

AB 982 Public Advisory Group

**Recommendations on Ambient Monitoring  
by the AB 982 Public Advisory Group**

Report to the  
State Water Resources Control Board

October 2000

DRAFT FINAL

## Executive Summary

- The PAG does not support the State Board's July 2000 draft Surface Water Ambient Monitoring Program (SWAMP).

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- While probabilistic monitoring may be appropriate for larger water bodies such as the ocean and bays, the PAG does not agree with the general application of probabilistic study design in the draft SWAMP and instead requests that the plan be based primarily on a rotating basin methodology as recognized by the U.S. EPA.

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- The state should strive to design a comprehensive, statewide ambient monitoring program that provides support for other water quality programs.

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- The PAG recommends a rotating basin approach under which each Region would be divided into five areas consisting of one or more hydrologic units. The major watercourses and tributaries in one of these areas for each Region would be monitored for a one-year period at least once every five years. The Regional Boards would, in a coordinated, unbiased effort, strategically select the specific, long-term monitoring sites at major sub-drainage area discharge points (tributaries) of each hydrologic unit, based on regional and state needs. The Regional Boards would also integrate in quality data from other agencies and organizations. The goal is complete spatial and temporal coverage of each Region at least once every five years.

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- The PAG would like to emphasize that coordinated Regional Board involvement in study design and sampling is critical to providing a comprehensive, effective monitoring program that results in identifying degrading and improving conditions in waterways.

- The design of the program should not be limited by fiscal constraints or resources. Prioritization of tasks may occur, based on a coordinated framework that emphasizes regional priorities and needs, as is necessary to accommodate final funding availability.

- A Scientific Peer Review Committee should be convened by the State Water Resources Control Board to provide periodic review and evaluation of the State's comprehensive monitoring program.

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## I. Introduction

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This report presents the AB 982 Public Advisory Group's (PAG's) joint comments and recommendations on the State Water Resources Control Board's effort to develop a Comprehensive Surface Water Quality Ambient Monitoring Program, [as outlined in the July 2000 draft report](#) and considering changes shared with several members of the PAG on October 4, 2000.<sup>1</sup> The Public Advisory Group is made up of twelve members of the regulated community and twelve representatives of the environmental community and their alternates.<sup>2</sup>

The draft Surface Water Ambient Monitoring Program (SWAMP) is intended to respond to legislative mandates on the need to establish a comprehensive, statewide ambient monitoring program, a need that came about as a result of the state's poor record on monitoring ambient water quality conditions. For example, the latest 305(b) report states that California monitors only 9% of its rivers and streams. To address this problem, the Legislature required the State Water Resources Control Board (State Board) to develop the following programs (see Attachment 3 for full text of legislative mandates):

- “comprehensive program to monitor the quality of state coastal [waters and watersheds]” (AB 1429);
- “comprehensive surface water quality monitoring program for the state” (AB 982);
- “plan for implementing a comprehensive program for monitoring ambient surface water quality and groundwater quality” (Supplemental Report of 1999 Budget Act).

The members of the PAG recognize and appreciate the Administration's new commitments to water quality monitoring that have taken place during the last year. The commitment of staff positions at Regional Water Quality Control Boards (Regional Boards) and budget changes to support monitoring are important first steps in the process of developing and implementing an effective monitoring program for the state and are a significant improvement over the past.

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However, the PAG [members](#) have several concerns related to the draft SWAMP proposed for submittal to the California State Legislature. These concerns have been expressed in PAG meetings, as well as in written communications, without significant written response on the part of State Board staff. The PAG, as a whole, felt this separate report was necessary in order to communicate to the State Legislature these concerns.

In particular, the July 2000 draft SWAMP does not adequately address the significant need for truly “ambient” water quality monitoring. Instead, the July 2000

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<sup>1</sup> The latest written SWAMP report that the entire PAG has had an opportunity to review is the July 2000 draft. Several changes were made to this draft in October 2000; these changes were shared with (but not given to) three representative members of the PAG Monitoring Subcommittee on October 4th.

<sup>2</sup> See Attachment 1 for list of PAG members.

draft SWAMP proposes a monitoring design that is biased towards problem areas. During the March 23<sup>rd</sup> PAG meeting, it was unanimously agreed that "the state should create an ambient monitoring program that addresses all surface waters of the state using consistent monitoring, sampling and analysis methods, standardized data quality assurance protocols, and objective, consistent and centralized data management" (emphasis added). Further, the PAG members collectively agreed that "this program should include *both* potentially clean and polluted areas," and that the Regional Boards should "establish monitoring priorities for the water bodies within their jurisdiction." The PAG's concerns regarding the need to include both clean and polluted areas are not sufficiently addressed in either the July draft SWAMP or the October revisions.

Given the monitoring efforts currently underway, including monitoring requirements in NPDES permits, citizen monitoring, collaboration with various academic institutions, and other efforts, this is a significant opportunity for the Regional Boards to coordinate these existing efforts and leverage resources so as to make the statewide monitoring effort more comprehensive. However, the July 2000 draft SWAMP's focus on probabilistic monitoring seeks to impose upon the Regional Boards a more inflexible, "one size fits all" methodology for ambient water quality monitoring that cannot integrate with other monitoring efforts.

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A primary responsibility of the PAG monitoring work, as stated in AB 982, is to assist the State Board in the evaluation of its water quality program structure and effectiveness as it relates to the state's monitoring and assessment programs. In order for the State Board to fulfill its own requirements under AB 982 and other legislative mandates, it must prepare a report by November 30, 2000 describing a proposal for a comprehensive surface water quality monitoring program, including associated steps and costs for developing and implementing the program and appropriate funding mechanisms. Since March 2000, PAG members have been meeting routinely to discuss the State Board's water quality program elements, their effectiveness, and necessary changes to ensure the development of a proposal for a truly comprehensive ambient surface water quality monitoring program. During these frequent meetings, the PAG has provided the State Board with constructive input on the framework for a workable comprehensive ambient monitoring program.

To date, there have been some fundamental disagreements between the PAG and State Board staff regarding the framework content of the July 2000 draft SWAMP, as indicated above and described in more detail below. Some of these appear to have been alleviated to some degree in the October 4<sup>th</sup> amendments shared with the monitoring subcommittee representatives. The PAG believes, however, that additional changes need to be made before the final report is adopted by the State Board.

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It is of the utmost importance that ambient conditions in water bodies be accurately characterized so that future trends in water quality conditions can be identified along with identifying specific existing or emerging water quality problems. Furthermore, accurate assessment of water quality is needed to support other water quality program efforts such as 305(b), 303(d), TMDLs, and NPDES permitting

activities. In addition, data collected under a comprehensive monitoring program can be useful in determining the effectiveness of water quality programs. The comments below are aimed at improving the draft SWAMP in order to meet these goals.

## II. PAG Consensus Recommendations on General Monitoring Plan Framework

The PAG members found consensus on many areas related to the framework of the state's ambient monitoring program. During PAG meetings, the members developed the following recommendations for the state's ambient monitoring program that were approved by consensus:

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- "The State Water Resources Control Board should develop an umbrella program that monitors and interprets that data for each hydrologic unit at least one time every five years. By umbrella program, we mean a minimum baseline monitoring program that focuses on all waters of the State and does not focus on individual problems."
- "The Program will have consistent monitoring methods with respect to sampling and analysis, data quality objectives, and centralized reporting requirements."
- "The Regional Water Quality Control Boards should be able to conduct monitoring for Regional priorities and that monitoring shall be done in accordance with protocols and methodologies laid out in the Program. The Regional Boards shall utilize Statewide templates and protocols in developing their monitoring programs."
- "The Program shall require that to the extent possible, all existing data is verified, useable, and accessible to the public through a centralized location. Future data collected will be recorded along with methods and QA/QC documentation through some State issued template so that it is coordinated."
- "The State Water Resources Control Board should formally adopt a Policy, and a means to implement the Policy, for the Regional Water Quality Control Boards on what constitutes reasonable minimum acceptable credible information. The Policy should also include the methods for determining whether to list or delist water segments on the Section 303(d) list consistent with Federal law."
- "The State Water Resources Control Board should formally adopt a Policy to maximize the Regional Water Quality Control Boards consideration of existing data during the 303(d) process."
- "The SWAMP should be designed based on the need for a comprehensive program instead of funding."

- "The SWAMP should not focus on problem areas but instead should be designed with the goal of accurately characterizing water quality in all watersheds throughout the state. The PAG believes it is equally important that water quality in "non-problem" areas be characterized to establish a baseline for future degradation determinations."
- "Currently, the SWAMP framework does not make any distinction between inland watershed monitoring strategies and ocean monitoring strategies. For instance, different monitoring program design strategies should be used for monitoring open ocean conditions, ocean shoreline conditions, enclosed bays/estuaries, open watersheds, and closed (no-outlet) watersheds. In addition, special monitoring program design considerations should be given when monitoring watersheds in urban areas. In other words, a one size fits all monitoring strategy (e.g., a probabilistic based sampling approach) is inappropriate."
- "The monitoring program should be designed as a component of an adaptive management approach to water quality improvement."

In summary, the PAG members – regulated and environmental community members alike – agreed that the state’s monitoring program should (a) address both clean and problem waters, with no bias towards one or the other; (b) be designed based on need, not budget; and (c) address all waters in the state, rather than merely a statistically representative sample.

As currently drafted, however, the SWAMP is slanted towards focusing attention on known problem areas instead of focusing attention on establishing baseline conditions for all water bodies within the state. The SWAMP should have goals and a framework that results in the collection of ambient data that can be used to address basic questions such as:

- What are the ambient conditions of the waters, and have they been characterized accurately?
- Have the temporal and spatial variations in water quality been accurately identified?
- How and why are conditions changing over time?
- Do monitoring efforts support/integrate/complement other existing [programs](#)?
- What are the general geographic locations of areas of concern?
- Where are emergent problems (due to both natural conditions and man-made) coming from?

The SWAMP should provide a coherent, comprehensive framework to considers the needs of existing and future programs and provides tools to analyze and understand data and turn it into accessible information. The water quality data produced by a truly comprehensive SWAMP will prove invaluable for making important determinations such as the condition of a water body and the effectiveness of water quality improvement

programs. A systematic method of ambient monitoring of all watersheds (“hydrologic units”), marine waters and nearshore coastal areas in the state should be developed and implemented on a five-year cycle. Specifically, the PAG recommends use of a “rotating basin” approach that enables collection of detailed information within watersheds. This monitoring would be targeted at detecting emerging problems in order to correct them early when they are more tractable and measuring long-term trends on a large spatial scale. Some types of monitoring (such as pathogen indicator monitoring) are already being conducted by other agencies, citizen groups, universities, and others; these types of data should be collected and used on a statewide basis to the extent possible.

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### III. PAG Concerns Regarding July 2000 Draft SWAMP

The July 2000 draft SWAMP proposes a “two component” monitoring system as depicted in Sections V and VI. The first component, described in Section VI of the draft report, is a “probabilistic monitoring” plan that involves selecting monitoring sites randomly to provide information that should be statistically representative of the overall water quality in the area sampled. The second component, described in Section V, tests sites either picked randomly or strategically by the Regional Boards in order to provide more detailed information on particular problem areas, with a focus on identifying sites for listing or de-listing under CWA Section 303(d).

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#### A. Use of Probabilistic Monitoring

The PAG is concerned about two aspects of the draft in particular. First is the allocation of a set amount of funds to the probabilistic monitoring approach. The PAG members have repeatedly expressed that the implied mandatory use of a probabilistic study design approach is a poor choice because the questions that this sort of design answers have extremely limited use in guiding management actions. The approach produces information at too broad a level of generalization and will not provide the type of data required to support the Legislature’s and Cal-EPA’s expressed need to provide spatial information suitable for targeting the most effective and cost-effective opportunities for water quality improvement.

U.S. EPA has recognized and accepted at least two general approaches to statewide monitoring throughout the United States:<sup>3</sup>

- the rotating basin approach
- the probabilistic approach

The rotating basin approach uses a site selection process based on the goal of attaining complete spatial coverage of the basin under study and identifying the relative contribution of sub-areas within the basin to the overall water quality of the basin. In California’s case, the PAG recommends a rotating basin approach under which each Region would be divided into five areas consisting of one or more hydrologic units. The

<sup>3</sup> Additional information on the rotating basin and probabilistic study design approaches is found in Attachment 2.



major watercourses and tributaries in one of these areas for each Region would be monitored for a one-year period at least once every five years. The Regional Boards would, in a coordinated, unbiased effort, strategically select the specific, long-term monitoring sites at discharge points for the major sub-drainage areas of each hydrologic unit, based on regional and state needs. The Regional Boards would also integrate in quality data from other agencies and organizations. The goal is complete spatial coverage of each region at least once every five years.

The probabilistic approach uses a random or “stratified” random site selection process with the goal of providing information that is statistically representative of the overall water quality in the basin. Unlike the rotating basin approach, this approach provides no information about the relative contributions of areas within the basin. The July 2000 draft SWAMP focuses on the use of probabilistic monitoring to develop generalized conclusions about the overall, statewide quality of California’s waters.

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The probabilistic study design is most effective for monitoring within water bodies such as large bays, estuaries, nearshore regions, and lakes. In watersheds, a study design based on the form and function of the watershed and the stream and river network (the rotating basin approach) provides more knowledge per unit of effort whether the unit of effort is dollars or staff hours. Even the U.S. EPA has had difficulty with the effectiveness of the probabilistic approach applied at a regional level: “[t]he U.S. Environmental Protection Agency Environmental Monitoring and Assessment Program [a probabilistic approach] attempted to design and implement a national level monitoring program to assess the Nation’s environmental resources by building a series of regional monitoring programs throughout the country. This showed promise but proved too costly and succumbed . . . .”<sup>4</sup>

It is the view of the PAG that the probabilistic approach focuses attention on developing abstract percentages of water quality statewide, rather than characterizing ambient water quality for each drainage area in the state. In other words, using this approach may tell us that a certain percentage of a specific type of water body in California is impaired for a particular pollutant, but it will not tell us the quality of any individual waters. Characterizations necessarily should address variations based on time and location of sampling, as well as identify specific sources of pollution, potential pollution and clean water. This is data that probabilistic monitoring, which looks at the state’s waters much more broadly, often cannot generate.

While probabilistic monitoring may be of some use for larger waters such as the ocean and bays, useful interpretation of probabilistic monitoring data for inland surface waters will be difficult at best, as it requires staff to make assumptions based on limited data from only a few tested waters. Moreover, the probabilistic monitoring approach can only evaluate the cumulative success of the state’s water policies and programs, rather than both cumulative and individual program successes, further limiting its usefulness.

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<sup>4</sup> Hashimoto, J., U.S. EPA, Weisburg, S., SCCWRP, from “Monitoring: Critical Foundations to Protect Our Waters,” *Proceedings of the National Water Quality Monitoring Conference* (1998).

The probabilistic monitoring approach is a “one-size-fits-all” strategy that largely ignores the types of watersheds monitored and program needs. For example, the Regional Boards generally would not be able to integrate this program and its results into their WMI chapter activities. The state’s ambient monitoring program should allow the Regional Boards sufficient flexibility to develop approaches within the monitoring framework that meet their needs, while coordinating closely with other appropriate entities to maximize use of the aggregate data to develop an accurate picture of water quality statewide.

The probabilistic approach also cannot be readily integrated into most of the other, numerous monitoring activities throughout the state, such as those conducted by other agencies and citizens. The state thus loses the ability to capitalize on these other monitoring programs.

The proposed allocation in the draft SWAMP of a set percentage of funds to probabilistic study design is a de-facto admission of defeat in attaining comprehensive spatial coverage of the waters of California. The state needs to choose a monitoring framework that will meet the needs of existing and foreseeable programs to improve or maintain water quality conditions, and will yield the most useful and meaningful data for the money spent.

The resources that would be ineffectively employed through the use of a probabilistic-based design should be made available to Regional Boards to be incorporated in a coherent, place-based (“rotating basin”) approach to monitoring. Probabilistic monitoring should be limited to larger open waters, such as the ocean and large bays and lakes, and inland only where needed to complement and enhance similar, existing U.S. EPA monitoring efforts, such as U.S. EPA’s Environmental Monitoring and Assessment Program (EMAP).

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Monitoring site selection should be conducted by the Regional Boards along with refined program objectives in the course of their Watershed Management and Basin Planning activities. Some Regional Boards, such as Region 3, have already demonstrated effective approaches to monitoring their watersheds using various designs which are capable of supporting place-based assessment efforts and are transferable to the state-wide level. Examples of discretionary site selection methods which may be employed include:

- Probabilistic (sites selected based on a random or stratified random approach)
- Stream Network (sites placed at major tributaries and along the main stem)
- Lagrangian (samples taken along the main stem of a river, stream, or drainage channel)
- Paired Watershed (sites placed at the discharge of a control watershed and a study watershed)
- Upstream / Downstream (sites placed upstream and downstream of activity to be measured)

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As noted above, the PAG supports a “rotating basin approach,” which uses a site selection process based on the goal of attaining complete spatial coverage of the basin under study every five years. Among other things, the advantages of using this rotating basin approach are that it would:

- Ensure the development of a cost-effective framework that truly reflects a comprehensive ambient monitoring program for all water bodies in the state.
- Provide a comprehensive look at all the state’s water bodies, rather than just some, primarily by leveraging and reallocating existing resources.
- Allocate monitoring funds towards activities that will maximize the state’s ability to assess the success rate of its many water quality programs.
- Be more amendable to integration with other agencies’ and organizations’ quality monitoring programs than a program focused mainly on probabilistic monitoring. It is both cost-effective and strategic to work with other agencies and groups that have water quality monitoring and improvement responsibilities, as it both increases the amount of data available and creates partnerships that can be used to improve water quality based on the monitoring results.
- Generate meaningful results that could be aggregated upwards to a statewide scale, allowing for both water body-specific and statewide water quality summaries.

Both the rotating basin and probabilistic approaches have merit in certain applications, which are further addressed in Attachment 2. For purposes of developing an ambient monitoring program that serves California’s most pressing needs, the PAG strongly recommends a focus on the rotating basin approach, with probabilistic monitoring used only as needed and appropriate.

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Arbitrary allocation of resources to probabilistic monitoring, as described in the latest changes to the July 2000 draft SWAMP, using funding percentages for each of the two components cannot be scientifically justified, nor does it recognize and respect the needs of the Regional Boards. Instead, the Regional Boards, based on input from stakeholders where appropriate, should be able to prioritize ambient monitoring efforts within their own regions. While the PAG recognizes and appreciates the changes in the latest draft SWAMP to allocate less funds to probabilistic monitoring and more to specific site monitoring, the PAG is also concerned about allocation of those funds when the actual budget is approved by the Legislature and the Governor. The “Prioritization” section of the report needs to be revised to emphasize the need for site-specific monitoring over the less practically useful results provided by probabilistic monitoring.

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#### B. Monitoring of Both Problem and Clean Waters

The PAG’s second major concern with the July draft SWAMP relates to monitoring of both clean and polluted waters. Section V. of the current SWAMP emphasizes use of testing to identify “problem” waters. While it does not prohibit the

Regional Boards from testing clean waters, its emphasis on use of clean waters only as “reference sites” indicates that the State Board views clean sites only as a tangent, rather than a resource to be protected. The directed focus on problems areas alone will not provide information in support of anti-degradation goals or allow for the collection of reference site data required to establish background conditions and reasonable specific numeric objectives. This lack of focus on tracking and protecting cleaner waters leaves them vulnerable to degradation. The objective of the SWAMP is to create an ambient monitoring program, not to collect data in problem areas. A true ambient program will include all water bodies, whether or not they are identified as a problem.

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This issue is particularly frustrating to the PAG because PAG members have brought up this consensus recommendation repeatedly since March 2000 and still have seen no changes in the draft SWAMP (including the October version) that address this issue. We strongly urge the members of the State Board to consider seriously the recommendations outlined in Section V. of this document with respect to including clean waters as an integral part of the draft SWAMP.

### C. Compliance with AB 982 Requirements

The PAG thought that the members of the State Board would find it helpful to have comments tailored towards the specific elements that the SWAMP must include in order to comply with AB 982. These are described below:

AB 982 Requirement 1 - *Physical, chemical, biological, and other parameters about which the program shall collect and evaluate data and other information and the reasonable means to ensure that the data is accurate in determining ambient water quality.*

#### Comments:

A) The SWAMP should employ a rotating basin site selection approach for watershed monitoring (National Water Quality Monitoring Council, 1998), as opposed to focusing on a statewide probabilistic approach. This will ensure cost effective monitoring which adequately addresses all waters, and which can effectively aid Regions in source identification as mandated by the Strategic Vision of the California Environmental Protection Agency (July, 2000).

B) The SWAMP should make a commitment to the use of response indicators such as bio-criteria as a basis for setting water quality guidelines and determining the condition of the waters of the state. Monitoring data to establish appropriate desired conditions is an essential component in the use of bio-criteria and other biological response indicators. California lags other states in the use of biological endpoints as a basis for decisionmaking. The Clean Water Act mandates assessment of the biological integrity of the nation's waters in addition to the chemical and physical integrity.

AB 982 Requirement 2 - The use of models and other forms of information not directly measuring water quality.

Comments:

A) Many types of loading calculations and estimates require modeling because sufficient historical records of contributing factors such as stream/river flow and rainfall do not exist. A centralized repository of model information and data that covers the entire state of California is needed to reduce staff time and duplication of effort at the Regional Board level and provide for statewide consistency. This could be as basic as a State Board website that contains links to Information Services. The SWAMP should identify and commit the resources needed to this task.

B) Geographic Information Systems (GIS) techniques and data play an important role in monitoring and assessment of water quality. Baseline data sets, similar to and compatible with the State Board's existing Geographic Water Body System data set, should be made available by the State Board to the Regional Boards at a central location on the world wide web. Data layers such as watershed boundary delineations and hydrography should be established as standards and specific protocols for improvements and updates to these data layers should be established in the SWAMP.

C) A remote sensing component should be added to the SWAMP that provides for the use of satellite image analysis and aerial photography, which, for example, can track sediment plumes and other pollution visually. This has the potential to be a useful tool for augmenting water quality data to create more comprehensive evaluations.

AB 982 Requirement 3 - Reasonable quality assurance and quality control protocols sufficient to allow sound management while allowing and encouraging, where appropriate, data collection by entities, including citizens and other stakeholders, such as dischargers.

Comments:

A) The State should develop an overall Quality Assurance and Control Plan for use by the regions. Quality assurance and quality control protocols should be developed in a manner consistent with the requirements for non-U.S. EPA organizations, as defined in the Code of Federal Regulations. U.S. EPA Quality Staff issues documents that specify how to satisfy these federal regulations. These documents contain policy statements that identify and discuss mandatory elements of EPA's Quality System for organizations receiving financial assistance from EPA. A complete set of guidance documents is available at: [www.epa.gov/quality/qa\\_docs.html](http://www.epa.gov/quality/qa_docs.html).

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B) As urged by the SAG, the State Board should appoint a statewide QA/QC officer as well as provide adequate funding for dedicated QA/QC officers at each of the Regional Boards. The statewide QA/QC Plan should be reviewed biennially to ensure appropriate protocols and techniques and to reflect new technologies and findings that may arise in the field of water quality assessment.

C) In order to combine data from various sources, a protocol for establishing defined data quality descriptions and data quality objectives should be established. Requirements for data precision and accuracy vary with the actual use of the data. A variety of definable categories need to be established in order to effectively utilize data from sources outside the SWAMP program.

D) The State Board has added volunteer monitoring coordination staff over the last year. This staff should be engaged in a dialog with staff working on the SWAMP program to fully integrate volunteer/citizen monitoring as a component of SWAMP. Provisions should be made for the various purposes of volunteer monitoring which range from educational purposes to rigorous scientific studies. The need for different levels of quality control and data quality objectives must be recognized.

E) In addition to QA/QC associated with monitoring, the use of data collected by other agencies and organizations requires that the data be stored in a format consistent with data collected by SWAMP. Accordingly, key statewide databases should be converted to the new U.S. EPA STORET at the state level and made available to the regions. Descriptions of the data quality objectives associated with external databases should also be provided. The PAG reiterates that specific databases should be identified for this purpose and that the monitoring plan commit to accomplish these tasks.

*AB 982 Requirement 4 - A strategy to expeditiously develop information about waters which the State presently possesses little or no information.*

Comments:

A) The PAG-recommended rotating basin approach to monitoring site selection will yield data that can be used to make determinations regarding water quality conditions in specific water bodies. By characterizing the discharges of sub-watershed areas, both sources of impairment and ambient water quality can be more readily quantified. The probabilistic approach currently proposed in the draft SWAMP does not address this need.

B) The maintenance of a long term array of monitoring sites to characterize watersheds can serve anti-degradation goals through both trend evaluations and reference condition assessments.

AB 982 Requirement 5 - *A strategy for assuring that data collected as part of monitoring programs and any associated quality assurance elements associated with the data collection will be made readily available to the public.*

Comments:

A) Just as the scientific elements of a monitoring program need detailed design in order to work, the presentation of information and data in the SWAMP require a 'before the fact' design. All too often data is collected and stored and too little thought is put into how to communicate or use the information produced by the data.

B) Information communication methods should be developed concurrent with scientific design. The Web can provide opportunities for effective information dissemination. In addition to providing a convenient method of widely distributing reports, the Web makes it possible to provide access to the underlying data. Access to the data itself can provide stakeholders and interested parties the ability to independently evaluate conclusions and assessments derived from the data.

Requirement 6 - *A strategy for assessing and characterizing discharges from nonpoint sources of pollution and natural background sources.*

Comments:

A) The PAG-recommended rotating basin approach to monitoring site selection can produce data that can be used to make determinations regarding the location and spatial extent of water quality conditions. By characterizing the discharges of sub-watershed areas, both sources of impairment and ambient water quality can be quantified. The probabilistic approach currently proposed in the draft SWAMP does not adequately address this need.

B) In addition, the rotating basin approach can enable broad scale statistical analysis of the performance of management practices in a cost-effective way. Methods developed by the U.S. EPA National Nonpoint Source Monitoring program can be employed to measure the performance of management efforts and program effectiveness over time.

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Requirement 7 - *A strategy to prioritize and allocate resources in order to effectively meet water quality monitoring goals.*

Comments:

A) The draft SWAMP does not seem to clearly establish a strategy for allocation of monitoring resources. Currently some Regions benefit from millions of dollars supplied by programs such as the Southern California Water Research Project, the

San Francisco Estuary Institute Regional Monitoring Program, and the Cal-Fed CMARP program. Other Regions which contain some of the state's more pristine waters cannot employ the underlying economic models used to support these types of programs because they lack the high number of permitted dischargers, the population, and/or the highly visible environmental problems. This has the effect of diminishing the protection of some of the state's waters.

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B) The monitoring plan needs more detailed treatment of monitoring resource allocations. These allocations should be developed in a dialog that includes both the State Board and the regions.

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C) AB 982 requires the State Board to develop a strategy to set priorities and allocate resources in order to effectively meet water quality monitoring goals. In order to maintain the integrity of the Watershed Management Initiative (WMI), the goals of the proposed SWAMP must integrate with the goals developed for the WMI. The focus of the monitoring efforts should be on documenting ambient water conditions of all waters within the State, and not specifically targeting on problem areas.

#### IV. Scientific Advisory Group Comments

The State Board convened a Scientific Advisory Group to comment on the AB 982 process. State Board staff posed the following question to the panel:

Are the proposed monitoring approaches sufficient to answer the questions posed (*i.e.*, “Is it safe to swim?”; “Is it safe to drink the water?”) and achieve the more specific monitoring objectives?

The scientists could not answer this question in the affirmative based on the monitoring plan framework as written. The fact that this fundamental question could not be answered is a problem. Both the method of determining the questions presented in the draft SWAMP and the methods of addressing the questions warrant additional scientific review.

SAG members commented that certain detailed pieces of information, such as the number of sites to be allocated and the viability of individual indicators, could not be judged for efficacy due to a lack of more detailed specific objectives. SAG members also seemed to be in agreement regarding the need for a formal scientific review process for the entire program and for the establishment of a forum of scientists from various agencies and organizations, including the academic community, to meet regularly to provide coordination of efforts and a channel of communication between monitoring programs and efforts. The SAG also agreed that a QA/QC officer should be housed at the State Board, and that each Region should have at least a half-time QA/QC expert to assess monitoring programs and incoming data.



The PAG has requested the minutes of the Scientific Advisory Group meeting but has not yet received any written material documenting the Scientific Advisory Group comments or recommendations.

The SAG strongly advised that the proposed SWAMP be periodically updated based on feedback from the Regional Boards and reviewed by a Scientific Advisory Committee. Regional Boards and an independent panel of scientists should periodically (at least biennially) review the SWAMP's scientific and programmatic effectiveness. The scientists involved in conducting SWAMP monitoring should be participants in the selection of the Peer Review Committee.

The SAG should also periodically review the QA/QC portion of the SWAMP to ensure that the requirements are kept up-to-date. The State Board should consider hosting periodic meetings with the Regional Boards' dedicated staff members and other interested parties conducting watershed monitoring to review program and QA/QC requirements.

From time to time, it would be extremely beneficial for the State Board to survey the successes of existing monitoring programs being used within and outside the State. For instance, USGS has progressed in their efforts of implementing its National Water Quality Assessment Program (NAWQA) in three watersheds within the State. This program uses a fixed station network approach so that trends in water, sediment and biota can be studied. Learning from the successes of other monitoring programs will help to avoid wasting valuable funding resources.

## **V. Priority Recommended Changes to Draft SWAMP**

As previously mentioned, the PAG members have been able to review only the July 2000 Draft SWAMP. Three members of the Monitoring Subcommittee were shown (but not given) revisions to this document. These comments are based on notes from those revisions, as well as the July 2000 document itself. The PAG may submit additional comments once the next draft or final report is available for review.

The PAG's recommended changes center on the two issues raised above: the over-application of probabilistic monitoring, and a focus on "problem" rather than all waters, including "clean" waters. The PAG appreciates staff's work in the October draft to address the PAG's other priority concern regarding development of a program based on need, not budget. The PAG's comments are divided by chapter below, with additional, more detailed comments in Attachment 4.

### **A. Draft SWAMP Section III. – "Program Goals"**

The goals should be revised to emphasize achieving a truly ambient program; *i.e.*, one that considers all waters, both impaired and clean. The top goal listed focuses on problem waters, which is not an appropriate focus for an ambient monitoring program.

B. Draft SWAMP Section V. – “Study Design: Identifying Specific Problems in Targeted Watersheds”

The very title of this section illustrates the frustration the PAG has had with the responses to PAG comments. While identifying specific problems is important, it is not the sole job of an *ambient* monitoring program, which must address all waters, clean or impaired. “Problems” in the title should be changed to “Conditions,” and the language throughout Section V. should be expanded to address clean water specifically, in addition to problem waters.

For example, the new language in Section V. states that the Regional Boards “may” monitor clean sites on a site-specific basis “if needed to compare with problem sites.” The PAG has stated repeatedly that this limited focus is insufficient. This language should be changed to state instead that the Regional Boards “*shall* monitor both clean and problem sites as needed to meet program goals, including but not limited to antidegradation mandates and policies.” Full consideration of clean sites would of course be addressed in any event through a rotating basin approach, as discussed next.

C. Draft SWAMP Section VI. – “Study Design: Documenting Ambient Water Quality Conditions in Potentially Clean and Polluted Areas”

Section VI. of the draft SWAMP focuses on using the probabilistic approach to meet to collect generalized water quality information, primarily for purposes of meeting Section 305(b) requirements. For the reasons described above, the PAG is concerned about the limitations of this approach.

The PAG instead supports a framework that will be able to address statewide questions while at the same time contribute to regional information needs. The PAG unanimously recommends a “rotating basin” framework, under which each Region would be divided into five areas consisting of one or more hydrologic units. The major watercourses and tributaries in one of these areas for each Region would be monitored for a one-year period at least once every five years. The Regional Boards would, in a coordinated, unbiased effort, strategically select the specific, long-term monitoring sites at major sub-drainage area discharge points for each hydrologic unit, based on regional and state needs. The Regional Boards would also integrate sound water quality data from other agencies and organizations. The goal is complete spatial and temporal coverage of each region at least once every five years.

This process could include a smaller amount of probabilistic (random) monitoring, as needed. Probabilistic monitoring should be limited to larger open waters, such as the ocean and large bays and lakes, and inland only where needed to complement and enhance similar, existing federal monitoring efforts, such as U.S. EPA’s Environmental Monitoring and Assessment Program (EMAP).

The process also would include additional, site-specific, “follow-up” monitoring of expanded reaches of selected areas of drainage into either impaired or cleaner waters, as needed to meet refined regional program goals, such as cause-and-effect relationships.

A summary of this approach is as follows:

**Statewide** - screening, pollution prevention, triage, long-term trends

- Sites primarily selected to monitor the discharge of sub-drainages within hydrologic units
- Sites selected randomly, using probabilistic approach, only where most needed and appropriate (*e.g.*, large bodies of water such as oceans)
- Sites selected without known impairment-based bias
- Sites are fixed/permanent in order to assess long-term trends
- Indicators should be capable of detecting previously unknown problems
- Indicators measured are consistent statewide within each parameter group

**Regional** - studies of special interest to regions (including impaired and/or clean waters)

- Sites either permanent or temporary
- Sites selected to maximize usefulness of data collected to regions
- Indicators should be capable of measuring the parameters of interest

The recommended “rotating basin” framework described above would address both the overall state information needs under 305(b) that are currently the focus of Section VI. of the draft SWAMP, as well as the site-specific monitoring requirements discussed in Section V. of the SWAMP.

It is our understanding that State Board staff would be interested in using the “rotating basin” approach if assured of its representativeness and practicality. The PAG members submitted materials towards those ends to State Board staff and are collecting additional materials to document the actual, current use of this approach in the state and its applicability in the SWAMP. If the rotating basin approach is adopted, Sections V. and VI. could be collapsed into a single section that outlines the rotating basin framework described above and notes that a smaller amount of additional monies should be set aside for additional, site-specific investigations as the Regional Boards determine is needed, based on the results of their basic ambient monitoring activities.

#### D. Draft SWAMP Section X. – Funding

As discussed in the Attachment 4 section on funding, the PAG has voiced numerous times its concerns about the problems associated with the State Board’s practice of designing a monitoring program based on existing or expected budget, not on need. The PAG thus welcomes and appreciates the significant work by staff to cost out in the latest (October 4<sup>th</sup>) draft SWAMP (Section X.) a monitoring program that is based on need, rather than on budget. The PAG also appreciates the fact that the majority of the funds in this new Section X. are allocated towards site-specific, rather than generalized

(i.e., probabilistic) monitoring. The PAG recommends that, if the SWAMP is revised to reflect use of the “rotating basin” approach to monitoring described above, these cost estimates be revised accordingly. Such revisions should take into account potential use of existing data collected by other agencies or groups that could be integrated with the rotating basin approach.

#### E. Draft SWAMP Section XI. – Prioritization

This effort to cost out monitoring in Section X. of the latest draft PAG needs to be coordinated with clear prioritization guidance, in the event the Legislature and Governor do not appropriate all of the funds requested. The PAG is concerned that without this guidance, limited funds may be over-allocated towards probabilistic monitoring at the expense of site-specific needs.

The PAG requests that staff add language to the “Prioritization” section specifying the parameters within which the Regional Boards must work to prioritize the funding they receive from the state. **We ask that this language indicate that the state’s main priority is site-specific, ambient monitoring needed to achieve the goals of the state’s various water quality programs, and that the section specifically state that the significant majority of appropriated monitoring funds will be used for such activities.** We also ask that this section specifically de-emphasize the use of limited funds for more generalized monitoring, which is primarily useful only for 305(b) reporting purposes, rather than from a program perspective. This language should state that probabilistic monitoring should be limited to areas where is it most beneficial and appropriate, such as for monitoring of large water bodies and for enhancement of inland programs such as EMAP.

Finally, it should also be made clear that, in the fortunate event that the State and Regional Boards receive full funding for monitoring, the allocation percentages provided in Section X. (which range from 70%/30% to 80%/20% Section V./Section VI. monitoring) will not be applied uniformly across regions, but will be only a statewide guideline, dependent on needs developed through coordinated Regional planning. Probabilistic monitoring is essentially of no value in some areas, and so rigid application of these percentages may yield wasteful spending on probabilistic monitoring in some Regions. The PAG recommends keeping 70-80% as a minimum for site-specific monitoring throughout the Regions, with more funding allocated to site-specific monitoring in Regions where probabilistic monitoring is inappropriate. The current draft SWAMP needs to be more clear on how these percentages will be allocated on a regional basis.

## VI. Conclusions

[The PAG, a public advisory body made up of stakeholders representing both the regulated community and the environmental/citizen group community, agree that the monitoring design proposed in the July 2000 draft SWAMP does not meet the mandates of AB 982, AB 1429, or the Legislature’s Supplemental Report of the 1999 Budget Act.](#)

The PAG also agrees that this design does not best meet the pressing needs of the Regions for better monitoring data, and does not provide the public or decisionmakers with the data they most need to determine the condition of the state's waters. The PAG recommends that the State Board adopt the rotating basin monitoring approach, specifically by merging the framework described in Sections V. and VI. into one section entitled "Identifying Ambient Water Quality Conditions," and incorporating the other language changes described in this chapter and Attachment 4. Changing the emphasis in the SWAMP to characterizing ambient water quality throughout the state, rather than focusing on problem areas and a handful of random sites, will help ensure that the intent of AB 982 is carried out effectively.

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## **Attachment 1 - Public Advisory Group Membership**

The PAG was established by the SWRCB in February 2000. The PAG is composed of 24 members: 12 members from the regulated community and 12 members from the environmental community. Each member has an alternate. The membership is as follows:

	<b>Member</b>	<b>Alternate</b>
<b>Regulated Community (12 members)</b>		
Production Agriculture	Tess Dunham, California Farm Bureau Federation	Brad Luckey, Imperial Irrigation District
Dairies	Paul Martin, Western United Dairymen	David Albers, Milk Producers Council
Rangeland	Bill Thomas, California Cattlemen's Association	Pat Blacklock, California Cattlemen's Association
Forestry	Mark Rentz, California Forestry Association	Mark Pawlicki, Forest Resources Council
Private Construction Stormwater	Cliff Moriyama, California Building Industry Association	Sat Tamaribuchi, The Irvine Company
Municipal Stormwater	Jim Scanlin, Alameda County Stormwater Program**	Armand Ruby, Larry Walker and Associates
Industry	Craig Johns, Kahl/Pownall Advocates*	Dave Arrieta, Western States Petroleum Association
Ports, Waterfront Organizations	Patti Krebs, Industrial Environmental Association	Ellen Johnck, Bay Planning Coalition Randal A. Friedman, U.S. Navy Region Southwest Environmental Department
Municipal Sewage (Publicly Owned Treatment Works)	Roberta Larson, California Association of Sanitation Agencies	Vicki Conway, County Sanitation Districts of Los Angeles County**
Counties	Jim Noyes, Los Angeles County Department of Public Works	Allen Campbell, Humboldt County Public Works
Cities	Dave Kiff, City of Newport Beach	David Tucker, City of San Jose
Water Agency	Peter MacLaggan, California Urban Water Agencies	David Bolland, Association of California Water Agencies**
<b>Environmental</b>		

	<b>Member</b>	<b>Alternate</b>
<b>Community (12 members)</b>		
	Linda Sheehan, Center for Marine Conservation**	Cori Fay Traub, Clean Water Action
	Jonathan Kaplan, Waterkeepers Northern California	Bill Jennings, Deltakeeper
	Bob Caustin, Defend the Bay	Bonnie Ahrens, Defend the Bay
	Donna Meyers, Coastal Watershed Council **	Alan Levine, Coast Action Group
	Marco Gonzales, Surfrider Foundation	Emily Roberson, California Native Plant Society
	Leslie Mintz, Heal the Bay	Heather Hoecherl, Heal the Bay
	Bruce Reznik, San Diego Baykeeper	Julie Hamilton, San Diego Baykeeper
	Lynn Barris, Butte Environmental Council	Zeke Grader, Pacific Coast Federation of Fishermen Association
	Barbara Vlamis, Butte Environmental Council	Allen Harthorn, Friends of Butte Creek
	Dave Paradies, Bay Foundation Morro Bay**	John Robinson, Heal the Ocean
	David Beckman, Natural Resources Defense Council*	Steve Fleischli, Santa Monica Baykeeper
	Nicole Capretz, Environmental Health Coalition	Laura Hunter, Environmental Health Coalition

\* PAG Co-Chair

\*\*PAG Monitoring Subcommittee

## **Attachment 2 - Monitoring Design Approaches**<sup>5</sup>

### **Rotating Basin Approach**

#### **Strengths:**

Organized systematic approach based on accumulating assessment over a fixed period of time.

Coincides with various management programs which are supported by the monitoring and assessment information (i.e. NPDES permit re-issuance, basinwide water quality planning, etc.)

Provides monitoring and assessment information at a local or reach specific scale so that the many issues which occur at this level can be addressed while providing the opportunity to aggregate upwards to a watershed, regional, statewide, or national scale once sufficient data exists.

There is more opportunity to define gradients of specific human disturbances/impacts with assessment information.

Develop and maintain tabs on reference/baseline conditions in a predictable and standardized time frame.

#### **Weaknesses:**

Visiting a basin/segment/watershed only once in five years may not be sufficient to satisfy all needs

### **Probabilistic Design**

#### **Strengths:**

Statistically robust design when applied to certain types of questions

Transcends state boundary limitations - can facilitate collaborative monitoring between states (if states involved all adopt the same approach)

#### **Weaknesses:**

Lacks site specific / issue specific resolution

Logistics are potentially more difficult (i.e. more difficult access to remote monitoring sites and more conflict over access to private land)

Reference condition may be more difficult to define on probability basis alone.

Local scale issues may be overlooked.

Visiting a basin/segment/watershed only once in five years may not be sufficient to satisfy all needs

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<sup>5</sup> Adapted from: Yoder, Chris O., 1998, "Important Concepts and Elements of an Adequate State Watershed Monitoring and Assessment Program," in *Proceedings of the National Water Quality Monitoring Council: Monitoring: Critical Foundations to Protect Our Waters*.



## **Attachment 3 – Legislative Monitoring Mandates: AB 982, AB 1429, and the Legislature’s Supplemental Report of 1999 Budget Act**

### **Assembly Bill No. 982**

Water Code Sec. 13191. (a) The state board shall convene an advisory group or groups to assist in the evaluation of program structure and effectiveness as it relates to the implementation of the requirements of Section 303(d) of the Clean Water Act (33 U.S.C. 1313(d)), and applicable federal regulations and monitoring and assessment programs. The advisory group or groups shall be comprised of persons concerned with the requirements of Section 303(d) of the Clean Water Act. The state board shall provide public notice on its website of any meetings of the advisory group or groups and, upon the request of any party shall mail notice of the time and location of any meeting of the group or groups. The board shall also ensure that the advisory group or groups meet in a manner that facilitates the effective participation of the public and the stakeholder participants.

(b) Notwithstanding Section 7550.5 of the Government Code, on or before November 30, 2000, and annually thereafter until November 30, 2002, the state board shall report to the Legislature on the structure and effectiveness of its water quality program as it relates to Section 303(d) of the Clean Water Act. The report may include the information required to be submitted by the board to the United States Environmental Protection Agency pursuant to Section 305(b) of the Clean Water Act, and any information required to be submitted to the Legislature pursuant to the Supplemental Report of the Budget Act of 1999. In formulating its report, the state board shall consider any recommendations of the advisory group or groups.

13192. (a) Notwithstanding Section 7550.5 of the Government Code, the state board, on or before November 30, 2000, shall assess and report to the Legislature on the State Water Resources Control Board’s and regional water control board’s current surface water quality monitoring programs for the purpose of designing a proposal for a comprehensive surface water quality monitoring program for the state. The report shall include a proposal for the program, including steps and costs associated with developing the full program, cost of implementation of the program after development, and appropriate funding mechanisms, including any fee structure. The board may include in the report information required to be submitted to the United States Environmental Protection Agency pursuant to Section 305(b) of the Clean Water Act, information required to be submitted pursuant to paragraph (1) of subdivision (c) of Section 13181, and any information required to be submitted to the Legislature pursuant to the Supplemental Report of the Budget Act of 1999.

(b) In considering and designing the proposal, the state board shall address factors that include, but need not be limited to, all of the following:

- (1) Physical, chemical, biological, and other parameters about which the program shall collect and evaluate data and other information and the reasonable means to ensure that the data is accurate in determining ambient water quality.
- (2) The use of models and other forms of information not directly measuring water quality.
- (3) Reasonable quality assurance and quality control protocols sufficient to allow sound management while allowing and Ch. 495 encouraging, where appropriate, data collection by entities including citizens and other stakeholders, such as dischargers.
- (4) A strategy to expeditiously develop information about waters concerning which the state presently possesses little or no information.
- (5) A strategy for assuring that data collected as part of monitoring programs, and any associated quality assurance elements associated with the data collection, be made readily available to the public.
- (6) A strategy for assessing and characterizing discharges from nonpoint sources of pollution and natural background sources.
- (7) A strategy to prioritize and allocate resources in order to effectively meet water quality monitoring goals.

(c) Nothing in this section affects the authority of the regional water quality control boards.

**Assembly Bill No. 1429**

Water Code Sec. 13181. (a) For the purposes of this section, the following terms have the following meanings:

(1) "Coastal waters" means waters within the area bounded by the mean high tide line to the three-mile state waters limit, from the Oregon to the Mexican borders.

(2) "Coastal watersheds" means the watersheds of tributary waters that drain to the ocean and significantly influence coastal water quality.

(b) (1) To the extent that funds are available for that purpose, the state board shall prepare and complete on or before January 1, 2000, an inventory of existing water quality monitoring activities within state coastal watersheds, bays, estuaries, and coastal waters. The information generated by preparing the inventory shall be made available as a report, and as an Internet-based index, that is available to the general public. A summary of the results shall be made available to the Legislature. The inventory shall include, but not be limited to, descriptions of all of the following:

(A) The sources of monitoring data, including federal, state, and local governments, the private sector, citizen groups, and nonprofit organizations.

(B) The monitoring methods being used by these sources.

(C) The location of the monitoring sites.

(D) Existing efforts to investigate the discharge of nonvolatile organic pollutants, including trace metals and nontarget organic chemicals, through storm drains into Santa Monica Bay, San Francisco Bay, Humboldt Bay, and San Diego Bay.

(2) Notwithstanding any other provision of law, the state board shall carry out paragraph (1) by contracting with institutions with expertise in coastal water quality monitoring, which may include the Southern California Coastal Water Research Project and the San Francisco Estuary Institute, to undertake the inventory.

(c) (1) To the extent that funds are available for that purpose, the state board, not later than January 1, 2001, shall prepare and submit to the Legislature a report that proposes the implementation of a comprehensive program to monitor the quality of state coastal watersheds, bays, estuaries, and coastal waters and their marine resources for pollutants, including, but not limited to, bacteria and viruses, petroleum hydrocarbons, heavy metals, and pesticides, as defined in Section 12753 of the Food and Agricultural Code. The proposed program shall utilize information available through the sources identified in paragraph (1) of subdivision (b), as appropriate, and shall avoid the duplication of existing and ongoing monitoring efforts to the extent feasible. The proposed program shall include, but not be limited to, all of the following:

(A) To the extent possible, a determination regarding the extent to which existing water quality objectives, sediment quality guidelines, tissue contaminant burden guidelines, and health standards are being met. Where information is not available to make this determination, the report shall identify methods for determining this information.

(B) To the extent possible, a determination regarding the sources of pollution in areas where objectives, standards, and guidelines are not being met. Where information is not available to make this determination, the report shall identify methods for determining this information.

(C) Methods for determining the degree of improvement or degradation in coastal water quality over time with respect to these objectives, guidelines, and standards.

(D) To the extent possible, estimates of the total discharges of pollutants into state coastal watersheds, bays, estuaries, and coastal waters from all sources.

(E) Standard protocols for sampling and data collection methods, to maximize the usefulness of the data resulting from the program.

(F) Recommendations for a standard format for reporting monitoring results to maximize access to and use of the data.

(G) The estimated costs of implementing the program and the proposed schedule of implementation.

(H) A description of the method by which the state board shall provide biennial reporting to the public on water quality within the state's coastal watersheds, bays, estuaries, and coastal waters, and recommended actions that should be undertaken to maintain and improve water quality in those areas.

(I) A description of the method by which the state board shall develop a system for monitoring mass contaminant discharges, including, but not limited to, heavy metals, PCBs, PAHs, and pesticides from storm water at the point of discharge. The system shall provide for the appropriate frequency of monitoring for each specific contaminant. The system shall be designed to identify the relative contribution of contaminants in storm water to the overall anthropogenic discharges into near coastal waters. To the extent possible, the system shall be designed to determine the effectiveness of best management practices in reducing the discharges of contaminants to near coastal waters.

(2) The state board shall consult with the San Francisco Estuary Institute and the Southern California Coastal Water Research Project to prepare the report. Notwithstanding any other provision of law, the state board may carry out paragraph (1) by contracting with institutions with expertise in coastal water quality monitoring, including, but not limited to, the Southern California Coastal Water Research Project and the San Francisco Estuary Institute, to prepare the report. The state board or its contractors shall convene workshops, symposia, and other professional and scientific meetings for the purpose of developing a consensus on the part of regulatory agencies and dischargers with regard to the appropriate methods to be used to monitor water quality on a statewide basis.

(d) The state board shall not use more than 5 percent of the funds allocated to implement subdivisions (b) and (c) for the administrative costs of the contracts permitted under those provisions.

## **Legislature's Supplemental Report of 1999 Budget Act**

The State Water Resources Control Board (SWRCB) is required by the Supplemental Language for the Fiscal Year (FY) 1999-00 Budget to report on the baseline ambient surface water and ground water monitoring programs as follows:

### Baseline Ambient Surface and Groundwater Quality Monitoring.

(a) By January 10, 2000, the SWRCB shall report to the Chairs of the Joint Legislative Budget Committee and Senate and Assembly fiscal committees on:

- The specific watersheds and coastal resources where ambient surface water quality monitoring has been conducted or contracted for during the three-year period beginning July 1, 1997. The report shall include the dates the sites were monitored, the type of monitoring, the pollutants monitored for, the results of the monitoring, and expenditures.
- The specific groundwater basins where ambient water quality monitoring has been conducted or contracted for during the three-year period beginning July 1, 1997. The report shall include the dates the sites were monitored, the type of monitoring, the pollutants monitored for, the results of the monitoring, and expenditures.
- A plan for implementing a comprehensive program for monitoring ambient surface water quality and groundwater quality, and how the Governor's 2000-01 budget proposal fits within this plan.

(b) The Legislative Analyst shall review and critique the report required in paragraph (a), and comment on its review at hearings on the 2000-01 budget. The Legislative Analyst's commentary shall include a report on the board's plan for implementing a comprehensive program for monitoring ambient surface water quality and groundwater quality.

## **ATTACHMENT 4: Additional PAG Comments and Recommendations on Ambient Monitoring**

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These comments further explain the positions of the PAG outlined in this PAG chapter. They are not intended to be exhaustive, but rather are provided so as to express the general opinion of the PAG.

### General Comments

The July 2000 Draft SWAMP includes a framework for conducting ambient water quality monitoring which is based on a probabilistic approach that has frequently been used in designing ocean monitoring programs. This approach has been utilized by U.S. EPA for inland watershed monitoring as part as the EMAP program and has resulted in difficult, at best, data interpretations. A monitoring program based on a rotating basin approach utilizing fixed station networks will yield valuable data that can be easily integrated with existing monitoring activities. This type of monitoring program will also yield data that should be of use in other water quality programs. Adopting a fixed station network approach will also ensure that trends in water quality can be tracked.

In watersheds, the proposed SWAMP should identify what considerations should be given to spatial and temporal variations within the stream/river/lake targeted for monitoring. Also, water quality can be greatly affected by both flood and drought conditions. It is also important that the monitoring program being designed take into consideration the locations of historical sampling sites where background/ambient water quality data were collected to determine original (1975) background/ambient water quality conditions. Integrating historical sampling sites into a modern monitoring program will help to answer antidegradation questions and will avoid misinterpretations of data due to spatial variations within a stream/river reach.

The State Board should emphasize that the Regional Boards use the most appropriate monitoring approach for their specific application. Examples of different types of monitoring approaches and their optimal use would be helpful. For instance, the State Board could provide individual detailed monitoring frameworks for the following applications: ephemeral rivers, perennial rivers, lakes, estuary and ocean monitoring programs. A strong effort should be made to encourage Regional Boards to integrate ambient monitoring plans with current monitoring activities. The recently adopted State Implementation Plan mandates the collection of ambient data. As a result ambient monitoring requirements are being placed into permits and soon there will be a tremendous amount of ambient data generated throughout the State. The Draft SWAMP should require Regional Boards to coordinate ambient monitoring efforts with the NPDES permit monitoring programs in order to maximize the benefit of multiple sampling activities within watersheds.

Physical monitoring concepts should be incorporated into the proposed SWAMP. Identification of gaining reaches (where groundwater discharges to surface water) and losing reaches (where surface water percolates into groundwater) can play an important role when evaluating surface water quality data. For example, if concentrations of a

conservative constituent increase downstream where there is no contribution from tributaries, the concentration increase could be the result of evaporation of surface water or from discharge of a different quality groundwater, both of which can be reflective of natural conditions.

The goals and objectives for the SWAMP should be expanded to include monitoring strategies for identifying watershed characteristics, such as stream morphology, land use, ephemeral or perennial stream conditions, location of dry reaches, identification of losing and gaining reaches, and identification of point and non-point discharge locations. Using a watershed-based monitoring approach will provide a comprehensive approach to data collection that incorporates water quality as well as watershed characteristics. This approach will ensure that the condition of water resources can be evaluated along with laying a foundation to assist in establishing cause-and-effect relationships.

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The SWAMP should produce data that can be used to support other water quality programs that reflect the intent of the Clean Water Act to provide for the "restoration and maintenance of the chemical, physical and biological integrity of the Nation's waters." This can be accomplished by adopting an integrated approach to gather monitoring data from California's surface waters, including macroinvertebrate and/or other biological indicators focusing on multi-metric analysis for both species diversity, EPT taxa, abundance and tolerance values. This is an important component of SWAMP that currently does not exist as a statewide program. Chemical monitoring alone does not provide the necessary comprehensive information to characterize the ecological condition of our waterways. Without biological data, there is no basis for documenting loss or fluctuations in species diversity and abundance. Reference conditions need to be developed along with reference collections for waterways in the state. California lags behind other states in establishing Bio-Criteria as a component of its water quality management strategy. The SWAMP program should make a commitment to providing for the establishment of statewide response indicators such as bio-criteria.

Physical monitoring to assess changes in channel and streambed conditions, stream flow, aggradation and degradation (eroding) conditions, and other relevant physical parameters. Restoration monitoring should also be a component of this. This is especially important for habitat related beneficial uses.

As part of the Regional monitoring program design and development, the State Board should require that the Regional Boards include the following: a written explanation as to why a specific monitoring approach is being employed; how the monitoring program integrates with past and current monitoring efforts; what water quality parameters and indicators will be monitored; how will spatial and temporal variations in water quality be addressed; and identification of the refined monitoring goals for particular watersheds. In addition, each Regional Board should dedicate a single staff person to coordinate and review their monitoring plans to ensure consistency with the proposed SWAMP and subsequent updates to the SWAMP.

## Adaptive Management

The monitoring program should be capable of providing information to support appropriate action to solve problems and protect unimpaired waters (“adaptive management”). Without sufficient site-specific monitoring data, adaptive management will remain unattainable.

An effective monitoring program should focus efforts towards assessing water quality and guiding management actions in the most effective and equitable way. For instance, it is less effective to list an entire river and impose control implementation on 2,000 square miles, than to identify subwatersheds that may be the source of 90% of the problem and spend the time and money on focused effort. In watersheds, a fixed monitoring site network which characterizes impacts (both positive and negative) on receiving waters as an aggregation of the individual contributing geographic areas can provide numerous benefits such as:

- Early warning capabilities to support initiation of voluntary, non-regulatory pollution prevention efforts in specific areas. It will probably always be far less expensive to prevent problems or catch them early than to wait until they become severe.
- Cumulative effectiveness and comparison monitoring for sub-watershed areas. For example, rural watersheds where Ranch Plans are being implemented could be compared to similar subwatersheds where they are not being implemented in order to demonstrate effectiveness without intrusive requirements on individual land owners.
- Screening level identification of areas that may need additional site deployments to narrow down the geographic extent of existing or emergent problems.
- A proven, effective, scientific approach to measure watershed scale changes over time.
- Information suitable to support modeling techniques required in many TMDL development situations.

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## Antidegradation

The draft SWAMP is weak in addressing the need for data for purposes of antidegradation reviews for cleaner waters of the state. The federal antidegradation policy at 40 CFR 131.12 and the State Board policy (Resolution 68-16) require antidegradation reviews whenever water quality may be lowered. These apply to both point and nonpoint pollution. U.S. EPA guidance on the antidegradation policy specifically states that, for those waters that exceed the quality needed to support one or more beneficial uses, an antidegradation analysis must be done that is based on both protection of beneficial uses and on changes in baseline, individual water quality parameters for the waters at issue. "Protection of beneficial uses" alone may not require the type of detailed, parameter-by-parameter monitoring called for in antidegradation reviews of cleaner waters. Thus, the draft SWAMP's limited attention to clean waters needs to be expanded.

Comment [VC1]: Page: 14  
Omit Figure 1

State Board legal guidance on this topic adds that this detailed antidegradation analysis must be done not only for waters that have been formally identified as top-quality or ecologically significant, but also for waters that “may” fit this description. To date, resources have been focused largely more on impaired waters, leaving a significant knowledge gap for cleaner waters (*i.e.*, those described by 40 CFR 131.12(a)(2) and (3)). Thus, there is virtually no knowledge base (baseline conditions) to do a proper analysis to see if the quality of these waters will be lowered. This gap needs to be addressed in the monitoring plan. Monitoring for the purpose of supporting antidegradation policies would likely involve all monitoring types (*e.g.* water and sediment chemistry, tissue chemistry, toxicity). The proposed random site selection process will not produce information capable of addressing these issues.

With respect to nonpoint pollution in particular, state and federal antidegradation policies also state that, if water quality will be lowered, “all cost-effective and reasonable” BMPs for nonpoint source control (40 CFR 131.12(a)(2)) must be put into place. Very little monitoring has been performed specifically on nonpoint sources to date. Combined with the lack of monitoring in cleaner waters, there is very little information for the state to use to comply with antidegradation policies that require them to identify which BMP’s are needed and are appropriate to offset potential increases in pollution into cleaner waters. The SWAMP should address this nonpoint pollution gap as well.

#### Beneficial Use Focus

The SWAMP goals indicate that the program is focused on achieving beneficial uses. However, the SWAMP should not be driven only by beneficial uses, but by watershed characterization and assessment needs. In general, the language related to beneficial uses under management objectives is unclear and should be revised. The program must take into account biologic, geomorphologic, and hydrologic conditions. The properly functioning condition of the watersheds requires strategically placed monitoring sites capable of revealing the interactions between various hydrologic subareas.

The Draft SWAMP focused on developing site-specific information on sites that are known or suspected to have water quality problems. The study design should have a science-based foundation and should not be driven or designed based on the need to answer the question of whether or not an individual beneficial use is being achieved. Instead, the focus should be on accurately characterizing ambient water quality conditions for all waters in the State and the uses should be considered when identifying the parameters to be monitored. For example, if a specific water body does not carry drinking water supply or commercial/sport fishing beneficial use designations, the list of chemical constituents to be monitored may be different than those selected for a water body that carries the uses. The list of beneficial uses identified in the draft SWAMP for evaluating specific problems was incomplete. State use designations such as industrial process water and agriculture were omitted.



The answers to whether or not beneficial uses are being protected should not be answered as part of the ambient monitoring program but as part of a separate assessment program. The development of a separate assessment program should include a framework for data interpretation and comparison to water quality objectives. The inclusion of assessment standards within an ambient monitoring program will bias the efforts of the program towards site-specific problem areas. Therefore, it is recommended that no distinction be made in the proposed SWAMP between “problem” and “non-problem” water bodies. Because runoff is the major source of pollution for many California waters, the monitoring program must provide information necessary to quantify the level of pollution and assist in the determination of the effectiveness of BMPs.

### TMDL Support

The draft SWAMP fails to specifically address the need to collect ambient monitoring data to support TMDL development. While the level of sampling required to develop rigorous TMDL assessment tools varies and will undoubtedly require additional resources, it is possible to tailor an ambient monitoring program to maximize its ability to support initial TMDL development. It is important, however, that this process not slow down the TMDL development. In some cases, the monitoring portion of [the AB982](#) process will be useful in TMDL development as source identification data becomes available. As TMDLs require consideration of both point and nonpoint sources, [nonpoint source](#), [\(including urban runoff\)](#) monitoring should be an element of the SWAMP.

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### Water Quality Indicators

Chemical monitoring of water quality does not always provide a comprehensive view of the ecological condition of the surface water. The use of response indicator data can be extremely valuable, yet are probably the most underutilized in current monitoring programs. The State Board should encourage the Regional Boards to develop monitoring programs that are designed to include response indicator monitoring. Guidance should be included in the proposed SWAMP on how to determine baseline or reference biological conditions of a water body. For instance, it would not be appropriate to perform baseline or reference condition benthic monitoring after a major rain event where the bottom of a stream bed has been subjected to scouring. The design of the monitoring program must attempt to collect response indicator data that can be linked to cause and effect.

### Assurance of Comprehensiveness

Important elements of a comprehensive approach include:

- *Establishment of a continuing program for monitoring conventional water quality parameters.* Monitoring of nutrients, dissolved oxygen, turbidity and similar parameters currently has no predictable financial support. Long-term funding should be specifically designated for use by Regional Boards to conduct this type of monitoring.

- *Establishment of a statewide Aquatic bio-assessment Program* with the California Department of Fish and Game Aquatic Bio-assessment Laboratory. Regions should each be allocated a certain number of sites per year just as they currently are with the Mussel Watch and Toxic Substances programs.
- *Establishment of a continuing sediment chemistry monitoring program.* Many substances which impact water quality are most easily detected in sediment. Sampling water itself often provides only a snapshot of a brief period of time. Sediment chemistry can reveal what has taken place at a monitoring site over longer periods of time.
- *Expansion of the State Mussel Watch Program* to provide more sites per year. Bivalves have proven to be a viable indicator of water quality problems, both from the standpoint of identifying bioaccumulative substances and of being representative of one level of the food chain.
- *Expansion of the State Toxic Substances Monitoring Program* to provide more sites per year and more species. Different species bioaccumulate different substances at different rates. A species list which contains information regarding the bioaccumulation rates should become a part of this program's documentation.
- *Expansion of the State Toxicity Testing Program.* Regions should each be allocated a certain number of sites per year just as they currently are with the Mussel Watch and Toxic Substances programs.
- *Establishment of a site and contaminant targeting strategy* based on the Department of Pesticide Regulation Pesticide Use Reporting system and on discharge information provided in NPDES permits, waste discharge requirements, and stormwater runoff programs.
- *Establishment of an integrated site selection system* for each of the programs mentioned above. Sites intended to provide statewide information would be visited every 1 to 5 years. Additional sites would be used for adaptive monitoring to provide Regional Boards with the ability to conduct more focused monitoring in specific areas.
- *Establishment of a statewide data management and analysis system.* Establishment of a user-friendly, multi-agency, GIS-capable internet-accessible database is critical. This database should include all existing and future compliance monitoring data. Compliance monitoring data provide the largest body of fixed station monitoring data in the state. A comprehensive monitoring program should not exclude collection and analysis of this wealth of information. Pooling these data should provide a web of monitoring points covering the state at a far lower cost than actually collecting samples at those locations. Also, the State should provide disclosure when industry collects data, and the database could provide a potential vehicle.

The GEOWBS system should be expanded to include an interface with monitoring data. A statewide electronic storage and access system should be established for all monitoring data, including compliance monitoring. This can be integrated with the State Water Information Management system (SWIM), Geographical Environmental Information Management System (GEIMS), and with the U.S. EPA STORET water quality database. Simple data entry and exploratory data analysis software should be created and distributed for use with the database. This software should be made available to Regional Boards, Cities, Counties, Dischargers, Volunteer Programs, and the public at large.

This database could integrate the programs referenced above and data from numerous other sources, including but not limited to:

- NPDES and WDR monitoring data
- Department of Pesticide Regulation Surface Water Quality database
- Department of Pesticide Regulation Pesticide Use Reporting database
- California Department of Health Services Drinking water sources database
- California Department of Health Services Shellfish database
- California Department of Water Resources database
- Flow and chemical data from USGS and other sources (*see, e.g.,* [water.usgs.gov/nawqa/data](http://water.usgs.gov/nawqa/data))
- EPA nutrient database
- Pathogen indicator data from AB 411 and other shoreline monitoring
- Volunteer monitoring program data
- Monitoring data collected as a part of CWA section 205(j), 319(h), 320, Proposition 13, and other programs
- TMDL monitoring data (both source identification and performance evaluation data)
- California Department of Transportation Water Quality Objectives database

The SWAMP identifies data management, data evaluation and reporting as high priorities. Based on the 1998 303(d) listing process it is apparent that in many cases conventional monitoring data, which are routinely reported to the Regional Boards, were not used for assessment purposes because the data themselves were not considered to be readily available (in other words, easily available in a database or spreadsheet format). This situation resulted in incomplete data evaluations and possibly incorrectly identified water bodies. Establishment of a statewide data management system is critical for conducting accurate water quality assessments. It is essential that the State Board have oversight on the data management system and that the system be user-friendly. All data do not necessarily need to be contained in the same database; however, links to all available data should be included at one web site location that is maintained by the State Board. Priority should be given to completing the SWIM system so that compliance data can be easily utilized for assessment purposes. This system has been in the development phase for years and has stalled on numerous occasions due to funding and other priorities. For years, dischargers have been monitoring and reporting valuable data that in most cases have never even been evaluated by Regional Board staff. To maximize the

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usefulness of monitoring data, the State Board should develop and support a GIS-based system, similar to what is currently in use on the USGS web site.

The PAG has unanimously agreed that the state should develop more formal guidance for listing and de-listing of waters under section 303(d) of the Clean Water Act. This guidance should provide the basis for final assessments of data collected by SWAMP. The US EPA has also identified the assessment process in California as an area that needs improvement, including additional staff and resources.

Data evaluation activities should be limited to measuring the success or completeness of the monitoring program. The data should be reviewed to see if the monitoring goals have been achieved. For instance, the data should accurately reflect current ambient water quality conditions and locations within the watershed. Data assessments should be made using guidance established in separate programs (*e.g.*, 305(b), 303(d), TMDLs, etc...). This separate guidance should provide flexibility in using and analyzing a broad variety of data, using a hierarchy of approaches based on the type and quality of data available. This approach would be consistent with U.S. EPA's approach to 305(b) water quality assessments as described in U.S. EPA's Guidelines for the Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates (EPA-841-B-97-002A, September 1997).

Data analysis must consider evaluation of source controls, educational programs, BMPs, and other management and planning programs. These data are necessary to determine if source controls are effective. The data therefore needs to be analyzed within a reasonable timeframe and with regards to trends. A strong effort must be made to make information relating to source control assessments (*e.g.*, BMP effectiveness) available to each of the Regional Boards and the public.

Analysis of monitoring data to make listing and delisting decisions requires a significantly more complex analysis than what is needed to determine if ambient monitoring goals are being achieved. Therefore, data assessment techniques and methodologies should be addressed in a separate document.

#### Quality Assurance/Quality Control

As stated in the draft SWAMP, in order to be of the most use to the State Board and the Regional Board programs, it is essential that data of the highest quality be developed. In order to achieve this goal, the State Board should require that the Regional Board dedicate at least one staff member that will be responsible for administering the monitoring program and QA/QC program requirements. Since this portion of the program is subject to change on a more frequent basis due to the development of new and revised sampling and monitoring techniques, it is imperative that Regional Boards stay apprised of recent developments. Developments in other State Board QA/QC programs should be evaluated and incorporated into the draft SWAMP as necessary. Having a dedicated staff person will also facilitate supporting local volunteer monitoring efforts.

The State Board should publish information documents to disseminate to interested citizen or environmental monitoring groups.

The October draft SWAMP appeared to address some of these comments through the suggested addition of a full-time QA/QC staffer in Sacramento. However, we do not believe it dealt with the recommendation for at least a half-time QA/QC staffer in each Region. The PAG supports addition of these much-needed personnel, who are critical to ensuring that the state collects and uses quality data on a long-term basis.

### Stakeholder and Citizen Involvement

The public should be encouraged to play a continuing role in monitoring. Volunteer monitoring data that pass QA/QC thresholds should be incorporated by the Regional Boards as part of SWAMP. Clear quality control information should be available to facilitate volunteer monitoring. The State should consider using schools for certain monitoring activities to cut costs and provide education around water quality issues.

The draft SWAMP is silent on including stakeholders in the process to help identify and select indicators to be monitored. Regional Boards should provide opportunities as appropriate for stakeholders to participate in the selection of indicators that will be used to characterize the level of use attainment and to measure progress. The approach presented in the July 2000 draft SWAMP would hobble the State's watershed management initiative by unilaterally imposing a set of criteria and methodology for interpreting those criteria without concern for localized conditions.

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Concerned stakeholders should have the opportunity to be involved as appropriate in the Regional Board's effort to develop monitoring programs. In many cases stakeholders are in possession of valuable information, due to their familiarity with the watershed, that could have a bearing on the design of a monitoring program. Also, many stakeholders, especially dischargers and environmental organizations, have vast experience in implementing and maintaining monitoring programs. Shared experiences and observations on various portions of the watershed may prove to be valuable when designing local comprehensive watershed monitoring programs.

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### Funding

The approach formerly taken by the State Board in developing a comprehensive surface water monitoring program was to identify the budget available and design a monitoring program accordingly. The design of the SWAMP should be based on meeting the AB 982 objective of developing a comprehensive ambient monitoring program and not be driven by budgetary preconceptions. If funding is used to drive the design of the program, it will compromise the integrity of the monitoring program as a whole and will fall short of achieving the intent of the AB 982 process, as described above. It appears, based on the latest draft SWAMP shared with the PAG Monitoring Subcommittee on October 4<sup>th</sup>, that this issue has been addressed somewhat through the

design of a program that is more based on need than available funding. It is unclear from that draft, however, whether the regional funding would be tied to fixed percentages of monitoring activities, or whether the funding estimates are reasonably reflective of the projected effort. The PAG recommends that the Regional Boards be allowed to design their own programs, within a coordinated effort with the other Regions and the State Board, rather than be tied to fixed percentages.

Funding will likely drive the implementation of the monitoring program within individual Regions. However, the individual Regional Boards will have the most familiarity with existing local monitoring programs, such as those implemented through the NPDES permitting process or are part of watershed studies and, therefore, should be encouraged to integrate the SWAMP efforts into their existing programs to maximize the effectiveness of monitoring expenditures. Individual Regions should also be directed to reconsider or redesign some of their monitoring strategies for existing monitoring programs and identify existing information gaps. In some cases, the Regional Boards may want to reduce sampling frequency at some receiving water monitoring stations prescribed in NPDES permits monitoring programs and request that the discharger use those same monitoring assets to sample (or increase sampling frequency) at another location in the watershed. The Regional Boards should be able to evaluate their information priorities and design a monitoring program that will meet their needs. Development of a monitoring framework that is based on budget constraints will unnecessarily restrict the Regional Boards' ability to design and implement the comprehensive surface water ambient monitoring program. If and when funding becomes an issue, the Regional Boards should implement the monitoring program in phased approach based on priorities within their Region.

### Conclusion

The ultimate goal of the SWAMP is to establish a framework for a monitoring program that will yield useful water quality data that reflects ambient and current conditions of all state surface waters. To this end, the Public Advisory Group process should be used as a tool to help determine the resources that are needed to assess water quality comprehensively in order to achieve and maintain water quality that meets beneficial uses, and is otherwise fully protective of human health and marine ecosystems. This can be accomplished through, among other steps, an aggressive monitoring program, the design of which should not be driven by budget but by need.

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