,000 grant in addition to the \$500,000 from SMC members.

Successes

SMC has successfully completed, or is currently in the process of completing these five projects.

- Standardization of sampling and analysis, defining monitoring questions of interest, creating an optimum program design, assessment of current monitoring programs and initial lab inter-calibration exercise.
- Microbial source tracking to discriminate between human and non-human sources of contamination—host-specific PCR seems to best fulfill the requirements.
- Study peak-flow impacts and the relationship between increased impervious cover and the physical condition of streams. Results from stream classification system indicate that streams near developed sites are unstable.
- Develop regionally consistent bioassessment monitoring with standard methods and a calibrated regional assessment tool.
- Lab inter-calibration.

Several organizations have agreed to join the SMC. They include CalTrans, City of Los Angeles, EPA Region 9, EPA office of Research and Development, and the State Water Resources Control Board.

TEXAS CLEAN RIVERS PROGRAM

Texas Clean Rivers is a Texas state government program. It is the funding mechanism of the coordinated surface water quality monitoring program. The TCRP consists of the Texas Commission on Environmental Quality and the river authorities of the state of Texas. The Lower Colorado River Authority (LCRA) is the lead agency for TCRP in the Colorado River Basin.

Geographic Area

TCRP is a statewide program and monitors water quality in all river basins of the state. The largest river is the Colorado. Because of its size, the Colorado River Basin is divided among three river authorities. The Lower Colorado River Authority coordinates most of TCRP's monitoring programs, including those outside the Lower Colorado River basin.

Focus

TCRP conducts surface water quality assessments for the state's 305(b) report. The Texas Commission on Environmental Quality (TCEQ) uses this data to compile its 303(d) list. The Texas river authorities often take the lead in TMDLs. TCRP is a state program, but local jurisdictions contribute data.

Governance Structure

TCEQ has oversight of the Texas Clean Rivers Program and determines which lakes and stream segments to monitor. The steering committee, comprised of stakeholders, also influences monitoring decisions. The stakeholder group includes wastewater and water right permit holders, local government representatives, environmental organization and volunteer monitoring groups. This stakeholder group holds annual meetings that are widely publicized and open to the public.

Monitoring Programs

TCRP partners routinely monitor water chemistry. They monitor sites all across the state for nutrients, fecal coliform, dissolved oxygen, pH, temperature, and other parameters. The focus of these routine monitoring programs is protecting habitat for fish and other aquatic life and ensuring the safety of contact recreation. They monitor less frequently and at fewer sites for toxics and metals.

LCRA monitors the aquatic community at ten locations on the Colorado River and its major tributaries twice a year. This involves collecting aquatic insects, analyzing aquatic habitat, and identifying and quantifying fish.

Data Management

All data are available on the LCRA website. TCRP has rigorous Quality Assurance standards that must be met by parties who wish to submit data. The Coordinated Monitoring Schedule has links to existing data.

Funding

Wastewater dischargers and water rights fees provide most of TCRP's funding. The wastewater discharge fees are proportional to the amount of discharge. TCRP applies these fees directly to monitor local surface waters to which these entities discharge.

Successes

LCRA's innovative coordinated monitoring schedule provides an extensive database for major water quality monitoring efforts in Texas. The website can be located at <http://cms.lcra.org/>. It provides a searchable map that links to the program's most recent monitoring data. This data management program proved so useful that TCRP contracted with LCRA to coordinate monitoring statewide.

Comparison Chart of Eleven Regional Monitoring Programs across the United States

NAME	REG MONT'NG Geog. scale of effort	INTEGRATE- PROGRAMS: stormwater, groundwater ESA, local.	FOCUSED PRIORITIES: Few key priorities or many	PART'SHIPS: W/ stakeh'ders & regulators/ Regulates	COLLAB AND IND AUTH ARE BALANCED: Stakeh'ders have equitable influence	POLICY GUIDES SCIENCE	Scientific Credibility: Agreed upon data, analysis and reports
<p>COMPREHENSIVE EVERGLADES RESTORATION PLAN -RECOVER \$10 million for 10 years for entire program. Uses federal funds to supplement major monitoring by 4 agencies USGS, EPA, Florida Department of Environmental Protection (FLDEP), and South Florida Water Management District (SFWMD). Program is focused on developing a baseline for the system, especially for the 68 planned recovery projects (which will be done over 60? years). Performing baseline assessment with the plan to look at changes in system health as projects are implemented.</p>	Entire South Florida ecosystem, including lakes and estuaries.	Only partially– but their monitoring is ecosystem-wide. Performance measures look at water quality and other features in a bigger way. Monitoring stations are at specific locations to look at ecosystem scale (regional indicators) to get baseline info for a physiographic location.	<p>Many. Big broad picture – ecosystem health. Science-based approach.</p> <p>Water Quality Team focused on (1) data collection, (2) data management, (3) data analysis, (4) reporting, and (5) quality assurance.</p>	<p>Limited. Co-led by USACE and the SFWMD. Limited leadership group: federal, state resource agencies, and two tribes. No NGOs, counties or cities.</p> <p><i>Water Quality Team (WQT). Public invited to some meetings but not all. Minutes and agenda are possibly published on the web.</i></p>	<p>Participants have equal influence but many stakeholders not included. Interagency monitoring is the goal but only partially realized to date. Example: Miami Dade County data is helpful but have not asked them to refocus. No projects there yet.</p>	<p>Very science based. Goal is to feed the management decision making from science. Prior to this effort, recognized that high-level managers were not bought in. High level folks were brought in at multiple forums – a) science-only, b) science/management interface, and c) management–only meetings.</p>	<p>Yes, for the data that they are collecting (they are doing protocol standardization). Assessment guidance document.</p> <p>Extensive public process to develop conceptual models and overall project goals. Documents were created in a collaborative fashion and were peer reviewed.</p>
<p>PSNS & IMF ENVIRONMENTAL INVESTMENT (ENVVEST) Partnership between US Navy, Ecology, and US EPA to understand the sources, pathways, and sinks of the contaminants entering Sinclair and Dyes inlets.</p>	Sinclair and Dyes Inlets and watershed	Fecal coliform study focused on stormwater. Treatment facilities and local health departments were also involved.	Few priorities-- 303(d) listings for fecal coliform, metals and PCB	EPA manages the Navy's permit with input from Ecology. (All 3 are major partners.)	Yes. The Navy is the technical lead, but Ecology and EPA provide the final review.	Yes, focus on TMDLs	TMDL monitoring must comply with QAPP
<p>CHESAPEAKE BAY PROGRAM Partnership between states and USEPA funded by Congress and member states at a ratio of 80/20 at a level of approximately \$15B over six years.</p>	Large scale-all of Chesapeake Bay and watershed	Yes, stormwater, TMDLs, air and land cover monitoring	Many priorities	No, regulated community not represented.	Yes. States and EPA are signatories NGOs, academics, other federal agencies, and business are non-signatory partners.	Yes, monitoring used to determine pollutant caps	Yes, peer reviews and split sample exercises
<p>GREAT LAKES. Great Lakes National Program Office (EPA) conducts monitoring programs that sample the water, aquatic life, sediments, and air in order to assess the health of the Great Lakes ecosystem. \$4.7 million for monitoring per year (Congressional Funds). - <i>Base Program: Ambient monitoring of Great Lakes</i> - Cooperative Monitoring Program with Canada - Special programs to address 42 areas of concern (only delisted 6 of these so far), lake-wide mass balance studies, fish (toxics).</p>	Large scale - Great Lakes+ (nearshore, offshore with limited forays into tributaries)	No. Although their program is looking across the ecosystem and addresses toxics, invasives, etc., they do not integrate with other regulatory programs nor do they work up the watersheds.	Huge agenda of priorities. Addressing: Biological integrity and such questions as "can you drink the water, eat at the fish, swim?"	<p>Yes, but... States, tribes, US EPA, Canada. No NGOs?</p> <p>Lake wide management plans (\$1 million per year per lake). That is where the states are heavily integrated in.</p> <p>Industry group CGLI sits at table for Great Lakes Binational Toxics Strategy sessions.</p>	Massive effort and so input is at high level. Each of 8 member states or 2 provinces appoints 3 voting members. No NGOs, business, cities, etc.	Guided by 80 indicators that were developed by Lakes Ecological Conference. (SOLEC) 1992: How do they relate research and monitoring and translate into something useful for managers.	EPA's work yes. But overall there is an assumption that the work is high quality (using EPA protocols, etc). Biannual conference: Look at all 80 indicators (representing various parts of the lake) each time, with a focus each time on a specific category (i.e., biological integrity).
<p>SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT. JPA FUNDED BY MUNICIPALITIES, STATE AND FEDERAL SOURCES.</p>	So California Bight	Yes (mostly), NPDES, biota, stormwater. (not groundwater or ESA)	Many priorities	Yes, but. Regulators and regulatees serve on Commission. No NGOs	Equal votes of Commission Members. No NGOs	Guided by key questions: Is it safe to swim? To Eat the fish? Is the ecosystem healthy? Are the natural resources being protected?	Yes. Science based approach using a separate entity that focuses almost solely on science and research

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NAME	REG MONT'NG Geog. scale of effort	INTEGRATE- PROGRAMS: stormwater, groundwater ESA, local.	FOCUSED PRIORITIES: Few key priorities or many	PART'SHIPS: W/ stakeh'ders & regulators/ Regulates	COLLAB AND IND AUTH ARE BALANCED: Stakeh'ders have equitable influence	POLICY GUIDES SCIENCE	Scientific Credibility: Agreed upon data, analysis and reports
SAN FRANCISCO ESTUARY INSTITUTE Non profit organization funded by member organizations at a level of approximately \$3M per year.	San Francisco Bay and its multiple estuaries. Reg. and watershed scale.	Yes, it is a coordinated multi-media regional monitoring program (dredging, stormwater, NPDES, invasives)	Many priorities.	Yes. NGO with board of scientists, environmentalists, regulators, local governments, and industries.	On-going forum of stakeholders	Yes. Management Questions guide monitoring goals.	Yes. At first skeptical but now trusted by stakeholders.
SO CAL STORMWATER MONITORING COALITION. Coalition of municipal stormwater agencies with cooperation of state agencies. Goal is to develop a) technical information to better understand stormwater mechanisms and impacts, and b) tools to improve stormwater decision making.	Southern California watersheds (stormwater focus)	No, stormwater focus for now	Yes – key stormwater priorities	Yes, but. Multi-party agreement that includes regulatees and regulators. No NGOs	Yes, but. NGOs have no voice. Each agency does own work with some collaboration on agreed issues.	Yes. Stormwater policy is guiding monitoring questions	Yes – on the limited items that they are collaborating on
OREGON WATERSHED ENHANCEMENT BOARD Interagency coordination at state level (cabinet level) to develop shared priorities and protocols for collecting data. Dependant upon receiving data from other agencies for several performance measures. Funded by state lottery. Similar to the Shared Salmon Board here in WA, OR has an infrastructure to distribute funding (for staff and supplies) to watershed – probably about 25% to 30% is for monitoring (fish, sediment, air and water) – last year they distributed a total of 94% of 70 m. Agency expires in 2014.	Entire state. Coordinates the collection of data about natural resource conditions throughout Oregon. Area that is most lacking is bridging gap between local and statewide efforts.	Somewhat. Better coordination with state programs because governance is designed to have state agencies working together on priorities and programs.	Many priorities. Duo goals - salmon restoration focus, and watershed health (all elements). Being developed now: Watershed priorities – restoration priorities – that would guide needs at local level. The state is not telling each watershed what to do. No statewide list of priorities.	Yes. But this is nonregulatory related program and there is no regulator/regulatee relationship. They recognize the need that they need to connect the dots better – to show how voluntary efforts are contributing to regulated obligations or to show that they are making it unnecessary to do regulated monitoring. OWEB pays for a lot of programs and projects that implement actions that are called for by reg programs (ex: pay for moving a dairy that is causing nutrient problems in a stream).	Yes, oversight by 17 members from state agencies, commissions, federal agencies, tribes, and public which makes decisions on a consensus basis. Federal agency reps do not vote on decisions of the board. The effort is very much grounded in locally based decisions and priorities. They are facing how to bridge this – to balance local and statewide.	Yes. Trying to answer questions of getting species off the ESA list by addressing science. They have performance measures from legislature to address ESA species. Leg and management ask key questions and they try to answer.	Getting there. Coordination of data. Coordinated protocols planned Water Quality sampling is conducted by several state agencies. Data is put into a collective database (there are some weak links). (also pay for wq coordinator for local councils) No programmatic approach to answering a set of questions. Questions are looked at by local districts. Coho effort recently was not able to use the local data (data not entered or out of date).
Cooperative Monitoring, Evaluation, and Research Committee (CMER) Partnership with WA state natural resource agencies and forest products industry. CMER committee is a monitoring, evaluation and research program established by forest practices board to ensure implementation of WA's forests and fish report.	Non-federal lands in Washington State	Yes, focus on ESA and CWA, FF&W	Yes-focused on ESA listings for salmonids and amphibians	Yes, Ecology and timber industry	Yes, all members participate in setting priorities	Yes, monitoring used to determine effectiveness of Forest, Fish and Wildlife rules	Yes, protocols outlined in manual. All participants follow
Puget Sound Assessment and Monitoring Program (PSAMP) Interagency Partnership, managed by Puget Sound Action Team—mostly state agencies and King County DNR, US Fish and Wildlife. PSAMP is a multi-agency effort to monitor the health of Puget Sound	Puget Sound marine waters	Some, PSAMP has recently begun to add effectiveness and validation monitoring as well as continue ambient program. Agencies can use their information to focus research and specific investigations.	Many priorities— biological resources, physical environment, toxics, bacteria and nutrients.	Regulated community not represented	All stakeholders have equal influence.	Not designed to determine cause and effect, ambient monitoring provides information on status and trends	Each participating agency has QA/QC, each project under QAPP

Comparison Chart of Eleven Regional Monitoring Programs across the United States

Name	TRUST AND TRANSP'NCY: Processes are clear	Flex. in Achieving Mandates: Effectively achieves mandates in flexible way	MONITORING RESULTS HELP MAKE POLICY DECISIONS	INFORMATION IS RELEVANT AND ACCESSIBLE	INCREASED CONSISTENCY ACROSS A REGION	LIMIT THE SCOPE AT FIRST	FINANCIAL ACC'NTB'TY	INCENTIVES USED
Comprehensive Everglades Restoration Plan - RECOVER	Yes. All laid out in documents and on web. Interagency forums: Based on: 1. Best science, fair process (everyone is heard), 2. quality products and 3. keeping on schedule.	Not applicable. They would like to begin to interface with other programs because the program is not sustainable over the long term (i.e., after Congressional Funds expire).	Yes. Adaptive approach will lead to adjustments as science indicates that changes are needed.	Sort of. They are developing a mega-database that will incorporate STORET data and other sources. Each agency or University maintains their own dataset.	Protocols are being applied by many but not everyone. A nice feature is access to real time USGS data for each station while they are standing at the site (to see water level were at that site over time).	Not really. Big picture scientific-based ecosystem wide approach.	MAP track system that tracks Congress-appropriated funds and also other funding agencies such as EPA and USGS. Reporting system looks at: Are the reports on time? Has the monitoring occurred and on time?	No. Agencies encouraged to participate because the info generated is useful for their other work.
PSNS & IMF Environmental Investment (ENVVEST)	Many meetings are open to the public and minutes are posted.	Yes, the goal of the project is to find innovative solutions to water quality problems	Yes, some shellfish areas were reopened.	Data are available on Ecology's website	Kitsap Co. and cities joined partnership—agreed to same standards	Yes, focused on fecal coliform initially	Unclear, information on DOD funding is difficult to track.	Department of Defense funding
Chesapeake Bay Program	Yes, executive committee and other meetings are publicized on website, minutes and reports posted	Yes, pollutant caps and other regulations reflect monitoring and research data, often revised.	Yes, some reductions in nutrients. New pollutant caps implemented	Data is managed by Old Dominion University. QA software ensures quick turnaround time and quality.	All member states agree to standards for a healthy Chesapeake Bay. All 6 states agreed on pollutant caps.	Yes, just did nutrients initially	Yes, latest budget is available on website. Budget Steering Committee is charged with making sure CBP projects meet strategic goals when they set funding priorities.	Federal matching funds (80/20%)
Great Lakes	Public process for Lakes Management Programs but not for specific monitoring programs. Peer review of fish program.	Not really applicable. But because they have to share funds (match) they have to work out specifics benchmarks after agree on overall objectives. .	For major issues, feedback loop back to Managers. End points – benchmarks – are developing this, but barriers because of Canada – they disagree with US approach. Fish Adv are all agreed upon.	Data is avail to public on web (100% is on the web) Metadata is posted when they can. Some of the files are too big.	EPA's work is consistent across the regions. States are not consistent.	Monitoring in place for 30 years. Modest funding and it grew. Started out with big goals.	46 tribes, 3 EPA regions, 2 countries, 2 provinces, 8 states, hundreds of municipalities. Governance is a major challenge. 3-4000 entities to notify. GAO audits them. EPA in-house protocols for tracking funds.	Yes! Money. They can offer grants and match for special efforts. Also can offer free time on their research vessels in exchange for 100% access to all data generated (academics, state agencies, etc).
Southern California Coastal Water Research Project	Yes. Minutes of Commission meetings posted. Annual reports.	Yes. Initial focus was to help answer questions for WQ permits	Yes. Feedback loop to decision makers. Lab intercalibration studies and bacteria studies have had large impact.	Yes. On web and in annual reports	Yes. Major focus on consistent protocols and lab intercalibration	Yes. Initial focus on POTW NPDES permits	Yes, each funded program responsible for budget.	If you join, you get to play. Their program does not point finger at any specific outfall.
San Francisco Estuary Institute	Yes. Peer-reviews.	Yes. Compare monitoring information to relevant benchmarks. Adaptive management focus.	Yes. Impacts seen at Water Board Hearings (TMDLs, permits), Dredging Management, Fishery Closures	Yes. Web page, annual reports.	Yes, within bay	Yes. Program has built over time.	Yes, expenditures outlined in annual report.	Compliance is defined by financial donation to regional monitoring program

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So Cal Stormwater Monitoring Coalition	No web page. Not sure if there is transparency to the public.	Yes. Feedback loop to permits is intended.	Projects selected by consensus Not all SMC members have to participate in all projects	Not sure if it is accessible. No web page	Yes on the specific items that they are collaborating on	Yes! Five years only.	Projects funded individually—project lead responsible for quarterly and annual reports including expenditures,	Yes (limited). If join then will potentially be able to influence permits. Often participation in a project can offset existing monitoring requirements. Tools developed often save costs in the long run.
Oregon Watershed Enhancement Board	Performance measures are clearly defined and reported in annual report. Only partial effort to date. This is a major initiative that they are currently undertaking. They are making investments to beef up web (for example, a restoration database).	They are a flexible process. They are trying to get beyond the paradigm of existing regulatory framework.	It is their goal but only partially realized at this time. They have a new director who has made this a big focus. They have direct link back to decision makers because they are a cabinet level agency and a fiscal responsibility with the \$70 million per year – people are looking over their shoulders. Oversight of the monitoring is by the OR Plan Monitoring Team, which evaluates project applications. No designated staff for wq. In evaluation of projects, DEQ would look at the wq monitoring (e.g., Are they generating data that is useful?) They are supposed to be providing coordination but this is still under development. No integration with local munies	Most data report on the web page. Their monitoring is very relevant because it ties into their programs and they reject projects that are not relevant (according to the partner agencies). They have a diverse board that looks at this. Team minutes are not posted yet but soon. Board meeting notes are avail. No closed meetings but not advertised (except board meetings).	Yes – increased with state agencies and water councils – got conversations started and more uniform. But not across the board yet.	Yes! Still maturing – haven't wrapped in all aspects. Started smallish (\$1 million and 5 staff) and are building. Most of money goes towards capital investments.	Performance measures include financial items	Gives out state money and license plate funds for restoration projects. Also match the federal funds for projects. They have specific technical guidance and protocols that they require projects to use. They won't pay people to do work if they aren't using protocols.
Cooperative Monitoring, Evaluation, and Research Committee (CMER)	Open meetings, but not well publicized. Monitoring data and analysis are published in annual reports	Adaptive management focus	Feedback loop is a goal.	Yes, available on Ecology's EIM database.	Yes, participating agencies follow manual	Yes, focus on salmon habitat.	Yes, process for financial accountability in CMER Charter.	Forest products industry can participate in research and monitoring- - willing to cooperate with regulators.
Puget Sound Assessment and Monitoring Program (PSAMP)	Yes, annual reports, data available online.	Status and trends mostly, doesn't focus on mandates	Monitoring data useful to natural resource management agencies to identify and remedy problems. Example-- data on fish contaminants led to rockfish consumption advisory for Sinclair Inlet	All data available on website, links to participating agencies provided	Yes, due to communication between programs, although less of a focus on causes and effects of specific discharges, i.e. stormwater.	Ambient monitoring focus	PSAT provides financial oversight	Puget Sound Action Team staff provide technical and professional support, also funding from state General Fund to coordinate programs.